2023 SPRING UNDERGRADUATE RESEARCH FORUM

30th ANNUAL

CELEBRATION OF ACHIEVEMENTS IN UNDERGRADUATE RESEARCH

ELON UNIVERSITY

Welcome to Spring Undergraduate Research Forum 2023!

The Spring Undergraduate Research Forum (SURF) is a time each year when we suspend our other campus activities to celebrate the academically centered creative endeavors and research efforts of Elon's students. SURF brings to light our students' wonderful academic and creative pursuits. We invite you to join and support the student presenters and performers as they share the joy of exploration and discovery that are the hallmarks of an intellectual community. Each SURF abstract was reviewed by two Elon faculty members with disciplinary expertise.

SURF 2023 has a total of 270 presentations, including 152 poster presentations and 118 oral presentations in 27 sessions. Some highlights for this year include:

- Seventy presentations are self-identified as projects related to diversity, equity, and inclusion (DEI). The titles of these presentations are marked with an asterisk (*).
- This year's SURF features a student-to-student panel on "Engaging with Undergraduate Research" organized by Undergraduate Research Student Association (URSA).
- There is an interdisciplinary symposium named "From the Field: Ethnography for Human Understanding".
- Four groups of students from Walter M. Williams High School also join us to present their posters mentored by Elon faculty.

Special Thanks

Planning a large event like SURF requires a team. We would like to thank the many people who helped make this event possible:

- Faculty mentors are an integral part of this process. Thank you to the wonderful mentors who supported students in their scholarship and creative endeavors.
- Thank you to the reviewers who provided constructive feedback on student abstracts.
- We would also like to extend the appreciation in advance to all the moderators who will ensure that the oral presentation sessions are run smoothly and on time, as well as to all the faculty members who will help assess the poster presentations.
- We would like to thank Dr. Julia Bleakney from the Writing Center for her workshops that helped students prepare for SURF.
- Many people from the Office of Event and Space Management and Office of Facilities Management, particularly Robert Johnson, Alexa Lowey, Sean Walker, and Wendy Fogleman, who provided all kinds of fantastic support to help with the setup of this event.
- Our program assistant, Emily Moser, and the Powell 108 student workers, Henry Searle, Christina Stafford, and Virginia Morrison have made significant contributions to the preparation for SURF Day.
- Our sincere gratitude also goes to the talented design team from the Office of University Communications and Eric Townsend, Assistant Vice President for Academic Communications, for designing the exceptional cover page for this program booklet.

Campus Map

To find the presentation locations, please click this link to access campus map.

Student-to-Student Panel on "Engaging with Undergraduate Research"

This URSA sponsored panel (10:00am, Moseley 215) provides an opportunity for students to ask questions about undergraduate research and engage in conversation with peers who are active members of the research community at Elon. Topics to be discussed include: how to find a mentor, how to identify a research question, benefits of engaging in undergraduate research, and potential challenges. All are welcome!

Undergraduate Research at Elon University

At Elon, Undergraduate Research & Creative Endeavors include activities undertaken by undergraduate students with significant faculty mentoring that:

- Lead to new scholarly insights and/or the creation of new works;
- Add to the discipline; and
- Involve critical analysis of the process and/or outcome of the activities.

Quality undergraduate research and creative activity result in a product that has potential for peer-reviewed dissemination in the form of presentations, publications, exhibitions, or performances. At Elon, undergraduate research takes place in the classroom in course-embedded research classes and outside of the classroom in faculty-mentored one-on-one or in small lab models.

2022-2023 Undergraduate Research Program Advisory Committee

Dr. Katie Baker
Dr. Jessica Carew
Dr. Barbara Gaither
Prof. Joel Hollingsworth
Dr. Tonmoy Islam
Dr. Cora Palfy
Dr. Samuele Pardini
Dr. Chris Richardson
Dr. Paula Rosinski
Dr. Hwayeon Ryu
Dr. Sabrina Thurman
Dr. Rissa Trachman
Dr. David Vandermast
Prof. Bill Webb
Dr. Eric Hall (Director)
Dr. Jen Hamel (Associate Director)
Dr. Qian Xu (Associate Director)

Undergraduate Research Student Association (URSA)

The Undergraduate Research Student Association (URSA) is an on-campus, student-run organization that aids all students interested in research, regardless of discipline. In their monthly meetings, they highlight special guests to discuss how to get involved in research, National/International Fellowships, research scholarships and grants, and more. In their SURF Day session, they will discuss undergraduate research at Elon through a Q&A style panel. URSA always welcomes new members. Please join URSA on PhoenixCONNECT or contact Sophie Miller (smiller63@elon.edu).

URSA
UNDERGRADUATE RESEARCH STUDENT ASSOCIATION

PROGRAM LISTING BY SESSION AND TIME

(Click the page number for presentation information. All listed times are Eastern.)

ABSTRACTS BY DEPARTMENT/PROGRAM

(Click the page number for abstracts.)

Poster Sessions I (8:30am – 9:40am): **Alumni Gym**

#	Presentation Information
1	**Keriann Croy, Saffie Hollingsworth, Madison Horner, Molly Hunt, & Olivia Pozytko** (Williams High School) Prof. Larry Cantwell Analyzing the Effects of the COVID-19 Pandemic in Adults' Anxiety Levels with Children and Without Children
2	**Abigail Choi, Eman Dweik, Samantha Fish, & Rana Ligue** (Williams High School) Prof. Larry Cantwell Investigating Food Security in Local High Schools and Universities
3	**Thomas Fasan, Grace Gabrielli, Gracie Hartle, Britton Isley, Ella Porfilio, & Lauren Turner** (Williams High School) Dr. Ryne VanKrevelen Analysis of Factors That Affect a Billboard Hot 100 Song's Popularity
4	**Bobbi Foster, Santiago Herrera, Franklin Nguyen, & Kenna Talhelm** (Williams High School) Dr. Ryne VanKrevelen How Fan Attendance Affects Home Team Win Percentage
5	**Mia C. D'Agostino** Dr. Jessie Moore Social Media 101: A Guide to Best Social Media Practices
6	**Ashleigh N. Azan** Dr. Sirena Hargrove-Leak & Dr. Paula DiBiasio Bike Pedal Adapter for Children with Motor Impairments: 3D Printable and Accessible*
7	**Hannah I. Pleasants** Dr. Cynthia Fair Social Determinants of Health for Type II Diabetes in Texas Hispanic/Latino Community
8	**Paige Goldberg, Alejandro Mejia, & Brandon Fowlin** Dr. Amy Overman Efficacy of Security Updates: A Study of User Behaviors, Cognitive Burdens, and Behavioral Nudging in Young and Older Adults*
9	**Laura A. McGuire** Prof. David J. McGraw & Dr. Wen Guo Exploring Paid and Unpaid Theater Internships: Surveying Interns on Their Experiences in Theater
10	**Jordan E. Chizmadia** Dr. Caroline Ketcham Disability Identity and the Disabled Student Experience in Neurodiverse and Disabled College Students*
11	**Kathleen Carmody** Dr. Stephen Byrd Restraint and Seclusion in Special Education
12	**Emily Padron** Dr. Carol Smith How Outdoor Experiences and Education Contribute to Early Childhood Development
13	**Hailey Kennedy** Dr. Aaron Sparks The Biden Campaign and the Youth Vote: Evidence that Social Media and Progressive Climate Policy Attracted Younger Voters

14	**Alexa D. Roveri**	Dr. Benjamin Evans
	Magnetic Hyperthermia Therapy Using Microparticle-Silicone Composites for Implantable Medical Devices	
15	**Ryan D. Gibbons**	Dr. Kelsey S. Bitting
	How Much Carbon Do the Elon Forest Soils Hold?	
16	**Lauren F. Oppenheim**	Dr. Anne-Marie Iselin
	Parental Physical Discipline Effects on Somatic Symptoms Associated with Anxiety and Depression in Adolescents Across Three Countries*	
17	**Mary Cummings**	Dr. Steven Bednar
	The Effect of Economic Downturns on Alcoholism	
18	**Margaret Bickerstaffe**	Dr. Elizabeth von Briesen
	An Agent-Based Modeling Approach to Food Deserts	
19	**Bennett Lynch**	Dr. Alex Traugutt
	Exploring Efficiency and Profitability in the College Football Win Totals Market: A Heuristic-Based Analysis	
20	**Emma M. Hallock**	Dr. Heather Barker
	Preparedness and Self-Efficacy of Elon Pre-Service Teachers to Teach Statistics	
21	**Mary Hermes, Lauren Hill, Griffin Pace, & Thomas Wilson**	Dr. Hwayeon Ryu
	Mathematical Modeling of Immune Response to SARS-CoV-2	
22	**Nicole Cason & Sara Arora**	Dr. Aaron Sparks
	Meta-Analysis of Usage of the NEP, CNS, and EID to Predict Pro-Environmental Behaviors	
23	**Jackson T. Abele, Maggie E. Cox, Mallory R. Poff, & Carleigh M. Wood**	Dr. Will Pluer
	Mississippi Delta Weir Design Challenge	
24	**Victoria G. Getter**	Dr. Anne-Marie Iselin
	Correlates and Predictors of Recidivism Among Adult Incarcerated Offenders	
25	**Emma G. McNamara & Christina R. Berry**	Dr. Jennifer Hamel
	Abundance and Distribution of Foliage Gleaning Bat Prey in a Neotropical Forest	
26	**Brad R. Weiss**	Dr. Alexis Franzese
	Assessing a Theoretical Model about Motivations for Change within College Student Memoirs	
27	**Ashley M. Pehan**	Dr. Matthew Wittstein
	Stressor or Supporter? Students' Perceptions of Their Learning Experiences and Disordered Eating Behaviors	
28	**Charlotte I. Stoddard**	Dr. Lisa Buchanan
	What Factors Affect Teachers' Decision Making with Diverse Literature in the Classroom?*	
29	**Michelle L. Marder**	Dr. Eryn Bernardy
	Investigating Interactions Between Bacteria Infecting Patients With Cystic Fibrosis	

30	**Mackenzie E. Deming** Dr. Kevin Agnew The Association Between Technical and Power Skills and Early Career Progression of Love School of Business Alumni
31	**Avery L. Johns & Ayesh Awad** Dr. Sirena Hargrove-Leak Developing a Footstool and Back Support for a Girl Who Has Cerebral Palsy*
32	**Simone Llanos-Taminez** Dr. Cynthia Fair Making Sense of Medical Gaslighting: A Qualitative Study of the Experiences of BIPOC Women with Health Care Professionals in the United States*
33	**Catherine M. Capodanno** Dr. Karen Yokley Computational Sensitivity Analysis of a Mathematical Model of Chemotherapy
34	**Josie M. Brothers** Dr. Lisa Buchanan Examining the Civil Rights Movement in Children's Literature*
35	**Maria Ahm** Dr. Christopher Leupold Exploring Antecedents of Team OCB in Collegiate Sports
36	**Mark Dobson** Dr. Caroline Ketcham Examining the Relationship between Concussions and Mental Health in Neurodiverse Athletes
37	**Elissa M. Rizzo** Dr. Damion Blake Evaluating Colombia's Justice and Peace Law Using a Restorative Justice Framework
38	**James W. Allen** Dr. Richard Blackmon Lithium-Ion Battery Array Temperature Regulation
39	**Jessica M. Baker** Prof. Brian Walsh Dancing Queen and the Idolization of a Teen: How Fifty Years of Lyrics, Media, and Culture Have Influenced the Way Society Views Young Women*
40	**Adam S. Ohana** Dr. Antonio Izzo Molecular Analysis of Soil Fungal Communities in a Truffle Orchard Chronosequence
41	**Virginia Grace Beall** Dr. Lynn Huber Queer Depictions of Jesus on TikTok*
42	**Ellery M. Ewell** Dr. Caroline Ketcham Mentoring Relationships in Black-Identifying Students*
43	**Julia N. DuVal** Dr. Ketevan Kupatadze An Evaluation of Student Health as a Result of Academic Environment at École Diagonale in Paris, France
44	**Sammy C. Tucker, Matthew J. McCourt, Lamar A. Williams, & Nicholas A. Muller** Dr. Jonathan Su Factors that Contribute to Picking Cart Fishtailing Forces and Recommended Solutions
45	**Brett M. Bailey** Dr. Daniel M. Haygood The Next Gen Sponsors of NASCAR: How Brands Use IMC on Twitter While Sponsoring a Full Car Wrap of a NASCAR Cup Series Car

46	**Abbey L. Rose**	Dr. CJ Fleming
	Longitudinal Impact of COVID-19 Related Factors on Depression and Anxiety	
47	**Logan W. LaMont**	Dr. Pratheep Kumar Paranthaman
	Evaluating Player Experience Factors in Monomodal and Multimodal Interactions in Mixed Reality Games	
48	**Olivia A. Nevin**	Dr. Daniel M. Haygood
	Social Setback: A Study of Social Media's Role in College Students' Well-Being During COVID-19	
49	**Benjamin Trainum, Ryan Cappel, William Collins, & Gabe Nicholas**	Dr. Jonathan Su
	Designing an Efficient, Single-Gear Powertrain for the Elon FSAE EV Race Vehicle	
50	**Douglas Ulrich & Zillion Moe**	Dr. Khirey Walker
	A Modern Evolutionary Impact of NIL: Player, Performance, & Profit	
51	**Lila R. Cobey**	Dr. Antonio Izzo
	Absolute and Relative Abundance of Tuber borchii at Burwell Farms	
52	**Grace F. Gallery**	Dr. Lisa Buchanan
	Examining Race, Ethnicity, and Female Representation in Children's Piciture Books at the Four Local Alamance County Libraries*	
53	**Sidney R. Lowe**	Dr. Bethany Brinkman
	Hydrology of Pervious Surfaces and Runoff Analysis at Elon University	
54	**Jake A. Twer**	Dr. Daniel M. Haygood
	Street Drugs Merging: An Exploratory Content Analysis on the Framing of Ketamine Treatment for Depression and Traditional Antidepressants Within Major U.S. News Outlets	
55	**Hannah Giessler**	Dr. Ilyssa Salomon
	Exposure to Weight Loss Content on TikTok and Disordered Eating in Young Adults	
56	**Catherine E. Oliver**	Dr. Stephanie Baker
	The Impact of Film on Understanding the Black Maternal Health Crisis*	
57	**Arieh N. Fischthal**	Dr. David Vandermast
	Comparison of Tropical and Temperate Forest Composition and Structure Using a Higher-Taxon Rank	
58	**Emily K. Murrill & Alejandra Gonzalez**	Dr. Travis Maynard
	What You'll Do With That Degree: A Study of the Writing Lives of PWR Alumni	
59	**Abigail H. Thomson**	Dr. Caroline Ketcham, Dr. Takudzwa Madzima, & Dr. Eric Hall
	The Relationship Between Sex Hormones, Cognitive Function, and Mental Well-Being Across the Menstrual Cycle	
60	**Ally Laird**	Dr. Heather Lindenman
	Writing Confidence and Self-Perception	
61	**Samantha J. DiRenzo**	Dr. Chris Richardson
	Multiwavelength Diagnostics for Active Intermediate Mass Black Holes in Dwarf Galaxies	

62	**Megan N. Sulinski** Prof. Allison Bryan Special Education Representation in Children's Books*
63	**Jay E. Bennett** Dr. Ilyssa Salomon Exploring Experiences of Sexual Harassment on Social Media among Emerging Adults*
64	**Ashlye Dullye** Dr. David Vandermast Structure and Community Composition of Relictual Populations of Chestnut Oak (Quercus montana) in the Eastern Piedmont of North Carolina
65	**Sage Albert** Dr. Cora Palfy Understanding Musical Expression: A Rehearsal Technique
66	**Kyra K. Johnson** Dr. Jonathan Su Effects of Surfactants on the In-Vitro Testing of Drug Implants
67	**Josephine C. McWhorter** Dr. Eric Hall Mental Health and Physical Activity Amongst the Military Populations: A Survey Study*
68	**Gabriella Garcia** Dr. Smaraki Mohanty Marketing Backlash: Ad Perception and Consumer Behavior on Utilitarian and Hedonic Banner Ads
69	**Kinga Srednicka** Dr. David Vandermast Comparison of Diversity Values on Two Coral Reefs in Guna Yala Comarca, Panama
70	**Meghan D. Brooks** Prof. Allison Bryan Teacher Self-Censorship of LGBTQ+ Literature in Elementary School Classrooms*
71	**Vivian C. Krause** Dr. Jonathan Su Factoring Out Racial Bias: Developing a Dual-Sensor System for Pulse Oximetry*
72	**Kiara M. Hunter** Dr. Stephanie Baker Centering the Margins: Applying Public Health Critical Race Praxis in Exploring Black Adolescent and Young Adult Fatherhood*
73	**Chad Urquhart** Dr. Eric Hall Tick Tock – No Time For TikTok: An Examination of Procrastination and Mental Health In Undergraduate Students
74	**Amanda J. Bossert** Dr. Katrina Jongman-Sereno Intellectual Humility, Misinformation Beliefs, and Vaccine Attitudes and Status
75	**Zoie M. Browder** Dr. Megan Isaac Young Women's Violence as Protection in Young Adult Literature
76	**Avery Johns, Brooke Gehrke, & Apple Ngamwong** Dr. Jonathan Su Developing a Lightweight Recovery Boot with Heating and Cooling Treatment
77	**Josie V. De La Oliva** Dr. Jeff Carpenter Secondary Mathematics Teachers' Use and Adaptation of TeachersPayTeachers.com Education Resources

Note: The presentations with an asterisk (*) in the titles are self-identified as projects related to the topics of diversity, equity, and inclusion (DEI).

Poster Session II (4:20pm – 5:30pm): **Alumni Gym**

#	Presentation Information
1	**Abigail Saracino** Dr. Mark Enfield Examining K-12 Preservice Teacher Perceptions of Scientific Argumentation in the Elementary, Middle, and High School Science Classroom
2	**Ayesh Awad** Dr. Jonathan Su Analysis of Mechanical Performance of Polylactic-co-glycolic acid (PLGA) Polymer Biodegradable Stents Under Accelerated Conditions
3	**Morgan E. Rende & Alex K. Campbell** Dr. Yanica Faustin & Dr. Kristin Z. Black Reproductive Justice, Photovoice, and the Scholarship of Teaching and Learning
4	**Ryan Mancoll** Dr. Aaron Piepmeier Moderate Intensity Exercise and Cognition in Young Adult Cancer Survivors
5	**Danielle Nicole Dyer** Dr. Caroline Ketcham & Dr. Eric Hall Role of Self-advocacy in Black College Athletes' Development of Mentor Constellations*
6	**Phoebe O. LaPoint** Dr. Jennifer Uno The Interaction of the Gut Microbiome and Anxiety in Male and Female Zebrafish
7	**Amaya M. Gaines** Dr. Dillan Bono-Lunn Policy Solutions Waiting to Be Seen: Applying Intersectionality Policy Process Analysis to State Anti-Poverty Programs*
8	**Grady S. Cooke** Dr. Martin Kamela Design and Simulation of a Resonant Swing Set
9	**Amanda M. Rubeo** Dr. Lisa Buchanan Examining North Carolina Social Studies Standards and Understanding Perspectives of Recurring Historical Events
10	**Lindsay Berkowitz** Dr. Kim Epting When Language Moves What Matters: Effects of Linguistic Framing on Endorsement of Black Lives Matter Tenets
11	**David Jennings** Dr. Pratheep Paranthaman A Comparative Analysis of Interview Training Applications in Virtual Reality
12	**Kelly Belarmino** Prof. Courtney Liu & Prof. Julio Matos Always Room in the Circle: A Re-Imagination of Space for BIPOC Actors*
13	**Amber Olson, Amy Smelko, & Ashlyn Loring** Dr. Srikant Vallabhajosula Cognitive Performance and Dual Tasking in Collegiate Athletes
14	**Maggie E. Noble** Dr. Raj Ghoshal Perceptions of Crime from 1994 to 2022: A Content Analysis of Partisan Newspapers and a Survey of US Attitudes*
15	**Tyler C. Musante & Sammy Tucker** Dr. Will Pluer Construction of Stormwater Management Mesocosms to Model Full-Scale Systems

16	**Georgia Ritter** Healthcare in Spain Versus the United States	Dr. Ketevan Kupatadze
17	**Rachel N. Dietert** Text Mining for the Intersection of COVID-19 and Mental Health	Dr. Heather Barker
18	**Victoria I. Colbeck** "Ask Us, Hear Us, Believe Us": Exploring Quality of Care, Racism and Outcomes During Childbirth Experiences of Black American Mothers*	Dr. Yanica Faustin
19	**Amanda J. Lee** The Impact of a Vegan Diet on Cardiovascular Disease Risk in Men and Women Through the Gut Microbiome	Dr. Jennifer Uno
20	**Abigail M. Dumas** Exploring the Differences Between Lower Federal Court and Supreme Court Opinion Writing of Female Justices	Dr. Elisha Savchak-Trogdon
21	**Haydn Stucker, James W. Allen, Declan T. Elie, & Aidan D. Burnside** Defect Detection and Characterization in SiC Wafers	Dr. Richard Blackmon
22	**John Luke Farah** Impact of Internet Resource Integration on Immigrant-Owned Microenterprises' Profits in Greensboro, N.C.*	Dr. Mussa Idris
23	**Anna D. Lipsman** The Impact of Lifestyle Factors on Heart Rate Variability during the Transition from High School to College	Dr. Svetlana Nepocatych
24	**Victoria L. Seymore** Pre-Service Teachers' Perceptions of Anti-Critical Race Theory Legislation in the United States*	Dr. Scott Morrison
25	**Sarah M. Mirrow & Colton R. Waller** Investigation of Silent Transmission: Mathematical Modeling Incorporating Asymptomatic and Presymptomatic Spread of COVID-19	Dr. Karen Yokley
26	**Juliet E. Stevenson** The Influence of Environmental Structure and Nature Connectedness on Preschoolers' Creativity and Social Cohesion During Outdoor Play	Dr. Maureen Vandermaas-Peeler
27	**Olivia R. Lanter** Examining the Relationship Between Trained Lateral Bias and Stress Response in Pirouette Habits of College Dancers	Prof. Jasmine Powell & Dr. Matthew Wittstein
28	**Samuel Ramirez** Examining the Role of the Gut-Brain Axis in Alcohol Use Disorder in Zebrafish	Dr. Jennifer Uno
29	**Morgan E. Bassett** Introducing Mr. President: Exploring Healthcare and Rhetorical Genre Studies (RGS) Within the State of the Union Address	Dr. Jessie Moore
30	**Lauren Hanchar, Mary L. Hermes, Vivian C. Krause, & Jordan A. Wels** Improving the Stability of Organic Materials for Commercial Garment Dyeing	Dr. Jonathan Su

31	**Morgan N. Sierra** Teacher Decision Making: What Factors Inform K-2 Children's Literature Selections?*	Dr. Lisa Buchanan
32	**Julia L. Burpeau** Effects of Lifestyle Factors on Trabecular Bone Score during Transition from High School to College	Dr. Svetlana Nepocatych
33	**Grace Caluri & Jeppe Overgaard Jordoson** Alibi Believability and Judicial Instructions	Dr. Meredith Allison
34	**Jessica N. Skelley** Predicting Attitudes Towards the Defund the Police Movement vs. Police Budget Reallocation Reform: An Exploratory Study	Dr. Rena Zito
35	**Lily Helm, Anna Kauffman, & John O'Donnell** Incentivizing Walking for Children with Cerebral Palsy: The Singing Walker*	Dr. Paula DiBiasio & Dr. Sirena Hargrove-Leak
36	**Dalton Thompson, Devin Guilbeau, & Moris Menjivar Alfaro** Improving the Ergonomics of the Stihl Picking Cart	Dr. Jonathan Su
37	**Danielle DaSilva & Lia Rotti** Modeling Treatment Strategies for Transplant Patients	Dr. Karen Yokley & Dr. Julia Arciero
38	**Shauna K. Galvin** Boroughs Matter: Examining Maternal Morbidity By Racial Neighborhood Composition In NYC*	Dr. Yanica Faustin & Dr. Deshira Wallace
39	**Channing M. Lamparski** Phthalates' Effect on Zebrafish Reproduction and Development	Dr. Linda Niedziela
40	**Caroline C. Allen** The Benefits of the Outdoors on Mental Health and Education	Dr. Carol Smith
41	**Sammy C. Tucker, Gloria Kaso, & Allee R. Seering** Modifying Ride-On Cars for Children with Disabilities*	Dr. Sirena Hargrove-Leak & Dr. Paula DiBiasio
42	**Hannah Higgins & Parker Fairfield** Parental Beliefs about Motor Development and Practices to Support Infants in Indoor and Outdoor Environments	Dr. Sabrina Thurman
43	**Camryn Z. Levin** Investigating the Evolution of Rhetoric Surrounding Taylor Swift and the New-found Embracement of Successful Women (Camryn's Version)*	Dr. Jessie Moore
44	**Nicole LaMont** Detecting Change: Bat Response to the COVID-19 Stay-at-Home Order in NC	Dr. Nicholas Bussberg
45	**Elizabeth M. Czenczek** Compassion Fatigue in Special Educators	Dr. Stephen Byrd
46	**Abigail B. Winters** A Campus Analysis of Barriers and Facilitators to Physical Activity at Elon University	Prof. Elizabeth Bailey

47	**Lauren M. Davenport** The State of Dance for Health in the US and the UK*	Prof. Lauren Kearns
48	**Rebecca A. Rose** Strategy Use in Infant Pull-to-Stand Behaviors: A Longitudinal Investigation	Dr. Sabrina Thurman
49	**Makayla M. Oby** Investigation of Synergistic Combinations of Chemotherapy Drugs for the Treatment of Oral Cancer	Dr. Victoria Moore
50	**Bella Roy** Exploring the International Diffusion of Innovation Through the Lens of the Slow Food Movement	Dr. Scott Hayward
51	**Rane V. Parr, Sidney R. Lowe, Lauren E. Hill, Bruce D. Vagt, & Seth M. Wolter** Floating Garden for Bioretention Basin	Dr. Scott Wolter, Dr. Bethany Brinkman, & Dr. Jonathan Su
52	**Karen Guadalupe Cruz-Ruiz** Through the Lens of Latinx/Hispanic Women: Reproductive and Maternal Experiences in the Piedmont-Triad Area*	Prof. Amanda Tapler
53	**Kaitlin Cirillo** The Impact of Medication and Exercise on ADHD Behavior in Zebrafish	Dr. Linda Niedziela
54	**Bria Harmon** Computers: How Technology Has Enhanced Communication in the Workplace	Dr. Jessie Moore
56	**Kelsey Pettit** The Connection Between Experiential Education and Social and Emotional Learning	Dr. Evan Small
57	**Tiffany B. Pham** Mother & Infant Contributions to Maintaining Physical Closeness During Play: A Longitudinal Study of the First Two Years	Dr. Sabrina Thurman
58	**Ashleigh Azan, Madison George, Caleb Ogunmola, Alexa Roveri, & Andrew Weitz** No Space? No Problem. Accessible Balance Control Using VR Player Movement	Dr. Matthew Wittstein
59	**Tyler C. Myers** Investigating Chemotherapeutic Resistance in Leukemic Cells Exposed to Asparaginase	Dr. Tonya L. Train
60	**Alejandra Gonzalez** Generational Linguistic Evolution: How Gen Z is Using Social Media Platforms to Develop Language and How Companies Can Follow*	Dr. Jessie Moore
61	**Henry Agyemang, Sonith Riem, & Samantha Direnzo,** Improved Food Waste Processing Through Water Removal in a University Dinning Hall	Dr. Jonathan Su & Mr. John Ring
62	**Anna C. Cave** Sex Sells: A Content Analysis of Changes in Cosmopolitan's Sex-Related Headlines Over 40 Years*	Dr. Jane O'Boyle

63	**Christopher D'Inzeo** Mystery Skyscrapers in the Cell: Probing the Role of Guanine Quadruplexes in the Development of Chemotherapy Resistance	Dr. Victoria Moore
64	**Benjamin Waggener** Associative Learning in Harvester Ants	Dr. William Schreiber
65	**Rylei W. Smith** Country-Level Factors Associated with International COVID-19 Vaccine Uptake	Dr. Mark Weaver
66	**Jaimee C. Nachwalter** The Perceptions of Mental Health Providers on the Use of Teletherapy	Dr. Bud Warner
67	**Emmeline Roberts** Affordable Medical Equipment for Cerebral Palsy: A Pediatric Reverse Walker made of PVC	Dr. Sirena Hagrove-Leak & Dr. Paula DiBiasio
68	**Lauren E. Copenhaver** Investigating the Effects of Estrogen on Male and Female Pancreatic Tumor Cells	Dr. Yuko J. Miyamoto
69	**Benjamin Corrado** Efficacy of Artificial Intelligence as a Sales Training Tool	Dr. George Talbert
70	**Gabby Witherell, Payton Robinson, & Talya Geller** The Impact of a 12-week Education-Based Program on Metabolic Risk Factors and Mental Health Measures	Prof. Elizabeth Bailey & Dr. Svetlana Nepocatych
71	**Devyn G. Battaglia** Investigating the Application of Anatomical Information on a Dancer's Sense of Technical Execution and Performance	Prof. Lauren Kearns
72	**Christina I. Carr** Chronic vs. Acute Stress impact on Stressed-Induced Grooming in Ants	Dr. William Schreiber
73	**Schuyler Cady** Statistical Modelling of Alaskan Coral Biodiversity	Dr. Nicholas Bussberg
74	**Alissa R. Butler** Exploring the Innovation of Artificial Intelligence Writers	Dr. Jessie Moore
75	**Gisselle Garcia-Jose** Pediatric Movement and Development Through an Engineering and Physical Therapy Lens*	Dr. Sirena Hargrove-Leak & Dr. Paula DiBiasio
76	**Caroline DiGrande** Waste-Deep in COVID-19: The Effects of COVID-19 on Waste Accumulation and Sustainability Programming on College Campuses	Dr. Robert Perdue

***Note**:* The presentations with an asterisk (*) in the titles are self-identified as projects related to the topics of diversity, equity, and inclusion (DEI).

Oral Presentation Session I (10:00am – 11:40am)

McKinnon Hall D (Moderator: Dr. Amanda Chunco)		
10:00am	**Hannah L. Miller** Communicating a Crisis: Case Studies of Rhetorical Strategies for Modern Climate Communication	Dr. Michael Strickland
10:20am	**Madison H. Eaton** The Impact of Soil Compaction and Land Cover on Soil Carbon Sequestration at Elon University	Dr. Kelsey S. Bitting
10:40am	**Emerson Wells** Enacting "Community" in Community-Based Natural Resource Management Projects: Discontinuities in Big Life Foundation's Crop-Protection Fence	Dr. Amanda Chunco & Dr. Richard Kiaka
11:00am	**Lucy A. Garcia** Investigating Displacement in Burlington, NC: A Critical Geographic Analysis of the Historic "Black Bottom" District*	Dr. Ryan Kirk

McKinnon Hall E+F (Moderator: Dr. Michael Carignan)		
10:00am	**Daniel R. Saltsgaver** The Resurrection of God: Kierkegaard and Schopenhauer's Religious Revolt Against Reason	Dr. Michael Carignan
10:20am	**Kayla R. Spalding** Black Women, Political Power, and Their Impact on the Civil War and Reconstruction*	Dr. Amanda Kleintop
10:40am	**McLean Bell** Representation, Objectification, Derivatization: How Contemporary Feminist Artists Can Be the Problem and the Solution	Dr. Kirstin Ringelberg
11:00am	**Katherine E. Wunderlich** The Aesthetics of French Pastries: A Cultural and Historical Account of Pâtisserie in Paris	Dr. Leyla Savloff & Dr. Nina Namaste
11:20am	**Faith E. Minor** The Hidden Potential of the Tumtum as a Path to Liberatory Trans Judaism*	Dr. Geoffrey Claussen

Lakeside Meeting Room 212+213 (Moderator: Dr. Sirena Hargrove-Leak)		
10:00am	**Mallory R. Poff** Solar-Powered Refrigerator on Wheels: An Engineering Design Challenge	Dr. Sirena Hargrove-Leak
10:20am	**Madison K. George** Putting the Right Foot Forward: The First Women's Pole Vault Spikes*	Dr. Scott Wolter & Dr. Shefali Christopher
10:40am	**Aidan D. Burnside** Exploring the Mathematical Models of the Germicidal Efficacy of Ultraviolet Light and Developing an Overhead UV Cleaning Device	Dr. Richard Blackmon

Lakeside Meeting Room 214 (Moderator: Dr. Sophie Adamson)	
10:00am	**Guillermo Vizuete** Dr. Sophie Adamson The Socio-Political Force of Soccer: The Impact of the FLN Soccer Team on National Unity and Independence in Algeria
10:20am	**Julia N. DuVal** Dr. Sophie Adamson Traditions and Transgressions in and through French: Confidences à Allah (2008) by Saphia Azzeddine and La petite dernière (2009) by Fatima Daas* (This presentation is in French.)
10:40am	**Stephanie Wagner** Dr. Sophie Adamson Belonging in the Banlieue: A Linguistic Analysis of Self-Expression and Community from the Periphery of French Society (This presentation is in French.)
11:00am	**Ivy Montague** Dr. Sophie Adamson & Dr. Olivia Choplin Humor and the Creative Arts in France: Stand-up Comedy as a Lens into the Global Pandemic (This presentation is in French.)

Moseley 215 Student-to-Student Panel on Engaging with Undergraduate Research	
10:00am	**Panelists: Christopher R. Boyette, Ellery Ewell, Sophie I. Miller, Cole Powell** This URSA sponsored panel provides an opportunity for students to ask questions regarding undergraduate research and engage in conversation with peers who are active members of the research community at Elon. Topics to be discussed include: how to find a mentor, how to identify a research question, benefits of engaging in undergraduate research, and potential challenges. All are welcome!

LaRose Theatre (Koury Business Center 101) (Moderator: Dr. Greg Haenel)	
10:00am	**Ainsley B. Shan & Jake Ramalho** Dr. Jennifer Hamel & Dr. Michael Kingston Examining the Potential Tradeoffs of Vibrational Signals: Who's Listening?
10:20am	**Alana Evora** Dr. Jennifer Hamel An Open-Source Tool for Conducting High-Fidelity Vibrational Playback Experiments
10:40am	**Chase R. Solomon** Dr. Greg Haenel Differences in DNA Damage due to Reactive Oxygen Species in Hybrid Lizards
11:00am	**Claudia A. Penny** Dr. Greg Haenel Understanding Evolution at the mtDNA Sequence Level in Hybrid Tree Lizards
11:20am	**Emily N. Shaheen** Dr. Dave Gammon Using AI to Classify Birdsong in a Noisy Environment: A Comparative Study of Noise Filters

Sankey Hall 308 (Moderator: Dr. Steve DeLoach)	
10:00am	**Evangelia N. Sklaveniti** Dr. Steve DeLoach LGBTQIA+ Wage Inequality and Discrimination*

10:20am	**Hailey Crawford** Dr. Steve DeLoach Mind Over Matter: The Impact of Mental Well-Being on Labor Market Outcomes
10:40am	**Jack Shea** Dr. Steve DeLoach The Relationship Between Grit Scores and Wages
11:00am	**Martin Curtis Adams** Dr. Tina Das & Dr. Steve DeLoach Men's and Women's Work Burden Convergence: The Covid-19 Recession*

LaRose Student Commons 200 (Moderator: Dr. Alexa Darby)	
10:00am	**Heidi Weston** Dr. Peter Felten Mattering and Belonging: Pursuing Equity Through Partnerships in Higher Education*
10:20am	**Isabelle J. Stimson** Dr. Aaron Trocki Comparing Secondary Mathematics Teachers' Technology Use Across Three Countries
10:40am	**Sophia Aimone** Dr. Alexa Darby Disclosure Issues for Faculty with Learning Disabilities*
11:00am	**Gloria Cadet** Dr. Alexa Darby Law Students with Learning Disabilities and/or ADHD: Rationale for Requesting or Not Requesting Accommodations*
11:20am	**Maya E. Oledzka** Dr. Alexa Darby Assessing Efficacy and Strategies of Advisor Relationships with Doctoral Students with Learning Disabilities and/or Attention-Deficit/Hyperactivity Disorder

Turner Theatre (Schar Hall) (Moderator: Israel Balderas, J.D.)	
10:00am	**Anelisa L. Holder** Dr. Kenn Gaither Starbucks France: Analyzing Communications and Coffee Culture through the Circuit of Culture
10:20am	**Elizabeth Driggers** Israel Balderas, J.D. Corporate Social Responsibility in a Post-Roe v. Wade World: The Importance of Critical Thinking*
10:40am	**Erin C. Shugar** Dr. Kenn Gaither A Comparative Analysis of World War II Propaganda Posters
11:00am	**Grace E. Hallowell** Dr. Barbara Miller Gaither What Does it Mean to Look Healthy? Body Diversity in Women's Fitness Advertising
11:20am	**Megan E. Curling** Dr. Glenn Scott Stories and Resolutions: The Cultural and Environmental Impacts of the Tungkum Gold Mine on the Villagers of Na Nong Bong, Thailand

Koenigsberger Learning Center 127 (Moderator: Dr. Cassie Kircher) (The winners are announced on April 17th.)	
10:00am	1st Place

10:00am	2nd Place
10:00am	3rd Place

***Note**:* The presentations with an asterisk (*) in the titles are self-identified as projects related to the topics of diversity, equity, and inclusion (DEI).

Oral Presentation Session II (12:20 pm - 2:00 pm)

McKinnon Hall D (Moderator: Dr. Karen Yokley)		
12:20pm	**Jillian M. Thomas & Atira Glenn-Keough** Numerical Simulation of Jellyfish Swimming	Dr. Karen Yokley
12:40pm	**Danielle DaSilva** Mathematical Model of Obesity Trends in the United States	Dr. Karen Yokley
1:00pm	**Grace E. Simpson** County-Level Factors Associated with COVID-19 Vaccine Uptake in the U.S.	Dr. Mark Weaver
1:20pm	**Jacqueline A. Jovanovic** Estimating the Causal Effect of Pandemic-Induced League Shutdowns on Hockey Player Development	Dr. Ryne VanKrevelen
1:40pm	**Lucas Hoffses** Shuffling Cards, Flipping Polygons, and Group theory	Dr. Jeff Clark

McKinnon Hall E+F (Moderator: Dr. Anthony Rizzuto)		
12:20pm	**Josephine McNeil** Impacts of pH on Decomposition of Aqueous Carbonic Acid	Dr. Anthony Rizzuto
12:40pm	**Ashley M. Pehan** Kinetic Investigations of Nox Chemistry Pertaining to the Global Nitrogen Cycle	Dr. Anthony Rizzuto
1:00pm	**Anna C. Altmann** Analysis of Trace Metal Content in Littered Cigarette Materials	Dr. Justin Clar
1:20pm	**Foster Horton** Examination of Trace Metal Content in Sparklers: Implications of Exposure	Dr. Justin Clar

Lakeside Meeting Room 212+213 (Moderator: Dr. Aaron Sparks)		
12:20pm	**Ashley N. Vann** Examining Undercoverage in Rural Areas of the United States in Survey Methodology	Dr. Jason Husser
12:40pm	**Sara K. Arora** Climate Culture: Comparing Environmental Attitudes, Environmental Policy, and Cultural Context	Dr. Aaron Sparks
1:00pm	**Alicia G. Clanton** Examining Media Coverage of Local Reparations in Evanston, Illinois*	Dr. Jessica Carew
1:20pm	**Caroline Powers** Impacts of Satirical Television on Political Perspectives in France and in the U.S.	Dr. Sophie Adamson

Lakeside Meeting Room 214 (Moderator: Dr. Mayte de Lama) (All the presentations in this panel are in Spanish.)	
12:20pm	**Elissa M. Rizzo** Dr. Mayte de Lama Feminine Systems of Support in Un Largo Silencio
12:40pm	**Elizabeth C. Kohler** Dr. Mayte de Lama Identity in Julia: An Examination of the Obstacles That the Protagonist Overcame to Find Her Identity
1:00pm	**Lily C. Blake** Dr. Mayte de Lama A Man's World: An Examination of Self-Image and Worldview in Lucia Etxebarria's *Amor*, *Curiosidad*, *Prozac*, *y Dudas**
1:20pm	**Stephen Bloch-Schulman** Prof. April Post It is We Who Cannot Understand: Aluap and the Military Dictatorship in Argentina (1976-1983)*
1:40pm	**Tyra Duque** Dr. Juan Leal-Ugalde Nuestra gente: The Negative Implications of Anti-Immigrant Policy on The Well-Being of Latinxs in Alamance County, North Carolina*

Moseley 215 Symposium - From the Field: Ethnography for Human Understanding (Moderator: Dr. Brian Pennington)	
12:20pm	**Darsev Kaur** Dr. Amy Allocco Experiencing the Guru Through His Weapons: Shashtar Darshan in Contemporary Indian Sikh Worship*
	Samantha J. Schwamberger Dr. Robert Perdue Liberation Through the Land: Exploring Queerness in Appalachian Agriculture*
	Maddy Starr Dr. Amy Allocco Material Memories: Narratives of the Israeli/Palestinian Conflict*
	Peyton Rohlfs Dr. Dinidu Karunanayake Nationalism, Religion, and Identity Formations for the Sri Lankan Diaspora in Staten Island, NY*
	Natalie Triche Dr. Brian Pennington Contemporary Egyptian Nationalism Through an Ethnographic Lens*

LaRose Theatre (Koury Business Center 101) (Moderator: Dr. Eryn Bernardy)	
12:20pm	**Grace E. Loeser** Dr. Eryn Bernardy Investigating Biofilm-producing Phenotypes in Clinical Staphylococcus aureus Isolates: Implications for Infection Persistence in Cystic Fibrosis Patients
12:40pm	**Jennifer T. Tran** Dr. Jessica Merricks Analyzing Odyssey Scholars' Experiences in STEM*
1:00pm	**Meg Healy** Dr. Eryn Bernardy Comparing Genotype and Phenotype of Antibiotic Resistance Profiles of Staphylococcus Aureus Isolates from Cystic Fibrosis Patients

1:20pm	**Patrick A. Klesa** Zebrafish Behavior in Response to Novel Environment and Objects	Dr. Eric Bauer

Sankey Hall 308 (Moderator: Dr. Tonmoy Islam)		
12:20pm	**Christopher R. Boyette** Effect of Teacher Salary Freezes on Student Achievement in Michigan Public Schools	Dr. Tonmoy Islam
12:40pm	**Courtney B. Shanley** Redlining Effects on Student Achievement in Massachusetts Public Schools	Prof. Cora Wigger
1:00pm	**Elizabeth R. Cuoco** Analysis on the Effect of the Drug Epidemic in Different Areas	Dr. Tonmoy Islam
1:20pm	**James D. Grant** The Influence of Grade Inflation on Graduation Rates by Academic Major	Dr. Katy Rouse
1:40pm	**Cornelis Mercer van Meel** Flexible Work Accommodations and Employee Productivity	Dr. Tonmoy Islam

LaRose Student Commons 200 (Moderator: Dr. David Buck)		
12:20pm	**Michaela R. Guerin** Transprejudice and Gender Role Conflict: An Intersectional Approach*	Dr. David Buck
12:40pm	**Nicholas D. Williams** Use Your Words: Impact of a Driver's Linguistic Framing on the Outcome of a Traffic Stop	Dr. Kim Epting
1:00pm	**Olivia C. Eller** Yoga Flow Class Impacts on Test Anxiety in University Undergraduates	Dr. Mathew Gendle
1:20pm	**Sophia M. Templeton** Preschoolers' Funds of Knowledge and Bridging Between Home and School	Dr. Maureen Vandermaas-Peeler
1:40pm	**Sophie I. Miller** Telling Stories and Taking Pictures: How Children and Teachers Co-Facilitate Inquiry and Reflection Outdoors	Dr. Maureen Vandermaas-Peeler

Turner Theatre (Schar Hall) (Moderator: Dr. Jane O'Boyle)		
12:20pm	**Tiffany C. T. Huang** Graphic Designers' Consideration of Color Accessibility*	Dr. Harlen Makemson
12:40pm	**Issac W. Kunesh** Cost-Effective In-Camera VFX for Indie Filmmakers	Dr. Ahmed Abdullah Al Fadaam
1:00pm	**Nadine M. Jose** A Period Piece: Analyzing How Portrayals of Menstruation in Films Have Evolved from the 1960s to the 2020s*	Dr. Jane O'Boyle
1:20pm	**Ridley A. Randolph** Producing Gender: Examining Gender Representation in the Contemporary Romantic Comedy*	Prof. Sowjanya Kudva

1:40pm	**Emily Prins** Trauma and Transparency in True Crime Documentary Filmmaking	Prof. Nicole Triche

Note: The presentations with an asterisk (*) in the titles are self-identified as projects related to the topics of diversity, equity, and inclusion (DEI).

Oral Presentation Session III (2:20 pm - 4:00 pm)

McKinnon Hall D (Moderator: Dr. Duke Hutchings)		
2:20pm	**D. Haydn Stucker** Sensor Fusion Optimization for Aerial Fire Detection	Dr. Ryan Mattfeld
2:40pm	**Ryan Sherota** Emotion Regulation Analysis Using EEG	Dr. Shannon Duvall
3:00pm	**Spencer T. Buehlman** Finding Fires: Drone-Based Autonomous Fire Detection	Dr. Scott Spurlock
3:20pm	**Alexa L. Goldberg** Congruence Subgroups of the Virtual Braid Group	Dr. Nancy Scherich

McKinnon Hall E+F (Moderator: Dr. Young Do Kim)		
2:20pm	**Brett M. Bailey & Maxwell A. Casey** Enhancing Fan Engagement and Retention by Implementing the Metaverse: A Case Study	Dr. Young Do Kim & Dr. Tony Weaver
2:40pm	**Jack Rardon** An Audit of the NCAA Landscape Using Athletic Department Sport Offerings*	Dr. David Bockino
3:00pm	**Michael Brown** College Students Consumption and Interactivity with Digital Action Sports Content	Dr. David Bockino
3:20pm	**Evan Wu, Nick Ullian, Will Carroll, Teddy Freeman, & Jackie Jovanovic** From "Statcast" to the "Pitch Clock Era": Solving Baseball Analytics Challenges Using Quantitative Data and Traditional Baseball Knowledge	Dr. Mark Cryan & Dr. Ryne Vankrevelen

Lakeside Meeting Room 212+213 (Moderator: Dr. Janet Myers)		
2:20pm	**Aidan Melinson** Models and Myths: Unmaking the Bounds Between Gods and Saints	Prof. Andrew Perry
2:40pm	**Cailey S. Rogers** The Dark Side of Domesticity: Tracking the Female Gothic in Brontë Novels*	Dr. Janet Myers
3:00pm	**Zoë Rein** Rethinking Writing in STEM: Implementing Creative Writing to Foster Critical Thinking and Inclusion*	Dr. Heather Lindenman
3:20pm	**Alexandra R.H. Schneider** Exploration of Chinese and Jewish Femininity in Coming of Age Narratives*	Prof. Andrew Perry

Lakeside Meeting Room 214 (Moderator: Dr. Ben Evans)		
2:20pm	**Catherine M. Capodanno** Computational Modeling of Active Magnetic Films	Dr. Ben Evans

2:40pm	**Jordan Wels & Thomas Vivona** Investigating the Diagnostic Potential of Optical Emission Lines for Finding Dwarf AGN	Dr. Chris Richardson
3:00pm	**Thomas Vivona & Jordan Wels** Assessing the Utility of WISE Photometry in Identifying Dwarf AGN	Dr. Chris Richardson

Moseley 215 (Moderator: Dr. Katie Baker)		
2:20pm	**Dani Toma-Harrold** Toward Antiracist and Abolitionist Place-Based Environmental Education*	Dr. Scott Morrison
2:40pm	**Kayla M. Mead** What is Math and Math Teaching?: A Study Exploring Prospective Teachers' Perceptions	Dr. Katie Baker
3:00pm	**Kaitlyn R. Freeman** The Cultural Sensitivity of Elon's Love Your Body Week: Intentions, Outcomes, and Student Perceptions*	Prof. Monica Burney
3:20pm	**Kate M. Wirth** The Sex Talk: Conversations Between Fathers and Sons About Familial Upbringing and Impacts on Perceptions of Contraceptive Responsibility	Dr. Judy Folmar
3:40pm	**Lila R. Bensky** A Virtual World: How the COVID-19 Pandemic Has Changed Play Therapy	Dr. Judy Folmar

LaRose Theatre (Koury Business Center 101) (Moderator: Dr. Kathryn Matera)		
2:20pm	**Alexandra H. Lahetta** Investigating Transthyretin Aggregates Link to Oxidative Damage of HDL Cholesterol Carriers	Dr. Kathryn Matera
2:40pm	**Cole Powell** Mechanisms of Fatty Acid Oxidation by Myeloperoxidase: The Ramifications for Heart Disease	Dr. Kathryn Matera
3:00pm	**Ons Yasmeen Mrad Bouali** Investigating the Role of PPARs in Bile Acid-Induced Primary Biliary Cholangitis-Related Cellular Stress*	Dr. Tonya L. Train
3:20pm	**Sarina S. Jackowski** The Interaction Between Oxidized ß-Estradiol and DNA	Dr. Kathryn Matera
3:40pm	**Otto Fisher** PDMS Boron Nitride Composites for Water Treatment	Dr. Justin Clar

Sankey Hall 308 (Moderator: Dr. Larry Garber)		
2:20pm	**Chris Lee** What Determines Business Resilience in the Pandemic Era?	Dr. Long Xia
2:40pm	**Jennifer L. Goldberg** The Effects of Color vs. Black and White Imagery in Luxury Good Ads on Consumer Brand Evaluation: An Empirical Study	Dr. Larry Garber

3:00pm	**Emma K. Ciccotosto** Optimal Pricing Strategy for Recycling Supply Chain	Dr. Xin Liu

LaRose Student Commons 200 (Moderator: Dr. Svetlana Nepocatych)		
2:20pm	**Abigail Kroll** The Role of Social Support in Identity Reconstruction in Individuals after Stroke	Dr. Eric Hall
2:40pm	**Anna C. Morton** Family Dietary Characteristics and Changes in Eating Habits Across the Transition to College	Dr. Svetlana Nepocatych
3:00pm	**Christina Westbrooks** The Relationship Between Sleep Behaviors, Alcohol Consumption, and Mental Health in High School Seniors	Dr. Svetlana Nepocatych, Dr. Simmon Higgins, Dr. Mark Weaver, & Dr. Eric Hall
3:20pm	**Michael O. Sanderson** Athletic Identity as a Mediator for Injury and Mental Well-Being	Dr. Eric Hall
3:40pm	**Talya E. Geller** The Impact of the HealthEYou Program on Metabolic Disease Risk Factors	Dr. Svetlana Nepocatych & Prof. Elizabeth Bailey

Turner Theatre (Schar Hall) (Moderator: Prof. Kai Swanson)		
2:20pm	**Jesse S. Riback** TV Spec Screenwriting for the Modern Comedy	Prof. Kai Swanson
2:40pm	**Rebecca C. Potters** Screenwriting and Development in Animation	Prof. Kai Swanson
3:00pm	**Nicholas T. Asprea** More Than Meets the Eye: Harnessing the Power of Sound in Student Film	Dr. Todd Coleman
3:20pm	**Jack M. Morrill** Queering the Stage*	Dr. Susanne Shawyer & Prof. David McGraw
3:40pm	**Riley Gibson** An Exploration of Drag through Theatrical Design*	Dr. Susanne Shawyer & Prof. Jack Smith

***Note**:* The presentations with an asterisk (*) in the titles are self-identified as projects related to the topics of diversity, equity, and inclusion (DEI).

Symposium

From the Field: Ethnography for Human Understanding

This interdisciplinary symposium showcases five student research projects that employed ethnographic methods to study processes of identity formation in a variety of cultural settings. These student projects focused on post-Arab Spring Egypt, the Israel/Palestine conflict, the Sri Lankan community of New York City's Staten Island, the homeland of the global Sikh community in North India, and the experiences of queer farmers in the US Appalachia mountains. This symposium draws from students' insights about the lives and experiences of people who have navigated social, economic, and political currents generated by national and global forces much larger than themselves. Informed not only by ethnography but also by methodological approaches developed in the fields of public health, environmental studies, religious studies, and political science, these student researchers will engage in an interdisciplinary discussion about what ethnography has taught them about the everyday impacts of authoritarianism, sexual identity politics, militarization, migration, and global capitalism. Together, the student projects help to make these abstract forces come to life in the bodies and experiences of real people and communities while they also show how those lives are what give those forces life. This symposium testifies to the power of ethnographic research to promote understanding of our common humanity despite the many things like language, religion, and politics that can often divide us.

Experiencing the Guru Through His Weapons: Shashtar Darshan in Contemporary Indian Sikh Worship*

Darsev Kaur (Dr. Amy L. Allocco) Department of Religious Studies

This research seeks to understand the significance of the daily practice of Shashtar Darshan at Takhat Sri Keshgarh Sahib (TSKS), during which there is a procession of eighteen *shashtar* (weapons) that are honored for their connection to the Sikh *gurus* (spiritual or religious leaders) and other significant figures within the tradition. Drawing on 41 semi-structured interviews and five weeks of participant observation at TSKS in North India, I argue that the daily presentation and narrative exegesis of these symbolically charged weapons strategically communicates a collective history that connects Sikhs to their religious identity and community, propagates domsinant Sikh discourses, and evokes an affective response from audience members. TSKS is a historically significant Sikh *gurudwara* (temple) that ranks as one of five *takhats* (thrones), or seats of power, from which authoritative pronouncements concerning Sikh belief and practice are traditionally delivered. It is where, in 1699, Guru Gobind Singh installed the *Guru Granth* (Sikh scripture) and the *Guru Panth* (presence of the guru in the assembly of his followers) as the eternal figures of authority for Sikhs and initiated thousands into the tradition (Singh 2013). Shashtar Darshan allows an eager audience of about 75 Sikhs, consisting mostly of pilgrims and tourists, to engage with these weapons more directly in a congregational setting. The daily ritual deploys the material relics to deliberately reinforce the teachings of the *guru* and remind onlookers of Sikhism's militant past.

Liberation Through the Land: Exploring Queerness in Appalachian Agriculture*

Samantha J. Schwamberger (Dr. Robert Perdue) Department of Sociology & Anthropology

The back-to-the-land movement of the late 1960s and 1970s pushed back against industrial agriculture through organic and sustainable farming methods which defied traditional capitalist ideas and centered ecological consciousness. Moreover, many of the traditional gender roles found in the conventional agricultural setting were upended on these farms and homesteads. Responsibilities deemed either feminine or masculine began to break down as more women began to identify as farmers and transgress traditional gender norms. Studies examining how gender operates in sustainable agriculture have proven illuminating, but much less attention has been paid to how sexuality and queerness operate in these spaces (Hoffelmeyer, 2019; Leslie 2017, 2019; Wypler, 2019). This research sheds light on this overlooked topic by examining the experiences of queer farmers in Appalachia, helping to better understand the nexus of sexuality and sustainable agriculture. Specifically, I ask: how do queer people in Appalachia make meaning and forge their identities by practicing sustainable farming techniques in a new back-to-the-land movement? In the summer of 2022, I conducted 8 weeks of ethnographic fieldwork among queer farmers in Appalachia through interviews, participant observation, and immersion in culture to understand the intersection of queer identities and farming. Interviews were transcribed and coded using in vivo grounded methodology of Saldaña (2009) and Corbin & Strauss (2008). Through interviews and participant observation with fifteen queer farmers in Appalachia, I find that farming offers queer people the opportunity to defy limitations to their sexual identity, to create inclusive and secure food systems, and to challenge meteronormative queer stereotypes that suggest queer people can only be open and happy in urban settings. I also find that isolation and a general lack of community are the biggest challenges threatening the viability of farming for queer individuals in the region. Results of this project shed light on the queering of

American agriculture in the Appalachian context, as well as the general direction of this new back-to-the-land movement.

Material Memories: Narratives of the Israeli/Palestinian Conflict*

Maddy Starr (Dr. Amy Allocco) Department of Religious Studies

Since the establishment of the State of Israel and the catastrophe of the Nakba, which entailed the mass displacement of hundreds of thousands of Palestinians in 1948, the Israeli/Palestinian conflict has dominated global headlines and shaped foreign policy throughout the Middle East and North Africa. The state of constant tension and mutual distrust that has characterized Israel/Palestine since 1948 has also resulted in structural violence and resistance to occupation. Both Israelis and Palestinians tend to perceive themselves as victims of violence and the other as perpetrators of the conflict, thus mutually enforcing an "us versus them" atmosphere. While the conflict gains significant traction on the world stage during periods of heightened physical violence and war, less attention has been paid to how Israelis and Palestinians experience the conflict on an everyday basis. Likewise, there has been little attention paid to the material memories and realities of the conflict, including how recurring interactions with objects and images allow Israelis and Palestinians to remember narratives of the near and distant past and inspire mutual distrust, structural violence, and resistance. During five weeks of ethnographic research in Jerusalem, I explored how memory informs the pervasive tension, structural violence, and resistance of ordinary Israelis and Palestinians. My project asked: How do ordinary Israelis and Palestinians narrativize their experiences of the conflict, and how do everyday objects embody these narratives? Drawing on more than thirty interviews and hundreds of hours of participant-observation, I suggest that divergent memories of brutal conflict, structural violence, and dehumanization shape the perceptions of Israelis and Palestinians and fuel everyday tension and mutual distrust. I also argue that individuals in Israel/Palestine employ objects and images to evoke memories of the near and distant past that both perpetuate and resist prevailing violence.

Nationalism, Religion, and Identity Formations for the Sri Lankan Diaspora in Staten Island, NY*

Peyton Rohlfs (Dr. Dinidu Karunanayake) Department of English

This presentation explores how the Sri Lankan diasporic community in Staten Island, New York uses performance and materiality to generate narratives about what it means to be an "authentic" Sri Lankan living in the United States. Such narratives include a romanticized ideology of Sri Lankan history, nationalism, and religious identity. As I began building my literature review, I saw a lack of academic work around the Sri Lankan diasporic community in South Asian memory research; thus, this presentation aims to begin a conversation on diaspora identity and experience. By utilizing observations and 15 interviews from my five weeks in Staten Island, I aim to illustrate how narratives around authenticity and belonging emerge as an exclusive memory project focused on engraving the dominant Sri Lankan identity, Sinhalese Buddhist, into American spaces. With this in mind, I seek to answer the following questions: how is Sri Lankan identity formed, authorized, and performed within the Staten Island community? In what ways are Sri Lankan spaces in the United States a transnational reflection of mainstream Sri Lankan ideology of belonging? What role does materiality have in justifying the legitimacy to label such spaces as authentic and Sri Lankan? I begin with a discussion on how Sri Lankan identity is embedded within communal spaces such as the Sri Lankan Arts and Cultural Museum or Lakruwana restaurant as artifacts to memorialize national consciousness, religious

iconography, and traditions that authorize Sinhalese Buddhist identity as the only experience of Sri Lanka. Then, I explore the relationship between food and authenticity by drawing on the how Sri Lankan culture is commoditized as a consumed good to prescribe ideas on present belonging and a nostalgia for life before migration. I conclude these narratives and materials limit the acceptance of who counts as Sri Lankan within this community and establishes a tailored spectrum of "authentic" Sri Lankan-ness. Thus, the materials are reinforcing ethnic hierarchies that are transplanted from Sri Lanka and actively erasing experiences and narratives in Sri Lankan cultural that differ from the dominant one.

Contemporary Egyptian Nationalism Through an Ethnographic Lens*

Natalie Triche (Dr. Brian Pennington) Department of Religious Studies

From 2011-2013 Egypt saw massive protest movements that first sought to and then successfully toppled the regime of Hosni Mubarak. The protests led to elections that named Mohamed Morsi of the Muslim Brotherhood's Freedom and Justice Party to the presidency (the first ever democratically elected president of Egypt). After only one year, Morsi was ousted in a military coup led by Abdel Fattah Said al-Sisi, the military general who took office as president in 2013, where he remains today. Over the past decade, al-Sisi's regime has consolidated power, aided by his regime's facilitation of a singular national identity via tools of secularism, like establishing the supremacy of national identity over others, especially religious affiliation. Egypt's constitution names the nation as an Islamic country, yet Sisi foregrounds secularity in his governance. Over the course of two years, I pursued the question, what is the particular nature of Egyptian secularity and what are its implications for Egyptian identity? In a post-Arab Spring society, considering how identity is managed differently in public and private spheres is important because doing so reveals the way authoritarianism is negotiated in everyday life in Egypt. This project employed ethnographic fieldwork methods of data collection over the course of eight weeks in Cairo and interprets that data through the analytical frameworks of religious studies and global studies. Bringing the findings of preeminent scholars of secularism Saba Mahmood and Talal Asad together with the research I conducted leads me to argue that there are two central ways Egyptians frame their identity in primary ways in their everyday life. The first is *beledi*, or local, nationalism that takes a vernacular form and emphasizes love for Egyptian culture. The second is state-sanctioned nationalism. In this formation of national identity, pride for Sisi's regime is prominent. These two distinct forms of Egyptian nationalist expression that emerged in the course of my interviews reflect patterns in the negotiation of identity in authoritarian, post-Arab Spring Egypt.

Abstracts by Department/Program

Accounting

The Association Between Technical and Power Skills and Early Career Progression of Love School of Business Alumni

Mackenzie E. Deming (Dr. Kevin Agnew) Department of Accounting

There has been an increase in popularity among business majors as the U.S. national economy continues to grow and generate an abundance of data. There is a substantial need for people to make meaning out of numbers for analysis, financial, tax, audit, etc. purposes. In fact, over the next 10 years, analyst positions are projected to grow approximately 5% (U.S. Bureau of Labor Statistics). Elon's Martha & Spencer Love School of Business (LSB) provides an excellent education as well as the necessary means for students to become thoughtful and worldly leaders. The LSB houses three of the top ten undergraduate majors and had an employment and graduate success rate of 90% in 2022. This study examines technical and soft skills of recent graduates from the LSB to detect patterns that may have landed these alumni jobs. Technical skills, also known as hard skills, are specific capabilities learned to perform tasks that can be easily quantified, while power skills are "people skills" or personality traits one has. A data scraper will be created utilizing Python programming language, a technique of which online data is collected from another online platform. Particular factors from LinkedIn, such as gender, licenses & certifications, courses, and skills, are scraped and insight is provided as to what technical skills the alumni have. Additionally, a survey will be sent out to alumni asking simple personality-based questions where traits will be ranked on a scale from one (least important) to five (most important) that they believe made them successful in acquiring a job post-graduation. Results from both the data scraping and the survey will be examined and reported, and any trends indicated will help provide current undergraduate students what skill sets they should strengthen and work towards in their remaining years of school.

Biology

The Impact of Medication and Exercise on ADHD Behavior in Zebrafish

Kaitlin Cirillo (Dr. Linda Niedziela) Department of Biology

Diagnoses and prescriptions for attention deficit hyperactivity disorder (ADHD), a human disorder prevalent in children, have increased dramatically in the last decade for unknown reasons. Currently, medication is the most common treatment for ADHD, and the most commonly prescribed medication, methylphenidate, is a stimulant with many adverse effects. However, some studies show that exercise is beneficial in managing signs and symptoms of ADHD, both in addition to and instead of medication, depending on the severity of ADHD. Due to gene conservation and easily monitored behavior patterns, this research used zebrafish as the model organism to examine the effects of lead and exercise on a behavioral variable to measure ADHD severity. To conduct this research, a swim tunnel was constructed to exercise the zebrafish for 30 minutes daily for 10 consecutive days to represent chronic exercise. The behavioral variable, thigmotaxis, is the percentage of time spent on the outer edge of a petri dish. Thigmotaxis data was collected from video recording fish from above after interventions

were implemented, including lead exposure at 1 mg/L to induce ADHD-like behaviors as well as exercise to combat them. The values for thigmotaxis of all the fish in three groups (control, exercised, lead-exposed) were averaged and the percentages from each intervention were compared using ANOVA analysis, followed by paired t-tests when statistically significant. Analysis revealed increased thigmotaxis with lead exposure compared to control and exercise groups, both in the acclimation period ($p = 3.7 \times 10^{-3}$) and the thigmotaxic period ($p = 1.3 \times 10^{-3}$). Significant differences in thigmotaxis were also observed in both the first minute ($p = 2.7 \times 10^{-23}$) and the last minute ($p = 4.7 \times 10^{-22}$) across groups. However, no significant differences were observed between the first and last minute of thigmotaxis within any particular group. The next phase of the research will compare medication (methylphenidate), exercise (cardiovascular), and a combination of medication and exercise on ADHD-related behaviors and development.

Absolute and Relative Abundance of Tuber borchii at Burwell Farms

Lila R. Cobey (Dr. Antonio Izzo) Department of Biology

Tuber borchii is a type of ectomycorrhizal fungus—a fungus which has an obligate mutualism with a host tree upon which it relies for food. *T. borchii* is also responsible for producing highly-valued truffles as its fruiting body, from which spores are distributed. This species is garnering major interest in its controlled cultivation in North Carolina due to their high market value. In a typical commercial truffle orchard, host tree seedlings have been inoculated with *T. borchii* prior to planting. Over time, it is expected that native ectomycorrhizal fungi will outcompete the *T. borchii* for space on the host's roots, however it is not clear if that is the case, or if so, over what time frame this would occur. We took advantage of access to a successful truffle orchard—Burwell Farms in northern North Carolina—to study changes in the abundance of *T. borchii* in the soils as orchards age. Because ectomycorrhizal fungi cannot be cultivated in a laboratory setting, molecular techniques were necessary to gain further knowledge regarding their abundance and concentration in the soil. A total of 27 soil samples were analyzed from three plots of varying ages at Burwell Farms. Molecular analysis using real-time quantitative polymerase chain reactions (qPCR) was performed on each sample to determine the concentration of fungal DNA and the concentration of *T. borchii* DNA present in the soil. It was determined that there are no statistically significant differences in *T. borchii* concentrations between plots of different ages at Burwell Farms, relative to the total fungi and total DNA detected at each plot. These results suggest that *T. borchii* is successfully maintaining itself over time, in at least the time range we have examined. These findings help to develop a foundation of knowledge on the persistence of ectomycorrhizal species over time, and form a basis from which more nuanced questions surrounding *T. borchii* and other ectomycorrhizal species can be explored.

Investigating the Effects of Estrogen on Male and Female Pancreatic Tumor Cells

Lauren E. Copenhaver (Dr. Yuko J. Miyamoto) Department of Biology

Pancreatic cancer is one of the deadliest cancers, accounting for 7% of all cancer-related deaths. Despite women having a decreased prevalence and mortality rate with pancreatic cancer, women and the LGBTQ+ community are underrepresented and understudied in research. Our research focuses on how estrogen impacts male and female pancreatic cancer cells that may be the cause for this discrepancy. Investigating estrogen levels in women and trans-women is an interesting area of focus as their estrogen levels are different from men who are studied most often. While the range of estrogen concentrations for women and trans women are within similar ranges, the male sexed cells that present

in trans women may respond differently to estrogen levels they are not typically exposed to. While both male and female pancreatic cells have estrogen receptors, the different genetic composition and cellular environment lead us to theorize that there may be a difference in cell growth or death. To use the cells in our analysis of β- estradiol on pancreatic cell growth, death, and cell cycle function, model systems of female (Bx-PC 3) and male (PANC-1) cells were grown. These cell lines were then treated with various estrogen concentrations (0, 0.01, 10, 100 nM) for 24 hours and the effects on cell proliferation were evaluated by counting the cells. Preliminary results show no significant difference (p-value=0.119) in cell growth with estrogen exposure to the female cell line but a significant increase (p-value=0.026) in cell death was detected in the male line at mid-range estrogen concentrations. The next steps will be to treat the cells with a combination of estrogen and chemotherapeutics to see if drug treatment in combination with estrogen enhances cell death. This will help us better understand the effects of estrogen on pancreatic cancer growth and if the presence of estrogen has the potential to improve treatment options.

Structure and Community Composition of Relictual Populations of Chestnut Oak (Quercus montana) in the Eastern Piedmont of North Carolina

Ashlye Dullye (Dr. David Vandermast) Department of Biology

During the end of the Pleistocene Epoch 12,000 years ago, glaciers covered 5,000,000 square miles of North America and spread as far south as southern Virginia. Because of the cold weather brought on by the proximity of such a large ice mass, central North Carolina was dominated by cold-adapted flora. As the glaciers retreated, most of this flora migrated northward. However, isolated populations of some of these species, known as relictual populations, remain. This study characterizes relictual populations of Chestnut oak (*Quercus montana*) in the central Piedmont of North Carolina. Furthermore, we describe the composition of the forest community of which Chestnut oak is a component and determine the modern environmental conditions in which relictual populations exist. We are interested in whether these Chestnut oak populations currently appear to be stable, given anthropogenic climate change. We predicted that lower slope positions and more exposed aspects (S and W) would have reduced Chestnut oak abundance measurements than upper slope positions and sheltered aspects (N and E). We analyzed data from over 50 non-permanent CVS-style (Carolina Vegetation Survey) 100m^2 plots in Cane Creek Mountains Natural Area and Occoneechee Mountain Natural Area. At Cane Creek we found that the east aspect had higher community diversity (p=.002), lower Chestnut oak importance value (IV) (p=.0004), and fewer trees (p=.0002) than other aspects. For seedlings and saplings, the east-facing aspect had higher values for community richness, abundance, and diversity, but no differences for Chestnut oak seedlings and saplings. At Occoneechee we found that Chestnut oak IV was greater on north-facing sites than on south-facing (p=.04), and that this was due to the north-facing trees having greater basal area (p=.0005). For seedlings, north-facing aspect had significantly lower values for community richness, abundance, diversity and Chestnut oak relative abundance. However, for saplings, north-facing slopes had significantly higher values for community richness, abundance, and diversity, but not for Chestnut oak seedlings and saplings. In general, older populations of Chestnut oak appear to be stable and do not demonstrate significant statistically significant results along slope position or aspect that would suggest that climate change is currently affecting them.

An Open-Source Tool for Conducting High-Fidelity Vibrational Playback Experiments

Alana Evora (Dr. Jen Hamel) Department of Biology

Animals communicate to exchange information about activities central to their survival and reproduction, like foraging and mating. Many animal species, ranging from invertebrates to elephants, communicate with vibrational signals (i.e., waves that travel through solid substrates). One widely used and effective way to answer questions about vibrationally-sensitive organisms is the playback experiment, in which vibrational stimuli are played to focal organisms and their responses are observed. A challenge associated with vibrational playback experiments is that the stimuli played to organisms are filtered by both the playback equipment and the substrate through which the stimuli travel. This filtering causes unwanted distortion to the stimulus. A common solution is to measure the filtering and compensate for it, such that the characteristics of the stimulus detected by the organism match that of the intended stimulus. The purpose of this project is to develop an open-source tool for conducting vibrational playback experiments that (a) measures and compensates for unwanted filtering, (b) calibrates playback amplitude, and (c) plays vibrational stimuli. Our tool is based on a custom-written script in Matlab; however, because proprietary software licenses impose economic barriers that can limit access to research, we are developing our tool in the open-source language Python. The basic functions provided by the tool are a stepping stone towards increasing access to vibration research. Because the tool is open-source, we hope that the software can be expanded upon by other researchers in the vibrational communication research community.

Comparison of Tropical and Temperate Forest Composition and Structure Using a Higher-Taxon Rank

Arieh N. Fischthal (Dr. David Vandermast) Department of Biology

Tropical forest diversity is typically calculated by looking at the numbers of species contained within them. However, taxonomic sufficiency, where higher taxonomic ranks are used as surrogates, has been proposed as an alternative because it is faster, more cost effective, and does not require the level of expertise necessary to identify organisms to species rank. However, little work on this concept has been done for trees. In this study we report richness, Shannon's diversity, Simpson's dominance, and Pielou's evenness, and basal area at the Family taxonomic level in three different forests: Elon University Forest (EUF), a temperate forest in the Piedmont of North Carolina, Parque Internacional La Amistad (PILA), a montane cloud forest in Chiriqui Province, Panama, and Barro Colorado Island (BCI), a low elevation humid forest on an island in the Panama Canal in Panama Oeste Province. Our goal was to report each of the common diversity and structural measures for each forest at the Family taxonomic rank, to compare the data from each forest, and to set a baseline for the understanding of taxonomic sufficiency in trees commonly studied forest types. The basic unit of observation was a 10x10m module and though there were different numbers of modules in each forest, we compared the data from each forest by averaging values at the module level. At the Family taxonomic rank, PILA and BCI (H'=2.41 and 2.43, respectively) had significantly higher ($p<0.05$) diversity values than did EUF (H'=1.44) because of lower dominance values and higher evenness values. The Panamanian forests also had significantly greater basal area (BA=55.8 and 62.7 vs . 34.7 m2/ha, respectively). EUF trees occurred in fewer families (7.875 average among 8 plots vs. 19 and 15 for PILA and BCI). Results from our study of diversity and structure at the Family taxonomic rank are consistent with results of numerous other studies that show greater diversity in tropical forests than in temperate forests. Tropical forests demonstrate greater evenness and less dominance than those of temperate regions, consistent with the results of our study.

Comparing Genotype and Phenotype of Antibiotic Resistance Profiles of Staphylococcus Aureus Isolates from Cystic Fibrosis Patients

Meg Healy (Dr. Eryn Bernardy) Department of Biology

One of the most common bacterial pathogens found infecting the lungs of cystic fibrosis (CF) patients is Staphylococcus aureus. Over time, S. aureus has mutated and evolved to evade antibiotic treatment by acquiring resistance genes. This resistance to treatment has contributed to an increase in chronic infections that decrease patients' quality of life and leads to death. Researchers often know what genes are responsible for these antibiotic resistance traits and sequencing technology has allowed the search for these genes among clinical isolates to be fast, easy, and inexpensive. However, the presence of a gene in an organism does not always correlate to its physical expression, sometimes leaving clinicians in the dark about the true antibiotic resistance of isolates infecting patients. Research is lacking on the comparison between gene presence and observed expression of antibiotic resistance for a wide array of current S. aureus isolates infecting CF patients. Therefore, this work investigated if genotypic data of antibiotic resistance obtained from different isolates of S. aureus matched the resistance shown when grown with antibiotics. Clinical isolates of S. aureus obtained from the Cystic Fibrosis Biospecimen Registry at Emory University were tested with six different antibiotics, each from a different class. To do this, increasing concentrations of antibiotics were added to each isolate, which was grown in liquid media, to understand how much antibiotic is needed to kill the bacteria. As expected, the results depict some discrepancy between the genotypic expectation and the physical expression of antibiotic resistance in strains of S. aureus, inviting further investigation into genetic predication of pathogens for antibiotic treatment. Overall, this work will provide valuable information of precise resistance levels of each specific isolate of S. aureus, which could later be used for more accurate predictions when looking only at the bacterial genome.

Zebrafish Behavior in Response to Novel Environment and Objects

Patrick A. Klesa (Dr. Eric Bauer) Department of Biology

Fear, stress, and anxiety are complex behavioral states that have equally complex neurological bases which can be influenced by introduction of novel environments and objects. Due to the similarities between zebrafish and human brain anatomy, we are able to use zebrafish (D*anio rerio*) to investigate the phenomena of sex differences in fear behavior. The aim of this study is to track the influence of novel objects and environments on zebrafish behavior. The experimental protocol takes place over one week, where the fish are recorded over a 20-minute period of time, in which they are introduced to an experimental tank, which provides a novel environment and then introduced to a novel object. Fish behavior was tracked using Ethovision tracking software consisting of; 5 minutes before revealing the fear-inducing novel object and 15 minutes following the fear induction. Fear was assessed by using two specific behavioral patterns: Fear of novel environment and fear of novel object, using the first minute of presenting the fish to a novel environment and object presents the best data to help highlight any behavioral differences. Pre-partition raising, females spent about the same time in the bottom zones within the first minute compared to males. ($p= 0.5705$, $N=37$). Subsequently, when measuring the immobility duration of the fish, males displayed more time spent immobile than females at the bottom of the tank ($p= 0.1070$, $N=37$), this shows that males and females react similarly when presented with a novel environment. However, after the partition was raised, revealing the novel object, the female population spent about the same time immobile compared to males at the bottom of the tank within the first minute ($p= 0.8240$, $N=37$), this shows that females and males both display

behaviors of fear of a novel object. Through these results, we can see that females and males react similarly when introduced to a novel environment and novel objects. The next step in the experimental process is to increase the sample size through more experimentation.

Phthalates' Effect on Zebrafish Reproduction and Development

Channing M. Lamparski (Dr. Linda Niedziela) Department of Biology

Phthalates are found almost everywhere in today's world in products such as clothing, toys, food packaging, and fragrances. They provide flexibility, lubrication, water resistance, or act as solvents. Our exposure to phthalates is chronic, as humans have continuous contact to them over the course of their lifetime. They easily transfer from the products to the surrounding environment, making exposure very easy. Epidemiological studies have shown a significant association between human exposure to di(2-ethylhexyl)phthalate (DEHP), a well-known phthalate, and adverse effects on the reproductive system, such as endocrine disruption, fertility, and developmental defects. The purpose of this research was to compare DEHP with di(isononyl) cyclohexane-1,2-dicarboxylate (DINCH), its new and understudied non-phthalate alternative. Zebrafish were used as the model. Eight adult zebrafish (four males, four females) were placed into female-male pairings. Two pairs each were treated with 100 µg/L of DEHP or DINCH. After two weeks, breeding took place weekly for four weeks. The number of viable embryos, lifespan, and developmental defects were recorded. The control group produced a greater number of viable embryos than either treated group, providing support for the chemicals having a detrimental effect on reproductive success ($p = 2.31x10^{-7}$). It is of interest to note the DINCH group was the least successful, due to the lack of successful breeding events in this group, meaning the potential toxicity of DINCH should not be overlooked. No significant developmental defects or changes to lifespan were observed in the embryos in this study. These results help support both DINCH and DEHP having detrimental effects on the reproduction of zebrafish, as well as provide insight into what effect phthalate exposure may have on the human population.

The Interaction of the Gut Microbiome and Anxiety in Male and Female Zebrafish

Phoebe O. LaPoint (Dr. Jennifer Uno) Department of Biology

Recent research from the CDC indicates that 41.5% of adults in the US classify themselves as anxious or depressed. Interestingly, anxiety disorders are disproportionately more prevalent in women than men. It is well established that the microbiome greatly influences stress responses, mood states, and other aspects of brain health including anxiety disorders. It is also known that the microbial composition differs in males and females. Zebrafish are a good model organism for research on the gut microbiome and anxiety in humans as they both have very similar metabolic processes. This study aims to determine the similarities and differences between the male and female zebrafish microbiome and identify if these differences impact anxiety. Zebrafish were treated with amoxicillin to decrease the total intestinal bacterial abundance. The zebrafish were then subjected to an acute stress protocol or a chronic stress protocol. For acute stress, fish were net stressed for three minutes, followed by 3 minutes of acclimation. Chronic stress was induced over 8 days with fish being stressed daily prior to the three-minute net stress. Fish behavior and anxiety were assessed using the EthoVision tracking system and software. We observed a 48% and 67% decrease in bacterial abundance in males and females respectively treated with amoxicillin ($p<0.05$, $n= 5$). Interestingly both males and females treated with antibiotics showed significantly fewer right and left crosses following acute stress exposure- no significant differences were observed between male and female fish ($p<0.05$, $n=10$). In

chronically stressed fish, no differences were seen in anxiety-like behavior in control or antibiotic-treated fish regardless of sex. These results support current research indicating the overall role of the microbiome in anxiety and depression however, the differences between intestinal bacteria in males' and females' behavior remain unclear.

The Impact of a Vegan Diet on Cardiovascular Disease Risk in Men and Women Through the Gut Microbiome

Amanda J. Lee (Dr. Jennifer Uno) Department of Biology

Studies highlight many benefits of a vegan diet on the composition of the gut microbiome; however, little is known how and if these changes contribute to heart health. Trimethylamine (TMA) is a metabolic product produced from the breakdown of choline and L-Carnitine both found abundantly in red meat. TMA is converted to toxic trimethylamine N-oxide (TMAO) in the liver via flavin monooxygenase 3 (FMO3). The objective of this study was to examine if vegan diets impact TMA levels thus supporting cardiovascular health. We hypothesize that a vegan diet will foster bacterial diversity that favors decreased TMA/TMAO levels. Zebrafish were initially placed on antibiotics to clear their microbiome, following treatment, fish were fed a control, high fat (HF), or vegan diet for 3 weeks. Fish were sacrificed and intestinal, liver and heart tissue were harvested for analysis. Surprisingly, we observed the most significant increase in bacterial abundance in the HF diets relative to the vegan and control diets ($n= 5\text{-}6$, $p< 0.05$). Interestingly, when separated by sex, the highest change in bacterial abundance was seen in female fish on a HF diet. We next examined mRNA levels of FMO3. We saw the greatest increase in FMO3 levels in female fish on a HF diet, which corresponds to higher bacterial abundance ($n= 5\text{-}6$, $p< 0.05$). FMO3 levels were also increased for fish on a HF diet relative to the control diet with no significant differences between male and female fish. These results indicate that vegan diets may alter male and female bacterial composition differently however the impacts of these differences on CV health remain unknown.

Investigating Biofilm-producing Phenotypes in Clinical Staphylococcus aureus Isolates: Implications for Infection Persistence in Cystic Fibrosis Patients

Grace E. Loeser (Dr. Eryn Bernardy) Department of Biology

Pseudomonas aeruginosa and *Staphylococcus aureus* dominate infections in cystic fibrosis (CF) patients, and coinfection with these two bacteria leads to poor outcomes and a rapid decline in prognosis. The mechanism for these worse outcomes as a result of coinfection is poorly understood, though the biofilm-producing ability of *S. aureus* is thought to play a role. Therefore, the aim of this research is to determine the biofilm-producing ability of clinical *S. aureus* isolates from CF patients in order to understand the role that biofilms may have during infection by these isolates. Biofilms are a build-up of bacteria on a surface covered in a sticky substance made of polysaccharide. This polysaccharide can lead to immune evasion and infection persistence in CF patients by creating a physical barrier that prevents antibiotics from working properly. In order to evaluate the presence of biofilms, we grew each isolate on Congo red agar, a differential media, and observed the appearance of colonies. The dye in these plates is known to bind and aggregate in the biofilm causing a change in appearance. Smooth, red colonies reflect normal polysaccharide producers, while maroon, rough-textured colonies indicate polysaccharide overproducers and therefore these isolates have a strong biofilm. Results indicate that many of the clinical isolates examined are strong biofilm producers and thus likely contribute to the chronic nature of infection in the CF patients they originated from. In the

future, this data will be combined with information we have obtained about how these same *S. aureus* clinical isolates interact with *P. aeruginosa*. Overall, this work will add to our understanding of how biofilm production and potential persistence of *S. aureus* relates to its ability to coinfect with *P. aeruginosa*, and may provide valuable information to help us better treat these chronic infections.

Investigating Interactions Between Bacteria Infecting Patients with Cystic Fibrosis

Michelle L. Marder (Dr. Eryn Bernardy) Department of Biology

Lung infections in cystic fibrosis (CF) patients are the main cause of morbidity and mortality, and most are caused by either Staphylococcus aureus (SA) or Pseudomonas aeruginosa (PA). SA infections are mostly present in younger CF patients, but as they age, PA becomes the more common infecting agent. A smaller subset of patients are coinfected with SA and PA and have worse outcomes than those infected with only one bacteria. PA is known to kill SA in coculture, so the mechanisms of how they coexist are unknown. This project aims to investigate the interactions between two PA laboratory strains and various SA clinical isolates. There were two PA strains used, one of which is a wild-type known to kill SA (PAO1), and another which coexists with SA (PDO300), this strain is known as mucoid, which produces an abundance of polysaccharides. The SA clinical isolates were grown separately and then mixed with each PA strain and cells were counted after 24 hours of growth. We observed three different outcomes for the clinical SA isolates; the majority of isolates were only killed by PAO1, some were killed by both PA strains, and even fewer survived coculture with both PA strains. This data will help us determine the variety and prevalence of different interactions between clinical SA isolates and PA. Further data needs to be collected to determine the correlation between the interaction of SA and PA and other noteworthy clinical phenotypes. Overall, this work will help us identify the prevalence of coexistence between these two clinically important bacteria and potentially identify ways to prevent coinfection and the accompanying decline in patient health.

Abundance and Distribution of Foliage Gleaning Bat Prey in a Neotropical Forest

Emma G. McNamara & Christina R. Berry (Dr. Jennifer Hamel) Department of Biology

Predators and prey exhibit various adaptations that contribute to their foraging success and ability to survive. In an environment such as a neotropical forest, dense vegetation can conceal organisms, making it difficult for predators to locate them. One abundant type of predator in neotropical forests is Foliage Gleaning Bats (FGBs). FGBs hunt in dense tropical forests and collect their prey, which include arthropods and other small animals, from substrates such as leaves. They use echolocation to locate and identify prey, but vegetation reflects echolocation signals, and the resulting noise should interfere with an FGB's ability to hunt. One behavioral strategy that solves this challenge has been demonstrated by FGBs in a laboratory setting: bats can approach leaves at oblique angles, thereby avoiding reflections of noise from echolocation signals. However, for this strategy to be effective, prey must be distributed in locations that FGBs would encounter while using such approach angles. We collected data on the abundance and distribution of FGB prey in the neotropical forest understory on Barro Colorado Island (BCI), Panama. We searched twelve 25 m belt transects (0.5 m wide, from 0.5 to 2 m above ground) of forest understory vegetation, identified each animal that we located, and recorded location parameters, such as the type of plant each animal was on and their location on the plant. We sampled 414 plants, and potential prey items were observed on almost one third of them. The most common taxa observed were Arachnida, Hymenoptera, and Orthoptera. Animals were frequently observed on the tops and bottoms of leaves in the understory, where they could potentially

be located by an FGB approaching from an oblique angle. Our findings provide important information about the environment in which foliage gleaning bats catch their prey and will inform future studies on FGB foraging strategies.

Investigating the Role of PPARs in Bile Acid-Induced Primary Biliary Cholangitis-Related Cellular Stress*

Ons Yasmeen Mrad Bouali (Dr. Tonya L. Train) Department of Biology

Primary Biliary Cholangitis (PBC) is a chronic liver disease characterized by autoimmune-mediated destruction of the bile ducts, in part due to impaired intracellular pH signaling, that can ultimately lead to liver failure. A class of nuclear receptors, called PPARs, have been shown to play a role in inflammation and bile acid transport in the liver. Recent clinical trials have used PPAR activators, like bezafibrate, to decrease PBC-related inflammation. However, the effects of PPAR modulation at the cellular level have yet to be characterized in PBC due to the absence of an effective cellular model. In this study, H69 bile duct cells were used to create a model of PBC-like cellular stress using glycochenodeoxycholic acid (GCDCA), a bile acid seen in increased concentrations in PBC patients' blood. Cells were treated with various concentrations of GCDCA for 8 hours and a fluorescent assay was used to determine cell viability. H69 cells cultured for 8 hours with 500 µM or 1 mM concentrations of GCDCA resulted in significantly decreased cell viability, 58% and 23% respectively, as compared to untreated cells. When cells were pre-treated with bezafibrate, to activate PPARs, significant protective effects against GCDCA-induced death were seen. Pre-treatment with 100µM or 500µM concentrations of bezafibrate for 12 hours resulted in a 2.6- and 5.3-fold increase in cell viability, respectively, as compared to the untreated GCDCA control. This preliminary viability data demonstrates that while GCDCA possesses toxic effects on H69 cells, bezafibrate may be able to protect against this stress, creating a PBC-like stress and treatment model. Our future goals include testing more PPAR-modulating drugs to determine the role of activation versus de-activation of PPARs in PBC-like cell stress.

Investigating Chemotherapeutic Resistance in Leukemic Cells Exposed to Asparaginase

Tyler C. Myers (Dr. Tonya L. Train) Department of Biology

Acute lymphoblastic leukemia (ALL) is a cancer with a 5-year survival rate of 85% when treated with chemotherapy. However, in the minority of patients who develop resistance to their chemotherapy, the survival rate drops to approximately 20%. Asparaginase is a commonly used chemotherapeutic for patients with ALL. It functions by breaking down asparagine, an amino acid that is essential for cancer cell division, resulting in increased rates of apoptosis (cell death). Preliminary experiments were performed to investigate the efficacy of asparaginase at inducing apoptosis in two leukemic cell lines at various concentrations to determine the EC50 (effective concentration to kill 50% of the cells) for the leukemia cell lines HL60 (acute myelogenous leukemia) and Jurkat (acute T-cell leukemia). The cells were separated into six different treatment groups and exposed to various concentrations of asparaginase for 24 hours (0, 1, 5, 10, 20, and 50IU). After 24 hours, the percent viability was determined using a quantitative fluorescent assay. A statistically significant ($p = 1.11*10^{-8}$) correlation was observed between concentration of asparaginase and mortality of both cell lines ($r^2_{Jurkat} = 0.95$ and $r^2_{HL60} = 0.91$ with EC50s of 2.75IU and 2.25IU, respectively) after 24 hours of exposure. In future experiments, asparaginase resistance will be induced through long-term, low dose exposure to asparaginase. In the resistant cells, new EC50s will be calculated with and without the addition of

asparagine synthetase and glutamine synthetase inhibitors. These preliminary experiments provide the baseline for future investigation into asparaginase resistance and enzyme inhibition within these leukemic cells, with the goal of lowering EC50s in asparaginase-resistant cells.

Molecular Analysis of Soil Fungal Communities in a Truffle Orchard Chronosequence

Adam S. Ohana (Dr. Antonio Izzo) Department of Biology

Truffles are a very sought after and expensive food that are a fungus within the *Tuber* genus. Truffle fungi form a mutualistic relationship with their host tree, relying on it entirely for carbon while helping the tree acquire limiting nutrients. In North Carolina, many farmers are attempting to cultivate these fungi, which are otherwise very rare and only found in the wild. Many fungi in the soil compete for nutrients and tree roots, where truffle farmers look to support the most desirable fungi. Shifting soil conditions due to orchard succession and orchard treatments therefore can alter the competitive landscape in a fungal community. This study looked at fungal community development as orchards age at Burwell Farms in North Carolina. Growing *Tuber borchii*, a desirable white truffle species, has been their specialty and their farm has orchards at multiple stages of development. The oldest and most profitable orchard is around 8 years old, the middle one is 3-4 years old and the youngest orchard is 1-2 years old. It was hypothesized that the fungal community would shift as the orchard ages. We took advantage of the different development stages to study the fungal community change as the orchard ages. Soil samples were collected in February of 2022, and total DNA was isolated from each. Because many fungi including the truffle fungi cannot be cultured, we used molecular approaches (DNA community fingerprinting of the total fungi through TRFLP) to analyze the soils. Our preliminary results support our hypotheses as we found that fungal communities within each stage are more similar than they are between stages. These preliminary results can lead to understanding how soil communities promote the growth of white truffles.

Understanding Evolution at the mtDNA Sequence Level in Hybrid Tree Lizards

Claudia A. Penny (Dr. Greg Haenel) Department of Biology

Mitochondria are largely responsible for energy production in the cell and have their own DNA (mtDNA). Due to the mitochondria's vital cell function, their genes are under selection to remain unchanged (balancing selection). However, recent research has shown that under certain conditions selection may be acting on mtDNA genes to slightly modify their function (directional selection). This research tested for natural selection on the mtDNA in hybrid lizards. The Long-tailed Brush lizard (*Urosaurus graciosus*) is a heat adapted species that hybridizes with the Common Tree lizard (*Urosaurus ornatus*), which is less heat adapted. These hybrids act like *U. graciosus* ecologically while containing the mtDNA of *U. ornatus*. Hybrid mitochondria show disrupted ATP production. Therefore, we expect hybrid mtDNA to be undergoing natural selection to improve overall energy production. To test this, we compared the codons of mtDNA genes from each species to see if the hybrid mtDNA was changing to better interact with a different nuclear DNA background. We have the complete mtDNA sequence for 2 individuals of each species and 4 hybrids, and have characterized 10,216 base pairs for changes in the mtDNA sequence. To see which mtDNA genes may be under stronger selection, we compared the proportion of amino acid replacements against the total gene length for each of the 13 mtDNA coding regions. We focused on the DNA mutations that cause the individual amino acid changes for each protein-coding gene. Some genes will have varying rates of change based on their position within the mtDNA genome and the coded protein function. The results show that some genes (ATPase8, ND4L, and CytochromeB) are under directional selection while

others show only balancing selection. This research is important because as species are forced to change habitats due to climate change, there will be more interspecific interactions and an increased number of hybrids formed. With our naturally-occurring model, we can understand the genetics of these interactions and better predict what will happen as climate change continues to alter natural habitats.

Examining the Role of the Gut-Brain Axis in Alcohol Use Disorder in Zebrafish

Samuel Ramirez (Dr. Jennifer Uno) Department of Biology

14.5 million people struggle with Alcohol Use Disorder (AUD), characterized by uncontrolled drinking and withdrawal. Both chronic and acute alcohol use are known to disrupt the intestinal microbiome and are associated with mood disorders. The gut-brain axis is a bidirectional communication pathway between the brain and the intestines. Probiotic modulation has already been shown to alter brain chemistry in zebrafish. Recent research indicates the gut-brain axis is involved in the behavior modifications associated with AUD, however the mechanism by which it does so remains unknown. The objective of this study is to examine the impact that alcohol has on the gut-brain axis. We hypothesize that a reduced intestinal diversity will lead to heightened behavioral responses and alter biomarkers associated with chronic alcohol exposure. In order to examine this hypothesis, zebrafish (Danio rerio) were exposed to amoxicillin and erythromycin for at least fifteen days to clear their microbiome. Following treatment, fish were immersed in 0.50% ethanol for one hour and in escalating dosage up to 0.25% for two weeks to mimic acute and chronic alcohol exposure. Fish were recorded for 10 minutes following treatment to analyze behavioral patterns. Preliminary results from the acute ethanol treatment indicate fish exposed to ethanol in both antibiotic treated and untreated groups displayed reduced vertical and horizontal transitions, with more pronounced shifts in antibiotic-ethanol- treated group (n= 6). Future studies will focus on further analyzing data using video-tracking software and molecular examination of biomarkers such as GABA receptor subunits, as dysregulation of these genes are linked to alcohol preference. We hypothesize increased GABA receptor subunit gene expression following ethanol exposure and modulation of this expression dependent on microbiome composition.

Using AI to Classify Birdsong in a Noisy Environment: A Comparative Study of Noise Filters

Emily N. Shaheen (Dr. Dave Gammon) Department of Biology

The presence of background noise often leads to inaccuracies when artificial intelligence algorithms categorize sounds, e.g., voice-to-text transcription. To assess whether noise reduction can help improve such categorization, I compared the classification accuracy of birdsong into syllable types after applying four types of noise filters. Multivariate statistical tests based on acoustic measurements from hundreds of mockingbird songs showed that classification accuracy improved with the effectiveness of the noise filter. I argue that developing an AI model capable of automatic classification for long recordings could be a critical tool for future research.

Examining the Potential Tradeoffs of Vibrational Signals: Who's Listening?

Ainsley B. Shan & Jake Ramalho (Dr. Jennifer Hamel & Dr. Michael Kingston) Department of Biology

Animals communicate to facilitate behaviors such as mating, foraging, and predator evasion and defense. However, communication can be costly: signals can be detected by both intended and unintended receivers, including eavesdropping predators. In a plant-feeding insect (Hemiptera: *Entylia carinata*), females with eggs or offspring produce vibrational signals during simulated predator encounters, and males produce vibrational signals in a mating context. Because most invertebrate predators of *Entylia* are sensitive to substrate-borne vibrations, we hypothesized that a potential cost of vibrational signaling for this species is the attraction of eavesdropping predators. To test this hypothesis, we examined the responses of a common, generalist insect predator (Coleoptera: *Hippodamia convergens*) to male mating signals, maternal antipredator signals, and silence. We played vibrational stimuli to predators through the stems of potted plants using linear resonant actuators, and we monitored the stimuli that were played using micro accelerometers. We found that the amount of time until predators located the stimulus leaf differed among treatments (one-way ANOVA: F:3.790, P:0.048), but pairwise tests were not significant (Holm-Sidak method: NS). However, a total of 7 predators located the stimulus during treatments in which signals were played, and no predators located the stimulus during the silence treatments. In addition, we found no differences between treatments in the amount of time predators spent moving on plants or in the amount of time that predators remained on plants. We conclude that the vibrational signals produced by *Entylia carinata* have the potential to attract predators. Our findings provide evidence that vibrational communication may impact ecological interactions. However, further work is needed to uncover the costs and benefits of vibrational communication for this species.

Differences in DNA Damage due to Reactive Oxygen Species in Hybrid Lizards

Chase R. Solomon (Dr. Greg Haenel) Department of Biology

Hybridization can occur when the ranges of closely related species overlap. Hybrid offspring often have lower fitness due to genetic incompatibilities that can lead to cellular dysfunction and infertility. Previous analyses of mitochondrial function in hybrids of the lizards *Urosaurus graciosus* and *Urosaurus ornatus* found that these hybrids had increased ATP production rates. Higher ATP production increases reactive oxygen species (ROS) production which can then damage DNA. Research also found increased melanin content in hybrid liver tissue, which may be functioning to protect the hybrid lizard DNA from damage due to excess ROS. The purpose of this study was to assess the difference in DNA damage due to ROS in liver tissue of the two parental types and their hybrids. Because hybrid lizards show genetic incompatibilities, we expect them to be more susceptible to DNA damage than parental types when exposed to ROS. Isolated liver tissue cells were treated with hydrogen peroxide, a source of ROS, at 3 different concentrations (0.0882M, 0.0176M, and 0.0088M). Comet assays were used to assess DNA damage. The comet assay allows the visualization of DNA damage through single-cell electrophoresis. Damaged DNA breaks into shorter fragments and travels farther in electrophoresis, forming a “tail” to the DNA. Images of DNA damage were analyzed using OpenComet. Each liver tissue sample (6 total, n=2 per species) resulted in analysis of roughly 1,000 cells. DNA damage was assessed by comparing the olive moment ([tail mean-head mean] x [% of DNA in the tail]) of cells. Both hybrid and *U. ornatus* tissue showed significantly higher damage when compared to *U. graciosus* (ANOVA, $p < 0.01$). There was no significant difference between hybrid and *U. ornatus* tissue. It appears that *U. graciosus*, which lives in much hotter environments than *U. ornatus*, has evolved a way to protect its DNA from high levels of ROS correlated to living in extreme conditions. This mechanism, however, does not appear to function in hybrids which are found in the same extreme environments but have many of the genes (including the mtDNA) of the *U. ornatus*.

Comparison of Diversity Values on Two Coral Reefs in Guna Yala Comarca, Panama

Kinga Srednicka (Dr. David Vandermast) Department of Biology

Many anthropogenic stressors are impacting the health of coral reefs globally. Pollution, ocean acidification, sea level rising, overfishing, and tourism are contributors to severe damage and destruction of reefs. To measure current anthropogenic impacts – and more specifically find indicators of a healthy reef – two coral reef sites were studied in Guna Yala, Panama, a growing archipelago community. Both sites were on the leeward sides of their respective islands: site 1 was near an inhabited tourist island, while site 2 was near an uninhabited island. The relative distance from and development of the nearby community was recorded at each site to record effects of potential anthropogenic impacts. To sample the reefs, 1x1 m^2 gridded quadrats were used to create 81 points where sand, dead coral, hard coral, soft coral, and other sessile organisms were recorded. Motile species were recorded if they were found anywhere in a quadrat. Between the two sites, 24 species were identified in 150 quadrats. The Shannon Diversity Index and a two-tailed, two sample equal variance t-test were performed to compare the diversity between the two sites. The presence of soft coral, hard coral, lettuce coral, and total amount of coral was significantly greater ($p<.05$) in site 1 than site 2. The Shannon Diversity value did not differ significantly between sites, although a greater abundance of species was found at site 1 (31 vs. 27), the island located near greater potential anthropogenic stressors. Differences between motile or other sessile organisms at each site in diversity were not significant. The results show conflicting findings to determine the severity of anthropogenic stressors on nearby coral reefs. Other studies on reef health in Guna Yala also found conflicting results, but that reef diversity was greater at sites further from human habitation. With future studies and continuing to monitor healthy reefs, it is possible to know the extent of anthropogenic harm on coral reefs.

Analyzing Odyssey Scholars' Experiences in STEM*

Jennifer T. Tran (Dr. Jessica Merricks) Department of Biology

Collaborative innovation lies at the heart of STEM disciplines, yet the United States continues to struggle to achieve diverse representation in these fields. The large gap in access to STEM education for marginalized communities (underrepresented racial/ethnic groups, low-income communities, and first-generation college students) is further exacerbated by low retention of STEM majors overall. This highlights the need to not only support better access to STEM degree programs, but to find ways to support marginalized student success through graduation. Many US Institutions provide programs and services to support students from underrepresented communities. For example, the Odyssey Scholars program at Elon University supports academically strong leaders in their community, but also who demonstrate financial barriers to higher education. The program provides opportunities for study abroad, networking, and for undergraduate research. Despite the high quality education offered at Elon University, and the promises of the Odyssey program, STEM students in this program experience extremely low retention in their major. The purpose of our work is to explore the academic and social experiences of Odyssey Scholars in order to understand how and why many abandon their goal of pursuing STEM degrees in favor of other non-STEM degrees. Through an analysis of students' perspectives during focus groups containing first-year students and upperclassmen, interviews with upperclassmen, plus insights about students' background and experiences from survey data, we characterized the factors that underlie students' decisions to leave the STEM field. We chose to include the voices of students who persisted through the major as well as those who left STEM in favor of

other degrees. Our findings indicate that strong professor-student relationships contribute to retention, but issues related to academic support and workload management were strongly tied to students' overall confidence and ability to persist.

Chemistry

Analysis of Trace Metal Content in Littered Cigarette Materials

Anna C. Altmann (Dr. Justin Clar) Department of Chemistry

Substantial research has addressed the environmental impact of nicotine from cigarettes and cigarette butts (CBs) on human and environmental health. However, very little research has focused on the trace metals found inside tobacco and cigarettes, and their impact on human health and the environment. Previous studies on the release of trace metals from CBs have not determined if CBs are a source or sink for trace metals in the environment. This research seeks to address that question by developing a baseline of trace metals content in CBs before subsequent environmental release studies. In Phase 1 of this project, a mass balance was completed to determine trace metal concentrations in each component (paper, tobacco, and filter) of an unsmoked cigarette. The cigarette components from six brands were digested with hydrochloric acid and nitric acid using EPA method 3051A before metals analysis with Inductively Coupled Plasma – Optical Emission Spectrometry (ICP-OES). In Phase 2 of this study, CBs produced through laboratory simulated smoking and CBs collected from the environment were tested for their ability to leach trace metals into receiving waters of different chemical properties and identity. Test solutions include Milli-Q water, simulated precipitation, phosphate buffers (pH 10, pH 7) and simulated seawater. Results indicate that artificially smoked CBs leach the same or slightly more metal than the CBs from the environment. Additionally, the more degraded the CBs were from the environment, the less they leached. Overall, the leaching solution did not impact the quantity of metal leached. In addition to leaching, CBs collected from the environment were shown to pick up metals, with differently degraded CBs acting as a sink for specific trace metals, like aluminum. Future research will investigate leaching in natural water solutions, the leaching of toxic low concentration metals, and CBs as passive tracers.

Mystery Skyscrapers in the Cell: Probing the Role of Guanine Quadruplexes in the Development of Chemotherapy Resistance

Christopher D'Inzeo (Dr. Victoria Moore) Department of Chemistry

Guanine quadruplexes (G4s) are nucleic acid structures believed to play a variety of roles in gene regulation. In particular, previous studies have shown the functional relevance of G4s in regulating genes involved in the development of cancer. Additionally, G4s have been shown to exist in higher amounts in cancerous tissue relative to their non-cancerous counterparts, suggesting that the formation of G4 structures is involved in the development of cancer. While the relevance of G4s in the development of cancer has been established, the role of G4s in the development of resistance to chemotherapy remains unexplored. Therefore, this study aims to investigate the functional role of G4s in chemoresistance. To do this, G4s will be visualized and quantified in non-resistant and resistant pancreatic ductal adenocarcinoma (PDAC), acute myeloid leukemia (AML), and NUT carcinoma (NC) cell lines. While resistant AML and NC cell lines have been established, the first part of this study involved the development of a PDAC cell lines resistant to the gold-standard chemotherapy 5-

fluorouracil (5FU). Initial results during the development of the 5FU resistance PDAC cell line indicate high levels of intrinsic 5FU resistance in PDAC and drastic phenotypic changes upon treatment with low concentrations of 5FU. Ongoing work involves immunofluorescent experiments to visualize and quantify G4s in parental and chemoresistant cancer utilizing BG4, a G4-specific antibody. If shown to play a role in the development of chemoresistance, this study will encourage further research into the functional role of G4s in the regulation of specific genes and the development of therapeutics targeting G4s relevant to chemoresistance development.

PDMS Boron Nitride Composites for Water Treatment

Otto Fisher (Dr. Justin Clar) Department of Chemistry

Access to clean water is a global issue and research into new and improved methods to treat contaminated water is vital for not only the environment but the ecosystem. While the current industry standard used in the treatment of water is Granular Activated Carbon (GAC), our research set out to determine if other materials may be more efficient and effective. Currently, our research examines the use of Boron Nitride Nano Sheets (BNNS). The particles are composed of atoms of boron and nitrogen allowing for an extremely high surface area. This increased surface area allows for significantly more interaction with possible contaminants. Our research aims to test the effectiveness of BNNS to determine its viability in removing contaminants from water. We have designed “sponges” made of polydimethylsiloxane (PDMS) and BNNS particles. The polymer acts as a rubber to immobilize the BNNS particles. Our initial experimentation compared the PDMS polymer composites functionalized with BNNS against the industry standard GAC. Our data retrieved was promising as all of the BNNS composites proved to be more effective in our test trials. Specifically, the BNNS particles have now been successfully implemented to remove multiple model organic molecules such as methylene blue, aniline yellow, and congo red azo dyes. The progress made regarding organic contaminants suggests potential success with other common contaminants such as metals. Thus far, the use of copper(II) chloride as a model metal contaminant has elucidated valuable data for future contaminants regarding the effectiveness of BNNS particles. The goal of subsequent research includes optimizing the BNNS composites for increased water remediation. Current testing of other model contaminates such as nickel (II) chloride and lead (II) chloride are ongoing.

Examination of Trace Metal Content in Sparklers: Implications of Exposure

Foster Horton (Dr. Justin Clar) Department of Chemistry

Fireworks have been known to produce a large amount of trace metal pollutants which present a serious risk to the respiratory system of healthy individuals as well as those suffering from underlying respiratory diseases. While the link between trace metal pollutants and respiratory health has been examined in the case of fireworks, there has been little to no research done on the substantially smaller, but still plausible physiological impact of sparklers. Sparklers are composed of a variety of metals that can produce a broad range of colored sparks when ignited, similar to fireworks. The presence and concentration of these metals in colored sparklers could pose a potential risk to individuals in close proximity if the metal-containing vapors produced by the sparklers are inhaled. Respiratory exposure to fumes may result in a multitude of health conditions ranging from lung irritation to permeant damage on a cellular level. Through ICP analysis of metal compounds present in the fumes emitted by sparklers as well as their metallic composition before and after burning, sparklers potential for physiological damage can be assessed.

The Interaction Between Oxidized ß-Estradiol and DNA

Sarina S. Jackowski (Dr. Kathryn Matera) Department of Chemistry

The initiation of breast cancer has been widely associated with certain processes involving the natural steroid estrogen, or estrogenic carcinogenesis. One proposed mechanism of carcinogenesis is estrogen oxidative metabolism, catalyzed by mammalian peroxidases. The mammalian peroxidase most implicated in breast cancer initiation is lactoperoxidase (LPO) as it is found where estrogens circulate, such as the breast ducts. Peroxidases can catalyze the oxidation of estrogen catechol metabolites to toxic quinone derivatives. These derivatives are proposed to cause cancer through covalent modification of DNA, but their structure bound to DNA is unknown. There is also a lack of evidence that quinone derivatives are the only compounds formed through estrogen oxidative metabolism that interact with DNA. In this study, estrogens oxidized in the presence of mammalian peroxidases were analyzed to give insight to the product(s) formed and to determine the mechanism by which these oxidized estrogens may bind to DNA. To analyze these interactions, the oxidation of β-estradiol in the presence of hydrogen peroxide was catalyzed by LPO at varying conditions. The oxidized compounds were characterized through thin layer chromatography (TLC) and ^{1}H-NMR. The interaction between oxidized β-estradiol and DNA was analyzed through DNA agarose gel electrophoresis, UV-visible spectroscopy, and estrogen ELISA assays. Results suggest the formation of multiple oxidized estrogens, while the carcinogenesis mechanism is still unknown. Results suggest that the oxidized product may be intercalating between DNA bases or cleaving the DNA.

Investigating Transthyretin Aggregates Link to Oxidative Damage of HDL Cholesterol Carriers

Alexandra H. Lahetta (Dr. Kathryn Matera) Department of Chemistry

Transthyretin (TTR) is a protein that has been implicated in oxidative damage of high density lipoprotein (HDL) cholesterol carriers. Normally TTR exists as a stable tetramer of four identical monomeric peptides, but with amyloidosis disease it destabilizes and the tetramer dissociates. The monomers then misfold, oligomerize, and eventually form fibrils that are deposited in tissues. These TTR aggregates are associated with oxidation and when they interact with HDL, the HDL becomes ineffective at carrying cholesterol to the liver to be metabolized. As a result, cholesterol builds up and forms plaque in arteries causing atherosclerosis. To gain insight into the relationship between TTR aggregates and HDL, the mechanism by which TTR aggregates cause oxidative damage to HDL cholesterol carriers was investigated. Numerous methods were used to analyze TTR aggregation including SDS-PAGE to characterize aggregate size and western blotting of oxidized proteins in HDL to measure the oxidative ability of TTR aggregates. Results from SDS-PAGE indicate that aggregates of up to eight monomers form after ten days at physiological temperature (37°C). Findings from western blotting suggest the ability of TTR to oxidize HDL, specifically the apolipoprotein component. Gaining a deeper understanding of the interaction between TTR aggregates and HDL can aid in developing preventive or therapeutic measures. In addition, the findings related to both aggregation and oxidation could be applied to TTR amyloidosis or other diseases with similar etiologies.

Impacts of pH on Decomposition of Aqueous Carbonic Acid

Josephine McNeil (Dr. Anthony Rizzuto) Department of Chemistry

The study of aqueous carbonic acid is of critical importance, as it plays an essential role both in the human body, as a buffer regulating blood pH, and in the environment, serving as the centerpiece of the global carbon cycle. Carbonic acid is highly unstable in aqueous solution and the decomposition into carbon dioxide and water occurs at an incredibly rapid rate, typically in millisecond timescales. Because of this short lifetime in aqueous solution, the kinetic properties (i.e. reaction rate) of carbonic acid are incompletely understood. Adding to the problem, most previous kinetic studies of carbonic acid have relied on indirect measurements of carbonic acid concentrations from direct measurements of its decomposition products (CO_2 and water). Our current study, on the other hand, involves the direct measurement of aqueous carbonic acid concentrations over time, by using a fast-flow mixing system coupled with liquid microjet technology, along with Raman scattering spectroscopy. This has allowed us to determine that the decomposition of carbonic acid into carbon dioxide and water follows first-order kinetics, and has a rate constant measured to be 0.030 ± 0.007 ms^{-1}. Ongoing studies have begun to investigate the carbonic acid equilibrium system over various pH ranges, most notably, at pH 7.4, which mimics human blood.

Kinetic Investigations of Nox Chemistry Pertaining to the Global Nitrogen Cycle

Ashley M. Pehan (Dr. Anthony Rizzuto) Department of Chemistry

Nitrogen-containing compounds and the physical and chemical processes in which they participate have long been known to impact fundamental atmospheric phenomena. NOx compounds, a type of aerosol particle, contain nitrogen and oxygen and are of particular interest as they have been linked to global climate change. The focus of this investigation is on aqueous nitrous acid (HONO), a short-lived NOx compound that decomposes into other common NOx particles (e.g., NO, NO_2, etc.). Consequently, these particles can cause significant damage to the environment, in particular their role in ozone layer depletion. Recent studies of the HONO decomposition reaction have shown that high concentrations of HONO follow a second-order kinetic decomposition, consistent with the current literature, but interestingly low concentration HONO follows a first-order decomposition. This concentration dependence on the kinetics is particularly intriguing as it implies two different chemical mechanisms are occurring and are dependent on initial HONO concentration. To elucidate the specifics of these two mechanisms, the products of these reactions have been studied at high and low concentrations in both aqueous and gas phases using UV-Visible spectroscopy and Raman scattering spectroscopy. The low-concentration spectra have been analyzed against high-concentration decomposition to confirm differences in the chemical mechanisms and identify products. Ongoing work is aimed at identifying decomposition products of low-concentration HONO.

Mechanisms of Fatty Acid Oxidation by Myeloperoxidase: The Ramifications for Heart Disease

Cole Powell (Dr. Kathryn Mansfield Matera) Department of Chemistry

Atherosclerosis is known as the buildup of plaque in arteries and has been linked to heart disease, which is the leading cause of death in the United States. The arterial plaque associated with atherosclerosis contains oxidized phosphoglycerides, largely comprised of three major lipids, linoleic, oleic, and arachidonic acids. These fatty acids are oxidized in the presence of an enzyme catalyst, myeloperoxidase (MPO), and hydrogen peroxide. This research has investigated the redox reaction between the three fatty acids and MPO, and focused mainly on proposing a mechanism for fatty acid oxidation. This has been done by performing enzymatic assays to confirm oxidation is occurring, and characterizing the oxidized products formed through spectroscopic techniques, including UV-visible

spectroscopy, nuclear magnetic resonance, and liquid chromatography/mass spectrometry. Additionally, colorimetric assays have been used to further characterize and quantify functional groups that may be indicative of oxidation. This research is designed as a model system, which uses purified samples of fatty acids with physiological relevant concentrations. Results show that linoleic acid and arachidonic acid oxidation catalyzed by MPO does occur readily. A likely mechanism for these reactions has been proposed, showing the movement of double bonds into conjugation, a key indication of free radical oxidations on fatty acids, and the addition of peroxide groups onto the carbon chain of the fatty acid, potentially cleaving the molecule to form malondialdehyde groups. Oleic acid is hypothesized to have similar reaction mechanisms, but does not react as readily.

Investigation of Synergistic Combinations of Chemotherapy Drugs for the Treatment of Oral Cancer

Makayla M. Oby (Dr. Victoria Del Gaizo Moore) Department of Chemistry

Oral cancer is one of the most common forms of cancer found in developing countries, but despite current efforts, oral cancer has remained prevalent. Current research on oral cancer is centered on clinical studies focused on single drugs or very few combinations of therapeutics historically used to treat oral cancer. However, there is a gap in the literature about the use of combinations of drug treatments for oral cancer. The goal of this study is to explore combination treatments and assess whether any synergistic effects can be produced. To accomplish this, oral squamous cell carcinoma (OSCC) cell lines, Cal-27 and OECM-1, from the tongue and the oral cavity respectively, will be used to investigate the efficacy of single drugs as well as combinations of drugs from a wide array of chemotherapy agents currently used to treat different forms of cancer. Thus far, cell viability assays have been performed in triplicate for Cal-27 and OECM-1 to analyze their viability in the presence of 14 drugs used to treat different forms of cancer: OXPT, 5-FU, CIS, MTX, CAB, TH278, GIM, VIN, DTX, HYD, PD0, IBET-762, ABT-199, and JQ1. These drugs target different proteins and enzymes that, when inhibited, can lead to cell death and the inhibition of tumor growth. Growth Inhibition (GI50) values were measured from both cell lines treated individually with each of the 12 drugs. GI50 values were high for many of the drugs tested across both cell lines, indicating that Cal-27 and OECM-1 are resistant. Lower GI50 values found for MTX, VIN, DTX, and TH278, indicating their potential to be successful treatments against Cal-27 and OECM-1. Both cell lines will soon be treated with new drug combinations that have not yet been studied. Cellular responses will be assessed to determine if any combinations are synergistic. The data generated can aid researchers in understanding how different OSCC cells respond to drug combinations, which may lead to more successful clinical treatment options in the future.

Cinema & Television Arts

Screenwriting and Development in Animation

Rebecca C. Potters (Prof. Kai Swanson) Department of Cinema & Television Arts

Animation has been the source of magic, imagination, and a “the sky's the limit” mindset in the television and film industries for as long as it has existed, yet too many undergraduate film programs only take the time to educate the next generation of storytellers on how to create, produce, and write for live action. This research tackles the differences between pre-production for live action works and

pre-production for animated works by tying together traditional research approaches with creative real-world application. While on a deep exploration of how some of the most popular animated works of the past decade were written, an original animated television series was born. This study about pre-production has reached its maximum level of researcher immersion as it has resulted in the researcher beginning pre-production for her very own original animated television series. *Station 53* is an adult comedy with elements of sci-fi and coming of age that has been conceived, planned, and executed in association with the contents of the study at hand. This study's research and original content will be presented by inviting the attendees to join in on a particular stage of pre-production. In the industry, it is standard for all films and television series to hold a table read, which is where actors casted in the work read the script aloud word-for-word with full emotional intensity to give the production team insight on how the story flows before the animation process even begins. This presentation will include a table read of *Station 53*'s pilot episode as well as an introduction about table reads in the industry, displays of concept art for the show, and an opportunity for attendees to give feedback on the writing of the script, all of which will be held and facilitated accordingly with the industry's expected level of quality and professionalism.

Trauma and Transparency in True Crime Documentary Filmmaking

Emily Prins (Prof. Nicole Triche) Department of Cinema & Television Arts

In February 1981, 14-year-old Deanie Peters left her brother's wrestling match to use the bathroom and was never seen again. The cold case left the Michigan town of Grand Rapids shaken, and decades later residents still hope for justice. The short documentary Not Without a Trace captures the longitudinal impact of Deanie Peters's disappearance on her community. To avoid the common ethical pitfalls of exploitation, retraumatization, and a lack of transparency within the true crime genre, Not Without a Trace incorporated ethical methodologies to navigate participant trauma and promote transparency in documentary filmmaking. By pulling from sources across film studies, journalism, and social justice frameworks, the production of Not Without a Trace informed a guide to ethical documentary production for film students so that future filmmakers can learn from the process of attempting to mitigate harm within the true crime genre. This presentation will also include the screening of a portion of Not Without a Trace.

Producing Gender: Examining Gender Representation in the Contemporary Romantic Comedy*

Ridley A. Randolph (Prof. Sowjanya Kudva) Department of Cinema & Television Arts

Romantic comedy films often feature degrading depictions of gender on screen. As the film industry continues to produce new work, the romantic comedy seems to be getting left behind by both filmmakers and audiences. As viewership and creation trend downward, the question of what happened to the romantic comedy genre and where it can go from here is ever present. Romantic comedies have a potential to create multidimensional gender representation that allows for a greater sense of viewer relatability, but the genre frequently churns out films led by two-dimensional female characters pursuing heterosexual relationships. This project aims to closely examine the shortcomings of the modern rom-com's gender representation and in turn offer potential paths forward for the genre. The written portion of this project explores the representations of gender in contemporary romantic comedy films through the critical analysis of films created after the turn of the twenty-first century. Taking the findings of this qualitative analysis, the second product of this project is a romantic comedy short film titled "The Brink" which attempts to break the traditional mold of the Western romantic comedy. The

film achieves this by taking on a female-led narrative and exploring topics of bisexuality and self-discovery. These two products work in conjunction with one another to offer a commentary on the current state of the romantic comedy while looking forward into the future of the genre.

TV Spec Screenwriting for the Modern Comedy

Jesse S. Riback (Prof. Kai Swanson) Department of Cinema & Television Arts

From January 16-22, 2023, twelve sitcoms were available for viewing on broadcast television and not one of them came close to cracking the Top 10 in Nielsen Broadcast Ratings. In that same week, the top two shows were both comedies housed on streaming platforms [1]. The popularity of half-hour broadcast sitcoms has steadily decreased in favor of half-hour dramedies on streaming platforms. Over the past semester, I have researched how the plot, themes, characters, and censorship have evolved because of the increase in streaming platforms. I have implemented this research into the outline of a comedic pilot spec script that could fit into a future lineup of a streaming service like HBOMax but not on broadcast television. Many undergraduate film and television programs gloss over the idea of spec script, but they are an integral part of developing a screenwriting career in the contemporary industry. By committing to the research behind writing script coverage of *Hacks* and *The Sex Lives of College Girls*, I am learning about how successful, contemporary screenwriters structure their episodes and develop their unique dialogue. This research will be integrated into an original spec script for *Hacks*, and an original spec pilot. My original pilot, titled *Are We Adults Yet?*, will be presented as a table read on SURF Day. Table reads are standard during script development for a new television series and it will be an opportunity for me to hear the dialogue and see a performance of the action lines I have written. Experiencing my script's outside of the page on the screen will be a valuable learning tool to see which jokes really land, and if my dialogue is snappy enough to work in a contemporary television format. Attendees of this table read would be exposed to the development process of comedic television and hopefully enjoy a few laughs.

Communication Design

Graphic Designers' Consideration of Color Accessibility*

Tiffany C. T. Huang (Dr. Harlen Makemson) Department of Communication Design

Colorblindness, or more formally known as Color Vision Deficiency (CVD), is experienced by 8-10% of men and 0.5% of women in the U.S. Those with CVD are unable to see a full spectrum of color, making it harder to distinguish one hue from another. They face constant challenges, including using technology at work or reading maps on public transit. Many of the challenges colorblind individuals face come from graphic design choices that did not carefully consider CVD. On the audience end, colorblind individuals may have a difficult time interpreting important information. This could be crucial in situations like driving, where differentiating the red and green light may take a colorblind driver longer. From a graphic designer's perspective, poor choices mean color is not leveraged to its full potential. Color is used to create memorable branding, draw viewer attention, and influence consumer decision. So, from both perspectives, designers should create work that is accessible to colorblind individuals. While studies have thoroughly investigated this subject from the perspective of colorblind individuals, virtually no study has investigated the topic from the designers' point of view. Ten graphic designers with various demographics and experiences were interviewed about their design

process and how they incorporate CVD-friendly practices into their work. This research found that the professional experiences designers have had strongly influence the degree to which they consider colorblind audiences. Designers most likely to consider CVD include those who entered the workforce recently, those who work with digital content, and those who design for a wide audience. In regards to techniques that designers use, interviews revealed that there is little reliance on tools meant to address color accessibility. Instead, designers rely on gut instinct and subjective viewpoints to choose colors for their work. During these conversations, it was clear that there is an overall sentiment that color accessibility is something every designer should consider when picking colors. Interviewees were asked about the experiences that helped shape their viewpoint of color accessibility. The researcher hopes that uncovering these motivating factors can influence graphic design education and result in work that is accessible to colorblind audiences.

Cost-Effective In-Camera VFX for Indie Filmmakers

Isaac W. Kunesh (Dr. Ahmed Abdullah Al Fadaam) Department of Communication Design

Within the professional film industry, extended reality (XR) studio stages are rapidly replacing green screens as the primary means of virtually extending a set for film productions. XR stages wrap the subject in large LED screens used as backgrounds which display computer generated images. XR stages offer the possibility to capture and blend actors and their digital environment seamlessly in-camera without the need for additional computer processing, rapidly reducing the cost of post-production for films that require locations that cannot easily be achieved in reality. While information about working with XR on large-scale productions exists, it is primarily anecdotal through interviews with directors of photography published in magazines and trade journals like American Cinematographer, or restricted to brand new programs at a few exclusive universities. Prior studies working with more accessible low-budget XR solutions are confined to user's posts on platforms such as YouTube and Reddit, with most results just being a test of how the technology might work. This project condenses the collective knowledge of amateur XR filmmakers into a narrative science fiction micro-short anthology series as the final product. This series, as well as informational behind the scenes content, gives a roadmap of low-budget XR production to amateur and student filmmakers to gain experience with a technology that has revolutionized the film and television industries. This is achieved through the implementation of several free software packages and inexpensive consumer-level technologies as alternatives to those used in high-budget professional workflows, such as replacing large LED panels with projectors. Preliminary results suggest that low-budget XR can produce a viable visual effect for film in some scenarios, namely close-up shots with scenes that are primarily backlit, but that the process may be most effective as a teaching tool and entry point into the technically complex world of XR stage filming and operation. Budget limitations play a key role in the complexity and variety of moving images that can be captured, but the workflow may be easily scalable to the high-budget level.

Computer Science

An Agent-Based Modeling Approach to Food Deserts

Margaret Bickerstaffe (Dr. Elizabeth von Briesen) Department of Computer Science

Food deserts are places where there is minimal access to healthy and affordable food in the surrounding area. Without the ability to acquire healthy foods like fruits and vegetables, people are much less likely to incorporate them into their diet. Most often, people living in these areas will instead consume unhealthier options because they are more readily available. This diet can lead to a variety of chronic health diseases including cardiovascular disease and type 2 diabetes. Therefore, food deserts are classified as a public health issue. Computational social science lets us study societal problems with computer simulations. Through agent-based modeling we can create artificial worlds where micro-level effects can be studied on a macro-level. It is in this artificial world that the model demonstrates an entire societal process where we can study different variables and see how they change the outcome. In its current state, our model maps the impact that a community organizer can have on bringing healthy foods into homes through home/community gardening. Home gardens offer people agency over what they consume and is a great way to regulate mental, physical, emotional, and spiritual health. The model's components include people (agents, n = 100) with attributes of hardship, influence, and organizer status (0 or 1). Agents move randomly throughout the model and if they bump into the organizer, they have a chance to be convinced to start or join a garden pending their hardship level and the influence of the organizer. Eventually a community garden can be started once enough members are available to organize it. This model helps to visualize the impact of home gardening on increasing fruits and vegetable levels in homes, and therefore giving people autonomy over their foods. The model will help to demonstrate the effectiveness of additional community organizers and a global lowering of hardship on the number of home gardens. We expect to use conversations with local community gardening organizations as a basis for more accurate rates of organizer success and will use those to draw results.

Finding Fires: Drone-Based Autonomous Fire Detection

Spencer T. Buehlman (Dr. Scott Spurlock) Department of Computer Science

Over the past several years, wildfires have become more extreme, destroying acres of nature and endangering lives. Recently, research in this field has turned to machine learning-based approaches to enable autonomous detection of wildfires before they cause serious damage. While a variety of machine learning approaches have been proposed in the literature, prior work has not adequately addressed the issue of which approach is best when implemented as part of an autonomous drone platform. Recent years have seen a marked increase in drone capability coupled with decreasing cost, making them a compelling choice for implementing an autonomous flying fire detection system. This project addresses the gap by evaluating the effectiveness of three machine learning techniques in detecting fires from the perspective of a drone camera: Gaussian Mixture Model (GMM), Deep Convolutional Neural Network (CNN), and Pre-trained CNN. Specifically, the project will compare the approaches in terms of a variety of metrics including detection accuracy, memory requirements, and speed to determine which is better suited for use on a drone. The work will consider how input from RGB cameras compares with thermal and LiDAR sensors across these approaches, evaluating effectiveness quantitatively in terms of accuracy, precision, and recall. A qualitative analysis will characterize effectiveness of the methods for a range of scenarios, such as smoke, active fires, and false alarm situations. The project will provide recommendations for the most accurate and efficient approaches for detecting fires from drones.

A Comparative Analysis of Interview Training Applications in Virtual Reality

David Jennings (Dr. Pratheep Paranthaman) Department of Computer Science

This project explores the important aspects of job interviews and how these aspects could be gamified and incorporated into a virtual reality interview training application. Existing research has demonstrated the benefits of virtual reality and gamification in job training, interview preparation, and educational situations. Time management, answering questions, asking questions, preparation, and follow-up have been identified as the core components of interviews. We developed a prototype version of an interview trainer application in virtual reality (VR) and this prototype consists of stages based on the core components of the interview preparation process. After the initial research and prototypical process, we identified two virtual reality applications and one desktop application that provide soft skills training for users. Two of these applications, Bodyswaps and VirtualSpeech, utilize virtual reality technology to enhance their interview training applications. The third application, SIMmersion, does not use virtual reality, thus contributing towards a comparison between virtual reality and non-virtual reality in terms of interview preparation effectiveness. To compare the applications, we will conduct user studies in which participants will, for short periods of time, test each application and provide feedback. Using a modified Van der Laan scale for usefulness and affective satisfaction, along with an electroencephalogram (EEG) device to record objective brain data, we will analyze user perception of these applications and their effectiveness.

Evaluating Player Experience Factors in Monomodal and Multimodal Interactions in Mixed Reality Games

Logan W. LaMont (Dr. Pratheep Kumar Paranthaman) Department of Computer Science

Mixed Reality (MR) is a hybrid technology that blends physical and digital environments using natural interactions. In MR, users experience computer generated contents in the physical world by wearing a head-mounted display unit. MR domain is still in its infancy with several open questions on immersion, comfort, user interactions, and user experience. Specifically, user experience in MR games has not been thoroughly researched in game design and human-computer interaction. To understand the effective interaction modes with new technology such as MR, user experience analysis and interaction patterns need to be deeply explored. We aim to analyze different interaction modalities and user experience factors by designing games with several interaction modalities in an MR environment. To address user experience in MR, we developed 5 games involving monomodal (using one form of input like speech, gaze, or gestures) and multimodal (combining multiple forms of inputs) interactions. In this project, 4 games were developed with monomodal interaction and 1 game with multimodal interaction. We are using an Electroencephalogram (EEG) device in tandem with the MR device to observe brain activity of players. Our goal is to conduct a comparative analysis of user emotions between monomodal and multimodal interactions and investigate how each input modality in MR contribute toward player experience in MR games. Currently, we are conducting user studies for this project and at the end of the user study, we will analyze 6 emotional factors (excitement, engagement, relaxation, stress, interest, and focus) from EEG brain activity data. The findings from this research study will contribute toward the future research in game design for immersive technologies, brain-computer interfaces, and games user research.

Emotion Regulation Analysis Using EEG

Ryan Sherota (Dr. Shannon Duvall) Department of Computer Science

Individuals who experience emotional dysfunction may have trouble recognizing, expressing, and regulating their emotions. Using technology to assist emotion regulation can greatly improve the

quality of life for people with emotional disabilities. It can be difficult to study the emotion regulation process of these individuals because of the inability to accurately measure their emotions. To understand how to analyze emotions using technology and how to help a person reach a state of calm emotions, we used an electroencephalogram (EEG) to record the brain activity of users. An EEG can measure brain activity through electrodes placed on the scalp, and modern EEG headsets are able to interpret brain activity in real-time to provide information about the user's emotional experience. Previous research has found that viewing the live data from an EEG is helpful in promoting calm emotions, but only marginally. We performed a verification study of this previous finding as well as added a new intervention: listening to music. Fifteen participants wore an EEG headset while watching a stress-inducing video, followed by one of three possible interventions. The intervention either consisted of listening to a song of their choice, viewing the live EEG data, or sitting in silence. We will present results of a comparative analysis of stress reduction rates and recovery times for the three groups.

Sensor Fusion Optimization for Aerial Fire Detection

D. Haydn Stucker (Dr. Ryan Mattfeld) Department of Computer Science

Over the past several years, wildfires have become increasingly more extreme, destroying acres of nature and putting people's lives in danger. Recently, research in this field has turned to aerial robotics and advanced sensor suites as an initiative to identify wildfires and rural house fires sooner, and to prevent suburban fires during regional burn bans. This project investigates scholarship on the use of unique sensor types to enhance the efficiency of rapid fire detection. However, these works have not adequately investigated a higher order of sensor fusion in application with aerial drones. This project addresses this gap by considering the effectiveness of three types of sensors in detecting fires with real-world datasets, obtained through controlled burns with the local fire department. The three sensors that will be tested are RGB cameras, thermal cameras, and LiDAR. Specifically, the project will analyze the strengths and weaknesses of each sensor, then determine sensor suite combinations that create the lowest false-alarm detection rate. The data will primarily be quantitative to reflect individual sensor performance, providing more accurate insight into sensor fusion performance on the final drone. In conclusion, this project will highlight what culminated sensor suite is more efficient in regards to detecting fires, and will be useful in determining where future research should go in testing larger, more advanced sensor suites on aerial robotics platforms.

Economics

Men's and Women's Work Burden Convergence: The Covid-19 Recession*

Martin Curtis Adams (Dr. Tina Das & Dr. Steven DeLoach) Department of Economics

According to literature, the financial crisis of 2007 accelerated the convergence of women's and men's unemployment rates. As men experienced higher levels of job loss, women experienced higher levels of employment in the workforce. In this study I examined whether the Covid-19 recession in 2020 declined the disparity between men and women unpaid and paid work burdens. I examined how the burden of market work and non-market work between men and women has been affected by the 2020 Covid-19 recession and whether it has truly contributed to a convergence in the disparity of it. Using the American Time Use Survey (ATUS), and a trend analysis methodology, I found that in the year

2020 women burdened significantly more non-market work than the previous years. Furthermore, I found that men burdened slightly less market work than women in comparison to previous years. The importance of this study is examining the differential impact in times of economic downturn between two demographics. Therefore, given the results of this study, policy makers should be cognizant of the differential impact the Covid-19 recession had between men and women when developing policies to offset the negative impact of difficult economic times.

Effect of Teacher Salary Freezes on Student Achievement in Michigan Public Schools

Christopher R. Boyette (Dr. Tonmoy Islam) Department of Economics

The United States has seen a decrease in the average real wages for teachers over the past two decades. Michigan has been no exception with its 11.6% reduction from 2000 to 2017 representing the fourth-largest contraction in the United States. One reason for this decline has been the use of teacher salary freezes to address budget shortfalls. Studies show that while teacher performance is not directly tied to wages, student performance may be impacted by teacher wages. However, few studies have been conducted on whether salary freezes affect student achievement. This paper examines if a causal relationship exists between teacher salary freezes in Michigan public school districts and student achievement. Ordinary least squares (OLS) and two-way fixed effects (TWFE) regressions with multiple covariates are analyzed for each school district's 5th, 8th, and 11th-grade standardized test scores. Afterward, propensity score matching and a difference-in-differences model with staggered treatment periods are implemented to determine the average treatment effect (ATE) and average treatment effect on the treated (ATET), respectively, of teacher salary freezes. Preliminary results show that the effects of teacher salary freezes vary based on grade level and how salary freeze is defined.

Mind Over Matter: The Impact of Mental Well-Being on Labor Market Outcomes

Hailey Crawford (Dr. Steve DeLoach) Department of Economics

Depression is a leading cause of employment disability worldwide, affecting both mental health and career outcomes, especially early career outcomes. Adolescent depression has been shown to negatively impact early career outcomes, including educational attainment, absenteeism, presenteeism, salary, and labor force participation. This study examines the effects of mental well-being on early career labor market outcomes using data from the 1997 cohort of the National Longitudinal Survey of Youth. The NLSY follows a set of individuals throughout their lifetime utilizing annual interviews to collect week by week data. Mental wellness is summarized by self-reported characteristics of the amount of time an individual feels happy, blue, depressed, calm, or nervous in the past month ranging from all, most, some, or none of the time. In ordinary and two stage lease square regressions the findings suggest that improvements in mental wellness are associated with higher wages and decreased probability of unemployment and job leave. However, when controlling for individual characteristics in a fixed effects model, only the probability of leaving the job remains significant. With the increasing prevalence of mental health issues in the United States, understanding the direct impact of depressive symptoms on labor market outcomes is critical. These findings have important policy implications, such as the need for increased mental health resources and treatment, as well as greater awareness of the importance of mental wellness in the workplace for both employees and employers.

The Effect of Economic Downturns on Alcoholism

Mary Cummings (Dr. Steven Bednar) Department of Economics

This study explores how economic downturns, such as unemployment, recessions, and mass layoffs, affect alcoholism and binge drinking rates among those in the labor force. With over 100,000 U.S. citizens dying from excessive alcohol use each year, according to the Centers for Disease and Control Prevention, more research is necessary to understand how this issue can be minimized and hopefully resolved. By examining the impact that stressors from work and economic downturns have on drinking habits, there may be ways to decrease these impacts. Prior literature suggests that the socioeconomic status of an individual can impact alcohol consumption before, during, or after economic downturns. Another implication of varying alcohol consumption rates is whether an individual remains employed or is laid off during a recession. Integrated Public Use Microdata Series (IPUMS) collects data from a sample of persons 18 years or older, including the National Health Interview Survey (NHIS) which provides harmonized annual microdata from the 1960s to the present on individual alcohol consumption, employment status, and county-level data. I will use linear regression to analyze the effects that various factors concerning economic downturns have on alcoholism rates at an individual level. Findings from this research will expand on how the harmful effects of excessive alcohol consumption can be diminished in the future.

Analysis on the Effect of the Drug Epidemic in Different Areas

Elizabeth R. Cuoco (Dr. Tonmoy Islam) Department of Economics

The drug epidemic in the United States is a serious and complicated problem. In 2021, there were approximately 106,699 drug overdose deaths reported in the United States. It is obvious that this is a nationwide problem, but it is not completely clear in which types of areas this problem is concentrated. This paper will analyze if deaths of despair numbers are higher or lower in demographics based on income and health. In this study, we use data from Public Health Rankings which identifies many indicators of people's health in the United States at county level. This study is restricted to the Northeastern states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. We estimated a regression model using variables related to the number of drug overdose deaths, income levels, etc. Broadly, the results of this study showed that income and drug overdose deaths have a positive relationship, meaning as the number of deaths increases, so do peoples' income. Hypothetically, this could be due to the fact that people with higher incomes have more access to purchasing drugs.

The Influence of Grade Inflation on Graduation Rates by Academic Major

James D. Grant (Dr. Katy Rouse) Department of Economics

In this paper, I analyze the effect of individual factors, institutional factors, and grade inflation to determine what if any of these dimensions can explain increasing college graduation rates over the last 30 years. While college graduation rates have been steadily increasing since the 1990s, previous research suggests that institutional factors and student characteristics play almost no role in explaining this change (Denning et al., 2022). Instead, research suggests grade inflation in higher education largely accounts for the rise in graduation rates. This paper uses a repeated cross-sectional of student-level data from a mid-sized, private liberal arts institution in the Southeast to examine the existence

and impact of grade inflation between 1998 and 2022 on graduation rates, and how this varies within academic departments and majors. I establish and identify the existence of grade inflation by regressing college grade point average (GPA) on pre collegiate measures of achievement (SAT scores, AP credits, etc.), demographic characteristics, institutional characteristics, and dummy variables for each cohort. Then, I utilize the Oaxaca decomposition to isolate the relationship between grade inflation and college graduation rates. Finally, I compare regression coefficient results across different academic departments and majors to evaluate their differences in grade inflation and graduation rates. I find that college grades have risen significantly over time (approximately 9% between 1998 and 2008), and that student and institutional characteristics only account for about 3 percentage points of that change. Similarly, I find that graduation rates have also increased significantly over time (10% between 1998 and 2008), but student and institutional characteristics minutely explain this change in graduation whereas the rise in first-year GPA explains over 85% of the graduation rate increase.

Redlining Effects on Student Achievement in Massachusetts Public Schools

Courtney B. Shanley (Prof. Cora Wigger) Department of Economics

In the 1930s within the United States, a federal housing agency, Homeowners' Loan Corporation (HOLC), created four-letter colored-coded maps with grades A (best), B (still desirable), C (declining), and D (hazardous) depicting the areas' mortgage security. The practice of redlining was outlawed in 1968, however, it has shaped the demographic and wealth patterns of American communities today. About 75% of neighborhoods that were previously graded or "redlined" on maps created more than 80 years ago continue to struggle economically. Students in these economically challenged neighborhoods often have fewer resources available to them leading to less student achievement in those areas. In this study, I explore the impacts of redlining on student achievement within Massachusetts public schools using panel data from the Massachusetts Department of Elementary and Secondary Education (DESE), National Center for Education Statistics (NCES), and National Assessment of Education Progress (NAEP) along with HOLC 1930s redlined maps. Massachusetts Comprehensive Assessment System (MCAS) standardized test scores from 1998 to 2019 are used as a proxy for student achievement. To determine causality, a year fixed-effects model was run, analyzing the treatment group, redlined schools, versus the control group, non-redlined schools, while controlling for HOLC grade, school grade, subject of MCAS test, and year. Due to the nuance between the distinction of grades A-D, I implement a thirteen-point system using pluses and minuses as the significance between the letters is not equal. This study only examines the effects on public schools within Massachusetts excluding vocational and non-public charter schools. I find that schools that were previously redlined performed lower than schools that were not previously redlined as the percentage of students who scored proficient or advanced on the MCAS was less. Moreover, schools rated "A-B" had less significant impacts to student achievement than schools rated "C-D."

The Relationship Between Grit Scores and Wages

Jack Shea (Dr. Steve DeLoach) Department of Economics

The determinants of success have long been a field of study. Angela Duckworth's research into grit, defined as passion and perseverance in the face of obstacles, is a novel method to view the catalyst behind successful people. The benefits of high ratings of Grit have been well documented on an individual's academic achievement, but little has been done to extrapolate the findings into the labor market. The purpose of this study was to determine the effect that young adult Grit levels have on

wages earned in adulthood. The data for this paper comes from the databases of the National Longitudinal Survey of Youth. Controlling for differences in educational attainment, cognitive skills, and health status, I find that an increase of one standard deviation in Grit levels leads to a 7.7% higher yearly salary for men, and a 10.5% higher yearly salary for women. Preliminary results suggest that a greater focus should be placed on the development of Grit in disadvantaged groups and communities.

LGBTQIA+ Wage Inequality and Discrimination*

Evangelia N. Sklaveniti (Dr. Steve DeLoach) Department of Economics

A recent study by The Human Rights Campaign (2022) investigated the wage gap between full-time LGBTQIA+ workers and cis/straight workers in the US. The findings reported the median earnings of the LGBTQIA+ community to be about 90% of the median weekly wage a typical cis/straight worker earns in the US. Only 5.6% of US adults identify as LGBTQIA+, helping the sustainment of ignorance for their struggles and framing this topic as insignificant for many. The awareness of discrimination in the workplace is essential for a safe and equality-promoting working environment that leads to passion and maximization of productivity. The purpose of this paper is to study whether a wage gap still exists for LGBTQIA+ individuals and whether it is based on individual differences or discrimination. Specifically, this paper examines the US sexuality wage gap of gay males and lesbian females by comparing the weekly US wages of gay cis men/ straight cis men and straight cis women/ lesbian cis women. Data is collected from IPUMS USA, including a 1% sample from the American Community Survey, focusing on the most recent and accurately representative year, 2019. The main independent variable is constructed from cohabiting couples in same/opposite sex relationships, which results in 1,178,914 observations. The model is based on a Mincerian Wage Model which controls for education, race, and experience. After estimating separate regressions for cis/straight and LGBTQIA+ workers, the Oaxaca-Blinder decomposition will be used to measure how much of the wage gap is attributed to factors such as skill or discrimination. The estimates show a wage difference for gay men of 3.7%, even though gay men are more educated than straight men. In contrast, lesbian women make 20% more than straight women. Taken together, these results show discrimination against gay men, but in favor of lesbian women, possibly due to discriminatory practices from societally constructed gender roles and false perceptions of masculinity and femininity.

Flexible Work Accommodations and Employee Productivity

Cornelis Mercer van Meel (Dr. Tonmoy Islam) Department of Economics

After two years of the COVID-19 pandemic, roughly six-in-ten U.S. workers who say their job can mainly be done from home are working from home all or most of the time. The vast majority of these workers (83%) say they were working from home even before the Omicron variant started to spread in the United States (Parker, 2022). Remote work is not a new concept, but it has become widely popularized in response to worldwide lockdowns. Even after the pandemic, many workers are still given the option to work a hybrid workweek, with some days in the office and some days at home. A concern with remote work is the lack of productivity that workers may experience due to being in a non-work environment. This paper aims to analyze employee efficiency when in the office versus out of the office, using wage as a measure of productivity. Employee work-life balance is also discussed when comparing remote work to office work. The data is collected from the American Time Use Survey (ATUS), and two-stage least squares regressions are used to analyze the correlation between remote work and wage. Preliminary results suggest that remote work results in higher hourly wages

and thus higher employee productivity. This is important research in today's rapidly changing working environment and has strong implications for the future of remote work and its viability moving forward.

Education and Wellness

The Benefits of the Outdoors on Mental Health and Education

Caroline C. Allen (Dr. Carol Smith) Department of Education & Wellness

This study explores the different ways in which mental health and educational practices can be heightened positively through the effects of the outdoors, especially in adolescents' ages. Currently within the literature, the outdoors have become a popular study subject, due to the increased awareness and benefits to students (Weir, 2020). Studies show that creating an outdoor environment within a K-12 school setting can lead to more engaged enrichment and creative thinking (Arndt et al., 2022). Several examples within the literature focus on the Special Education classrooms. One of the studies included comes from the understanding within student communication and social skills as well (Charlton et al., 2022). This is done through the concept of green spaces (woods) and blue spaces (water). Both green and blue spaces can lower the number of psychiatric disorders, including depression, eating and mood disorder, substance abuse, within adolescents (Charlton et al., 2022). More adolescents are coming home from school and going to an electronic – television, video games, phones – to play with instead of going outside and exploring. This has led to a decrease in experiencing outdoor settings and inhibiting today's younger generation of realizing the positive mental effects that come with being outdoors (Arndt et al., 2022). It comes after the majority are inside classroom walls for approximately eight hours a day. Due to this, students tend to see school on the negative side and they are not happy within that school setting. However, through more outside classrooms and playing outdoors, a shift in the mental health of students can change. While there is still developing research on the mental health of students through outdoor engagement, the purpose of this study is to highlight why it is important. This study is through the form of a literature review and the findings from the review will heighten the future educators' awareness and understanding of why the outdoors can be a safe haven for the mental health of the students and themselves.

Teacher Self-Censorship of LGBTQ+ Literature in Elementary School Classrooms*

Meghan D. Brooks (Prof. Allison Bryan) Department of Education & Wellness

This research analyzed teachers' self-censorship with respect to avoiding books that contain potentially challenged content. Self-censorship has been widely studied in librarianship (Rickman, 2010); however, research is lacking with respect to teachers. In a survey shared through social media, elementary educators were asked whether they were familiar with well-reviewed books appropriate for the grade level and containing LGBTQ+ characters alongside other books which did not. They were asked if they used the books in instruction or had them in their classroom libraries. If they were unfamiliar, the educators were given a summary from the publisher and asked about usage. More teachers were familiar with titles that did not contain characters who are part of the LGBTQ+ community. After reading book summaries, some teachers were less inclined to consider using a potentially controversial book, particularly if the book centered on a transgender child and less so if the character was gay. Some reasons teachers gave for not considering particular books were that themes

and characters would not be approved by their districts or the books would cause backlash from families and the community. Other teachers, however, were interested in using books with LGBTQ+ characters in their instruction or including them in their classroom libraries after reading the summary, but they weren't familiar with the titles to begin with. This indicates that this is a nuanced issue, particularly since additional restrictions and backlash may come with including certain topics in the classroom. The importance of sharing diverse literature in order for students to see themselves represented and to learn from the experiences of others is well documented (Bishop, 1990). Thus, if we are going to encourage educators to have a more diverse collection of books to share with their students, it is important to highlight literature that act as windows, mirrors, and sliding glass doors (Bishop, 1990). However, the data collected indicate that many teachers are not as familiar with or are resistant to using literature highlighting characters in the LGBTQ+ community, limiting the opportunity for all students and their experiences to be represented in their learning.

Examining the Civil Rights Movement in Children's Literature*

Josie M. Brothers (Dr. Lisa Buchanan) Department of Education & Wellness

The Civil Rights Movement is a longstanding piece of American history that has been taught in classrooms across the nation through lessons that emphasize the context of the Jim Crow South and the economic and social inequalities that plagued African Americans. Most often, the Civil Rights Movement is explained in the American curriculum through the lens of dominant figures and events that overshadow the perspectives of People of Color and the numerous counter narratives of organized efforts, both of which significantly shaped the movement. Understanding this limitation of the teaching of the movement, my research question is: what picture books have been published that are focused on the US Civil Rights Movement? What events do these books cover, from what perspective are these books written, and do these books provide a dominant or a counter narrative of the movement? These questions are important to the field of education and children's literature as books offer a strong structure to enhance teaching and learning about the Civil Rights Movement (Foster, 2015). By providing students with a more complete and a "more accurate history that commonly goes untold," (Anderson, 2018) children will be able to find more mirrors and windows (Tschida & Ticknor, 2014) within the content being taught. My research is broken down into three main categories of children's books: the events present, the perspective or focus of the book (major figures, community efforts, children's perspectives), and the type of narrative (dominant or counter). After analyzing 40 texts, the results indicated that a large amount of these texts offer a counter narrative lens. However, the majority of these texts focused their stories on an adult protagonist with many mentions of prominent leaders. The results of this project provide insight into what people and events of the Civil Rights Movement are included in children's literature which will thus be the narratives found in future children's libraries, school-based collections, and social studies curricula.

Restraint and Seclusion in Special Education

Kathleen Carmody (Dr. Stephen Byrd) Department of Education & Wellness

Restraint and seclusion are used in educational settings, specifically in special education settings as a form of classroom and behavior management. While there has been research conducted to show the harmful and lasting effects, restraint and seclusion still are used in many districts today. This study looks at the effects that restraint and seclusion have on students. It also examines how teachers feel about the use of these methods in the classroom, as well as their training on using restraint and

seclusion. Finding out both how teachers feel about using it, but also looking at how teachers are being trained to use restraint and seclusion, are important steps to take in order to reduce how often these are used in special education. To gather data on this theme, a survey of 20 questions was conducted that asked teachers about their training on restraint and seclusion, how often they used restraint or seclusion in the classroom, and their personal opinions on the use of restraint and seclusion in schools. Results showed that while two-thirds of teachers did not believe in using restraint or seclusion in schools, the ones that had used it, had very little training. Almost every teacher that was surveyed did not believe that their training surrounding the use of restraint or seclusion in schools was effective. They also did not have adequate knowledge of the laws regarding restraint and seclusion. Many teachers believed that the use of restraint and seclusion in schools was outdated and not the best or most effective method. However, while teachers are against the use of restraint and seclusion in schools, the law does not align with teachers' beliefs. As it stands, the law still supports the use of restraint and seclusion in schools. In order to better educate teachers about the laws regarding restraint and seclusion and how to properly put it into practice, there needs to be better training programs and a shift to more de-escalation training. Without this change, there could be further student injuries, legal issues for schools, and teachers will continue to feel unequipped to handle these types of situations.

Compassion Fatigue in Special Educators

Elizabeth M. Czenczek (Dr. Stephen Byrd) Department of Education & Wellness

Compassion Fatigue is the physical, emotional, and spiritual result of chronic self-sacrifice and/or prolonged exposure to difficult situations that renders a person unable to love, nurture, care for, or empathize with another's suffering (Harris; Quinn Griffin, 2015). Such fatigue causes the sufferer to lose the ability to experience satisfaction or joy professionally or personally. Compassion Fatigue is something Special Educators are prone to, due to being compassionate and empathetic individuals towards their students and their families. This research study seeks to understand more about how Compassion Fatigue affects educators in the Special Education field. The ultimate outcome of this project is the opportunity for special educators to share their experiences, in hope of helping the new generation of educators to have strategies, leading to less Compassion Fatigue. Fourteen educators in the state of North Carolina were surveyed and asked to share their experiences within the profession and offer ideas on what can be done to prevent Compassion Fatigue. Of those who responded, 76.9% of participants said that they have experienced Compassion Fatigue or burnout. Our results found that 100% of participants said that they are aware of colleagues who have experienced compassion fatigue or burnout. When asked what can be done professionally to prevent compassion fatigue, 40% of teachers recommended more funding, 45% said more support, and 54% said built in mental health days. The survey gave teachers a chance to share their mental health journey and provide advice for new teachers. Those surveyed recommended setting boundaries, making time for yourself, leaning on your support system, and saying "no" when it gets to be too much. In conclusion, Special Educators experience Compassion Fatigue and need more support from schools and districts to prevent this from happening. There is a need for less district requirements, more funding, more support for teachers, and overall more respect for educators. Educators need to also have time outside of school to rest, recharge, and spend time with loved ones. These boundaries are something that must be taught in teacher candidate programs to protect the well-being of educators.

Secondary Mathematics Teachers' Use and Adaptation of TeachersPayTeachers.com Education Resources

Josie V. De La Oliva (Dr. Jeff Carpenter) Department of Education & Wellness

Teacherspayteachers.com (TPT) is a massive and popular online education resource marketplace. Prior research, though, has revealed TPT resource quality to be uneven, in areas such as academic rigor and cultural relevance (Hu et al., 2019; Shelton et al., 2022). However, how teachers select, use, and adapt resources may be as important as resource quality, but has received little scholarly attention. Therefore, in this research, we addressed a literature gap by interviewing U.S. secondary mathematics teachers (N=10) about their TPT resource selection, editing, and classroom implementation processes. These semi-structured interviews were intended to reveal how educators view TPT material in its original form, how, if at all, they customize material and why, and the role of TPT resources in their teaching. The interviews were held on Zoom and consisted of 16-19 prompts. TPT offers both fee and paid resources and most participants reported a difference in quality level between these resource tiers, and thus developed different selection criteria for each resource type. Eight participants reported consistently visiting TPT for reasons including refreshing their resource supply, supplementing new curricula, and meeting their students' different learning needs. Many participants prioritized searching for resources that were specifically aligned with their standards, and contained multiple difficulty levels. Resources that featured multiple modalities and an attractive design were highly valued. Challenges with the search process included insufficient resource previews and few higher-level mathematics resources. Six participants stated they often edit downloaded resources, ranging from small "tweaks" to more large-scale changes. However, two participants emphasized their efforts during the selection process to find materials they would not need to edit. Teachers reported turning to TPT for its resource collection that they then select and tailor to their students' needs at their discretion. Through those processes, teachers appeared to find the TPT resources in practice to be valuable and efficient. Teachers also gain a support system through the TPT community that serves as a means for improving resource application and quality. These findings have implications for secondary math curriculum resource production, selection, and use, and for understanding a popular online education resource marketplace's use.

Examining Race, Ethnicity, and Female Representation in Children's Picture Books at the Four Local Alamance County Libraries*

Grace F. Gallery (Dr. Lisa Buchanan) Department of Education & Wellness

Libraries are a place where all members of the community can come and immerse themselves in all types of literature, especially families with little children. It's important that they contain books with diverse characters, experiences, and authors, especially in an increasingly diversified world. This study focuses on children's picture books at the four Alamance County libraries: May Memorial, Mebane, Graham, and North Park. My research addresses two essential questions: 1) What is the representation of female lead characters in picture books in the Alamance County Libraries? and 2) How does the collection compare to the race and ethnic groups of females in Alamance County? Growing up, I often saw men being the main characters in children's picture books, and when women were the main character, most often: 1) they were White with White authors and 2) were centered around perpetuating female stereotypical ideals around dress, behavior, and interests. The implications of this study can impact the books to which the local children have access. In the fall semester of 2021, I completed a content analysis of a total of 250 realistic fiction picture books. Using a Google form

survey compiled of pre-filled and short answer boxes, I recorded several aspects of the books that related to my study. Around 60% of both the authors and illustrators in the entire analysis provided an in-group perspective while less than a quarter did not. Furthermore, about 50% of the responses regarding the race and ethnicity of the female main character show that the characters were White while the other 50% vary from Black, Asian, Latino, and more. While the conflicts varied, plus over 80% of the stories didn't contain a stereotype, about 15% did. Within the 15%, ideas perpetuated by the stereotypes specifically targeted the female gender. While data on female persons broken down by race/ethnicity are limited, it is evident from the whole Alamance County census, that the findings do not exactly line up with the breakdown for larger represented groups. While there are signs of good representation, the literature can better represent those in the underrepresented groups in my research.

What is Math and Math Teaching?: A Study Exploring Prospective Teachers' Perceptions

Kayla M. Mead (Dr. Katie Baker) Department of Education & Wellness

Each prospective teacher (PT) has a different perception of mathematics and mathematics teaching, and these perceptions are based on prior and current experiences. This research project deeply examined one cohort of 28 PTs' perceptions at the beginning and end of their semester-long mathematics course, MATH 208: Numbers and Algebra for K-8 Teachers. The study was framed and guided by the question: How might PTs' perceptions of mathematics and mathematics teaching change and what factors impact changes in perceptions? While enrolled in the course, PTs are challenged with experiencing mathematics through the role of a student and an educator. PTs engage in content-based experiences with mathematics such as fraction comparison or gaining an understanding of place-value in other bases, while also experiencing the pedagogical moves for how they might teach these topics. The PTs participated in their regularly-planned course aspects during the semester, which included informal, formative survey checks on their feelings and beliefs about mathematics. After the course concluded, the researchers investigated the perceptions shared by PTs who gave their consent to be included in the project. Survey data from twenty-six participants were coded and descriptive statistics were used, then follow-up interviews were conducted with five PTs, chosen by representative sampling, to investigate survey patterns of expressed perceptions further. The survey findings did not show any backslide to negative expressed perceptions of mathematics or mathematics teaching. Rather, by the end of the course, PTs either remained with their mixed or positive perceptions, or moved from negative perceptions in a positive direction. Data revealed that perceptions of mathematics can change, even in just one semester. The interview data was analyzed with open coding and four themes emerged: (a) The Importance of the Use of Multiple Strategies in a Mathematics Course, (b) The Importance of Positive Environment and Encouraging Teaching, (c) The Importance of Connections to Elementary Classrooms, and (d) The Importance of Time to Process. Our intent for the study and findings is to support teacher educators and teacher preparation programs in creating more positive mathematics learning experiences for PTs to then transfer to their corresponding mathematics teaching practices.

How Outdoor Experiences and Education Contribute to Early Childhood Development

Emily Padron (Dr. Carol Smith) Department of Education & Wellness

This research aims to explore the connections between the field of Outdoor Education and early childhood development. According to the American Academy of Pediatrics (AAP), early childhood is typically defined as the years that encompass birth through age 8. Significant amounts of research have

been done regarding the long-lasting benefits of spending time outdoors, and how these benefits contribute to the well-being of children in their early years. However, educators may struggle to recognize the abundance of learning opportunities that are present in outdoor settings (Ernst, 2014). There are also many concerns that present themselves to today's generation of children, and not spending enough time outdoors can have several negative long-term impacts on a child (Ginsburg, 2007). When a child is in their early childhood years, both their brain and body are developing rapidly. This project explores the effects that outdoor/experiential experiences can have on children aged birth to six, and how these experiences contribute to their physical, emotional, social, and intellectual development. My research aims to compose a literature review that encompasses different scholarly sources and analyzes how these pieces of writing seek to explain how outdoor educational experiences can affect the development of a child in their most formative years of life.

The Connection Between Experiential Education and Social and Emotional Learning

Kelsey Pettit (Dr. Evan Small) Department of Education & Wellness

Social and Emotional Learning has been implemented in schools with a variety of frameworks (Schonert-Reichl, 2017, p.138) but is not always executed in a way that is culturally responsive to children (Cunningham, 2001, p. 86). This line of inquiry examines whether or not there is a relationship between Social and Emotional Learning and Experiential Education. Kolb's Experiential Theory of Learning (1974) postulates that learning is ignited with a concrete experience, followed by a reflective observation, abstract conceptualization, and active experimentation (Kolb A. Y., Kolb D. A., 2005, p. 194). While this theory encapsulates Experiential Learning, I am considering the transactive component between teacher and learner which is employed in Experiential Education (Itin, 1999, p. 92). I consider whether or not Kolb's model is effective for cultivating student and teacher engagement and activating SEL. The implications of this project can lead to the development of activities, lessons, and support that can be employed in the school setting, which can help strengthen classroom community, help children feel valued, and forge relationships between students and teachers. The methodology is composed of a literature review, as well as a self reflection of my experience in the public school setting, in order to build upon my pedagogical strategies to employ as a future educator. As I have spent time in schools, I have observed Social and Emotional Learning employed in classes, in the form of character education, and team building exercises with the These efforts acknowledge the humanity in the children and allow them to learn in the context of their community and allow them to demonstrate other facets of their lives besides academics (Nenonene et al., 2019). I want to explore how these approaches of Social Emotional Learning can be expanded on in a way that elevates children's voices, and fosters an environment of learning with the teacher and student. The project presentation will conclude with sharing how I am taking these findings, experiences, and reflections and applying them to my teaching now and plan for years to come.

Examining North Carolina Social Studies Standards and Understanding Perspectives of Recurring Historical Events

Amanda M. Rubeo (Dr. Lisa Buchanan) Department of Education & Wellness

"Narratives are the cultural frames through which we come to perceive events and phenomena in the world" (Gist, 22). This study examines the occurrence of historical events across the 2021 K-5 NC Social Studies Standards, in an effort to understand the different perspectives of history students are learning within the classroom. Each state is required to establish this set of universal standards, along

with unpacking documents that expand on the standard and provide examples of classroom pedagogy for implementation. The focus of this research surrounds the analysis of the 2021 K-5 NC Social Studies Standards, noting the occurrence of recurring historical events. In order to analyze this initial data, I grouped the standards by grade levels K-1, 2-3, and 4-5. From the selected standards, I compared their unpacking documents and identified key historical events and example topics the unpacking document suggested for teachers to utilize when teaching this standard. I then analyze them based on the language of the standard. This analysis yielded the result that the language of the standard determines the perspective of the content taught. I then selected the grade level with the most historical events within the curriculum, and compared the language of the standard to the example topics selected. I was then able to identify what perspectives of each event were missing, based upon the language within the standard. The themes of this research yielded the result that the perspectives within the 2021 K-5 NC Social Studies Standards are limited, meaning that the dominant perspective of social studies education within North Carolina doesn't reflect the multiple perspectives within historical events. Dominant narratives are widely accepted and influenced by those with the power and position to shape and color perception (Brown et al., 2018). This research reiterates the inequities still present in the history standards and resources in schools, and the importance for teachers to be knowledgeable about the historical content, therefore able to introduce and uplift underrepresented perspectives.

Examining K-12 Preservice Teacher Perceptions of Scientific Argumentation in the Elementary, Middle, and High School Science Classroom

Abigail Saracino (Dr. Mark Enfield) Department of Education & Wellness

Scientific argumentation refers to the concept of using scientific evidence and reasoning to support a position or claim. K-12 students are not prepared to engage with scientific argumentation at more advanced levels through their education because preservice and in-service teachers struggle with confidence in science content understanding. This study examines the perceptions of university students enrolled in a teacher preparation program (K-12 preservice teachers) regarding the role of argumentation in science education at elementary, middle, and high school levels. Argumentation is a crucial contemporary tool that encourages students to think critically about a concept and accumulate support for their position. This study utilizes the work of Dr. Suzanne Loper and Dr. Kate McNeill, who developed the Argumentation Toolkit (2018). This is an online resource educators and school administrators can use as a professional development tool to better equip K-12 teachers to instruct their students on scientific argumentation. Sixteen preservice teachers (12 elementary, 2 middle grades science, and 2 biology with teacher licensure) participated in this three-part study: pre-survey, engagement with Toolkit, and post survey. First, preservice teachers completed a pre-survey indicating their current perceptions of science teaching, the role of argumentation at different education levels, and their level of confidence in teaching science as a discipline. Then, they engaged with materials from the Argumentation Toolkit, including student work samples and video demonstrations of argumentative concepts. After engaging with the Toolkit, participants completed a post-survey, sharing how their perceptions changed after intentional time working with scientific argumentation. This study found preservice elementary, middle, and high school teachers felt explicit scientific argumentation in each level of education was important after engaging with the argumentation material. Additionally, participants showed an increase in agreement that their students should engage with argumentative skills, such as using data to support claims. It is crucial that K-12 preservice teachers be exposed to scientific argumentation, in order to develop understandings of this science practice. Understanding science practices enables future teachers to be effective when teaching scientific practices and concepts

to students. This will serve to benefit their future students as they progress through their science education.

Pre-Service Teachers' Perceptions of Anti-Critical Race Theory Legislation in the United States*

Victoria L. Seymore (Dr. Scott Morrison) Department of Education & Wellness

In the past year, 36 states have proposed or passed legislation to restrict teaching about race and racism in K-12 public schools, which stems from fears about critical race theory (CRT). In West Virginia, for example, the policy §18-2-44 from January 2022 states that curriculum promoting "divisive acts" and "critical race theory" is prohibited. This includes any teaching that the United States is inherently racist or sexist. The supposed purpose of such proposed and passed legislation is based on the idea that discussing race and racism is divisive, that it villainizes white people, and that it indoctrinates young minds (Duhaney, 2022). According to Ray and Gibbons (2021), "Opponents [of critical race theory] fear that CRT admonishes all white people for being oppressors while classifying all Black people as hopelessly oppressed victims. These fears have spurred school boards and state legislatures from Tennessee to Idaho to ban teachings about racism in classrooms." At the same time, and for myriad reasons, there are teacher shortages across the United States, with thousands of vacancies unfilled. Given that more teachers are needed in the coming years, particularly graduates from educator preparation programs at colleges and universities, this research study is not only about pre-service teachers' awareness and understanding of anti-critical race theory legislation, but also about the effects such legislation might have on their career trajectories. Thus far, we have recruited 31 participants who are pre-service teachers or in education-related majors (e.g., counselors in training) via social media and email. We will be presenting descriptive statistics on 17 survey items and thematic analysis of three open-ended items.

Teacher Decision Making: What Factors Inform K-2 Children's Literature Selections?*

Morgan N. Sierra (Dr. Lisa Buchanan) Department of Education & Wellness

Diverse, inclusive literature is becoming more accessible and utilized in the classroom. However, teachers face a multitude of hurdles in their decisions towards choosing quality literature resources. Much of the existing publications on teacher decision-making in children's literature focus on preservice teachers (Hart & Rowley, 1996, Voleker, 2013). This research project evaluates the attitudes and beliefs that inform teacher decision-making for children's literature use in K-2 classrooms. A comprehensive survey of certified in-service teachers was utilized to examine the internal and external factors that shape children's literature selections. From this pool of responses collected through an online instrument, specific trends in the data were analyzed. This project looked at how attitudes and beliefs differ based on experience, access to professional development, and race and ethnicity, among other factors. While teachers appear comfortable selecting diverse texts, findings show that teachers could benefit from support through professional development in children's literature, more resources for locating texts, and school settings wherein sourcing and using diverse texts is supported.

What Factors Affect Teachers' Decision Making with Diverse Literature in the Classroom?*

Charlotte I. Stoddard (Dr. Lisa Buchanan) Department of Education & Wellness

The focus of my research is teacher decision-making in terms of diversity in children's literature. The first step in my research process was completing a literature review to identify what research has been done before on the topic. I then created a mixed methods survey that collected demographic information about the participants including their race, gender identity, educational experience, number of years teaching, and teaching experience by both grade level and location. The survey also included open ended items that involved teachers' decision making around instructional planning with diverse books and their classroom libraries. Examples of open ended questions included their level of teacher autonomy, their class demographics, and the diversity of the literature in their classroom. This initial survey was a convenience sampling advertised on Twitter. Respondents were asked to identify if they would like to participate in a follow up survey. Findings indicated that most teachers who have diverse literature in their classrooms purchased that literature with their own money. Findings also demonstrated that teachers of diverse backgrounds are more likely to choose books for their classrooms that have characters from those same backgrounds. After analyzing the responses from the convenience sample survey I sent out a purposeful sampling survey to those teachers whose responses showed that they are already dedicated to choosing diverse literature for their classrooms. All teachers interviewed share in wanting to give their students windows and mirrors in literature and foster empathy to create a more just and equitable world. Teachers recognized that their libraries have gaps in books with LGBTQIA+ characters, (dis)abilities, religions, and family structures. Finally, some participants noted the surveys helped to identify the gaps in their libraries and highlighted the need to plan for future purchases. Implications for this research include school-based inventories in classrooms and school libraries, and monies allotted for diverse literature. In teacher education programs, teacher candidates might conduct inventories in field placement classroom libraries or other content analysis research using children's literature.

Special Education Representation in Children's Books*

Megan N. Sulinski (Prof. Allison Bryan) Department of Education & Wellness

This research sought to determine how often disabilities, as defined under the Individuals with Disabilities Act (IDEA), are represented within a school library collection. It is important for children to interact with literature as "windows, mirrors, and sliding glass doors" (Bishop, 1990) in order to see themselves and learn about others' lived experiences. Thus, access to books with characters with disabilities is important. Traditionally, "No group has been as overlooked and as inadequately presented in children's books…as individuals with disabilities" (Blaska, Lynch, 1998). This research was conducted by reviewing the online catalog of an elementary school in the local school district. I created a list of key words for each of the thirteen disabilities listed under IDEA laws to search for books. It is important to note that this research only studied instances of representation and not authenticity of content and language. In a collection of 5,000 books, only 112 were found to include representation of characters with disabilities. The most common disabilities that are categorized under IDEA laws and represented in this library are specific learning disabilities, autism, orthopedic impairment, deafness and blindness. Traumatic brain injury and multiple disabilities were not found in the catalog. Although some disabilities were represented more frequently than others, there are still relatively very few books that depict individuals with disabilities compared to the amount of books total within their library catalog. Without children being able to see themselves or others with differences in books, it stigmatizes people who are living with disabilities as a separate group of individuals. This is neglecting the opportunity to have children be exposed to those with differences as well as for students who may have a disability of their own. The lack of representation impacts disability awareness and inclusive practice from a school and family perspective. Additionally, this

illustrates an opportunity for school librarians and special education teachers to work together to build a representative and authentic collection which would allow for connection with families in the community.

Toward Antiracist and Abolitionist Place-Based Environmental Education*

Dani Toma-Harrold (Dr. Scott Morrison) Department of Education & Wellness

For decades now, research has documented that being outdoors makes people feel better physically, mentally, spiritually, and emotionally (Capaldi et al., 2014; O'Brien, 2009). Children often do better academically when they have opportunities to learn outside of the classroom and in nature or their local communities (Barnes et al., 2019; Williams, 2018; Williams & Dixon, 2013). Using the local environment and community as a text and context for learning is what I call place-based environmental education. Despite the overwhelming benefits of teaching and learning outside, place-based environmental education often lacks a justice-centered or antiracist approach, leading to missed opportunities for healing and engagement for all students, specifically students of color. Therefore, my project focuses on the following questions: Are there ways to center antiracism in place-based environmental education? In what ways might place-based environmental education intersect with abolitionist teaching (Love, 2019), a liberatory pedagogy designed to simultaneously dismantle the education system and create a new existence built on mattering, love, and care for students of color? What would an antiracist or abolitionist place-based environmental education entail? While there is currently no research exploring the connection between place-based environmental education and abolitionist teaching, that did not necessarily mean that there were not educators and practitioners engaging in this intersection. So, with these questions in mind, I interviewed 47 justice-oriented environmental and place-based educators to see how they potentially combined aspects of antiracism and abolitionist teaching to place-based environmental education. From these interviews, I developed three themes: (1) participants had a collective understanding of systemic injustices, (2) participants re-embedded students in communities and nature, and (3) participants viewed education as a humanizing process. These themes shed light on participants' educational philosophies and the ways in which they supported students of color to feel honored, cared for, and loved in or adjacent to schools. Findings from this research study demonstrate that integrating place-based environmental education and antiracist and abolition teaching is not only realistic and effective, but also necessary.

Mattering and Belonging: Pursuing Equity Through Partnerships in Higher Education*

Heidi Weston (Dr. Peter Felten) Office of Provost & Center for Engaged Learning

The construct of "belonging" is commonly used to understand and explain student learning and experiences in higher education. Recent research demonstrates that institutions and staff can foster belonging among students (Meehan & Howells, 2019). For example, student-faculty relationships positively influence belonging (Miller et al., 2019). A student's sense of belonging is positively correlated with learning and graduation rates (Strayhorn, 2012; Thomas, 2012) as well as mental health and wellbeing (Bye et al., 2020). Despite this research, scholars have increasingly identified limitations to the construct of belonging, perhaps most significantly related to students within historically underrepresented groups (HUGs) in higher education. Efforts to promote belonging can alienate students who wonder if they do -- or if they want to -- "fit" in a community. The rhetoric of "belonging" can place an assimilatory pressure on students. As a result, scholarship on belonging may misinterpret feelings of marginalization among certain groups of students and also might miss

opportunities to understand what leads these same students to learn and thrive in higher education (Cole et al., 2020). This study explores "mattering," a concept related to but distinct from belonging: "Mattering is the feeling of being significant and important to other people" in a shared context (Flett et al., 2019, p. 667). Drawing on interviews with student partners from HUGs at three U.S. higher education institutions, and existing literature, this study asserts that student-faculty and student-student relationships are essential to students developing a sense of mattering in higher education. In addition, it confirms that mattering, unlike belonging, is transferable between academic contexts (Cook-Sather & Seay, 2021). This study concludes by suggesting that mattering is a construct that deserves additional attention in higher education research, and that practices linked to mattering can be effective ways to pursue equity, justice, and learning in higher education. Focusing on mattering rather than belonging would maintain the positive benefits of belonging relating to student academic performance, graduation rates, and wellbeing, without placing an assimilatory pressure that furthers marginalization among students from HUGs.

Engineering

Mississippi Delta Weir Design Challenge

Jackson T. Abele, Maggie E. Cox, Mallory R. Poff, & Carleigh M. Wood (Dr. Will Pluer)
Department of Engineering

The Mississippi Delta encompasses 3.0 million acres, of which 2.2 million acres are irrigated for staple crops such as corn, soybeans, rice, and catfish. The MS Delta Alluvial Aquifer is used to irrigate this area, and over the past 30 years, it has decreased 20 feet in depth, requiring efforts to increase aquifer recharge and surface water availability for agriculture demands. A weir constructed in a river pools water upstream, which helps to recharge the aquifer through infiltration and allow for more surface water withdrawals. Weir placement is important to the success of aquifer recharge. In partnership with the Yazoo Mississippi Delta Joint Water Management District (YMD), we are creating a scalable weir design guide that will allow for broad implementation and increased water availability across the Delta region. The first weir has been sited in an area characteristic of the Delta region and will serve as an example for subsequent designs. The supplemental design guide will allow for further weir implementation in the Delta region by walking step-by-step through the design process. Inputs will be easily accessible for non-engineers and the outputs will be designs for Professional Engineer approval. By providing the local practitioner YMD with this weir guide, they will be able to design and install weirs more quickly and cheaply than before, supporting agriculture and groundwater resources in the Mississippi Delta.

Improved Food Waste Processing Through Water Removal in a University Dining Hall

Henry Agyemang, Sonith Riem, & Samantha Direnzo (Dr. Jonathan Su & Mr. John Ring)
Department of Engineering

According to the Food and Agriculture Organization of the United Nations, every pound of disposed food waste releases 3.8 pounds of methane during decomposition. Food waste also occupies about 20% of landfill waste. One way to reduce landfill of food waste and reduce greenhouse gas emissions is composting, in which this waste is separated and decomposed under aerobic conditions to form fertilizer. Elon University has committed to composting food waste from their dining halls. Elon's

current waste management practice involves separation and storage of pre and post-consumer food waste, which is then retrieved and processed biweekly by CompostNow, a local company that converts the waste into usable fertilizer. A drawback of off-site composting is carbon emissions due to the truck-based retrieval process. Since compost is comprised of 40-60% water, water removal from food waste would reduce the number of waste collection trips and result in both cost and environmental savings. Our presentation will report on means of reducing the amount of water content in Elon's dining hall compost. We will report on the development of a process flow model created from waste disposal at Lakeside dining hall, following food waste from generation, to identification, weighing, and disposal of food products. This includes both pre-consumer and post-consumer waste. This model was used to identify potential sizes and locations for compaction and to specify our user needs. We also performed research into state-of-the-art compaction units and user preferences. Regulations and standards for liquid leachate disposal were also reviewed for potential effects on operations. Process flow information, as well as current standards and regulations, were used to specify and design a solution to separate and remove water from compostable food waste. We anticipate that the successful incorporation of this compaction technology into Elon University dining operations will result in decreased cost and carbon emissions associated with composting.

Lithium-Ion Battery Array Temperature Regulation

James W. Allen (Dr. Richard Blackmon) Department of Engineering

The growth of the renewable energy sector is limited by the possibilities of energy storage. Lithium-Ion batteries have largely supplanted nickel-cadmium and nickel-metal hydride batteries in electronic applications due to their high capacity, light weight and high-power density. Lithium-Ion technology, however, has a drawback: these batteries have an ideal operating temperature, which must be taken into account when designing for rural communities. The focus of this research has been to create self-sufficient units capable of regulating the temperature around these batteries while minimizing energy consumption. This small system can be adapted for the user's choice of batteries. The design consists of silicone heating pads and aluminum to distribute heat in cold temperatures, as well as small fans to create airflow as temperatures increase. The design goal is to be able to regulate within 20 degrees of the ideal temperature, which is 50 to 85-degrees. This will vary by the battery as well as the size of the array. The large the array the larger the unit and increased energy will be required to regulate the temperature. A prototype of this system has been constructed and was evaluated at 38 degrees F over one week and temperature was monitored using a thermocouple. Once this prototype has demonstrated a successful trial, it will be scaled up into a larger (2 ft x 4 ft x 1.5 ft) system.

Analysis of Mechanical Performance of Polylactic-co-glycolic acid (PLGA) Polymer Biodegradable Stents Under Accelerated Conditions

Ayesh Awad (Dr. Jonathan Su) Department of Engineering

This study focuses on the latest generation of coronary stents: bioresorbable stents (BRS). Traditional stents have a major disadvantage in that they are permanently placed inside the body, which can interfere with the natural remodeling and adaptability of the blood vessels, potentially leading to chronic inflammation and stent strut fractures. BRS, on the other hand, are made entirely from bioresorbable materials that gradually get absorbed while providing the necessary mechanical support to the arteries. The study aims to examine the mechanical properties of BRS both experimentally and computationally. In the experimental aspect, stents will be 3D printed using PLGA filaments and

placed in a shaking incubator with a buffer solution. Samples will be taken throughout the degradation process and bending, and tensile tests will be performed on them. For the computational model, a fine element analysis will be used to simulate the degradation process and examine the stents' mechanical properties. By comparing the experimental and computational data, the study hopes to provide further insight into the accuracy of the results. Although there has been some research on the mechanical properties of BRS, none has examined these properties throughout the biodegradation process. This step is crucial to understanding the limitations of BRS and identifying areas for improvement. This research will present the 3D printed model, background research and introduction to the fine element analysis simulation.

Bike Pedal Adapter for Children with Motor Impairments: 3D Printable and Accessible*

Ashleigh N. Azan (Dr. Sirena Hargrove-Leak) Department of Engineering & (Dr. Paula DiBiasio) Department of Physical Therapy Education

Many children learn how to ride a bike at a young age, exercising and gaining independence. Children with motor control difficulties may have a harder time moving their legs in the controlled, circular motion necessary, which often makes it challenging to maintain their feet on the pedals and thus control of the bike. Therefore, they may need assistance with riding a bike. One common therapeutic approach that helps with pedaling as well as developing motor control and strength in the legs is to attach the children's feet to the pedals using an adapter. There are only a few, expensive commercial options for bike pedal adaptors and most caregivers do not have the tools to fabricate adaptors on their own. By combining the engineering design process and the human-centered design process, a pedal adaptor was designed to assist children with motor control difficulties. The accessibility of this adaptor will allow children to bike for physical therapy or leisure. Every detailed change in prototypes was made with an effort to create a device that is safe and useful. The device was designed to allow for use with any bike pedal. It was created using the computer-aided modeling software, SolidWorks and can easily be 3D printed and completed with attachment hardware available at any home improvement store. As a result, an inexpensive and accessible bike pedal adaptor was created for children with special needs so they can experience the joy of riding a bike along with the benefits of being active.

Exploring the Mathematical Models of the Germicidal Efficacy of Ultraviolet Light and Developing an Overhead UV Cleaning Device

Aidan D. Burnside (Dr. Richard Blackmon) Department of Engineering

Ultraviolet light exposure is rapidly being adopted as a disinfection method as multiple companies create products that utilize the feature. Short-wavelength ultraviolet light (UV-C) has been proven to be effective at killing bacteria and viruses on surfaces and in fluids. Despite this growth in utilization, there has been little published work on the mathematical model for the germicidal efficacy of UV light. This thesis takes a wholistic approach to exploring the germicidal efficacy of UV light and the market utility of a product and company focused on UV light disinfection. As such, the research is divided into three main goals. The first goal of the research was to conduct experiments to determine how varying optical parameters would impact disinfection capabilities of UV LEDs to inform an optimized UV disinfection device design. This was accomplished by observing bacteria before and after UV exposure under a variety of circumstances including various distances ranging .1-5 m, exposure times ranging .5-60 min, and pulse rates ranging 1-1000 hz, and measuring the relative changes in bacteria survival. The second goal was to design an overhead device for UV disinfection, "The LUV Bulb",

based in part on these experimental models and on information provided by local clients. Multiple prototype designs for the LUV Bulb were developed using engineering design principles and stakeholder input. The final goal was to demonstrate the feasibility of a company selling this product and was accomplished through market analysis, financial analysis, and exploration into similar companies and patents. The findings of this research are intended to advance the UV disinfection industry for the benefit of stakeholders that currently utilize the technologies and stakeholders who will use them in the future.

Pediatric Movement and Development Through an Engineering and Physical Therapy Lens*

Gisselle Garcia-Jose (Dr. Sirena Hargrove-Leak) Department of Engineering & (Dr. Paula DiBiasio) Department of Physical Therapy Education

Retrieving everyday items is not a concern for most. Now, consider a young child with shortened upper extremities who has difficulty retrieving items from the floor. Pediatric reachers or grabbers for individuals with similar issues regarding physical mobility are commonly available but require substantial grip strength. This project seeks to develop a pediatric reacher compatible with their grip strength. By reverse engineering the mechanics of a traditional grabber, one can understand the required force for movements. The objective is to provide the child with a device to retrieve items from the ground and allow the child to have enhanced independence. The approach began by interviewing the child's family to gather information about their daily routine, physical limitations, and desires for the product. To establish the qualifications the product needed to satisfy, emphasis was placed on defining the problem. Consistent testing and prototyping assisted in the compatibility and personalization of the product to meet the child's needs. The final prototype of the product will be a pediatric reacher that is attached to a harness support system and allows the child to develop movement and independence.

Putting the Right Foot Forward: The First Women's Pole Vault Spikes*

Madison K. George (Dr. Scott Wolter) Department of Engineering & (Dr. Shefali Christopher) Department of Physical Therapy Education

Despite evidence that women's feet are proportioned differently than men's and react differently to load, sports shoes are still designed without attention to women's lower extremity biomechanics and there are no women's pole-vaulting shoes. This project includes a biomechanical study comparing men and women's foot force distribution during a pole vault approach, mechanical and material evaluations of existing track and field spikes, and the development of women's pole vault spikes. The biomechanical research study provides evidence of male and female foot force patterns which was used to determine design parameters such as spike placement and heel design of the midsole and outsole of the new shoe. The mechanical evaluation included energy return measurements of existing pole vault spikes to determine effective materials for the shoe and X-ray diffraction technology was used to identify existing pole vault shoe material makeup. A women's pole vault shoe was constructed to female foot dimensions and pole vaulter foot force distribution during a runway approach. This study provides a methodology for determining effective shoe designs for specific users, contributes gender differentiable data to the footwear industry, identifies possible materials used in existing pole vault shoes, and provides a women's pole vault shoe engineered to enhance performance, prevent injury, and promote gender equality in sports.

Incentivizing Walking for Children with Cerebral Palsy: The Singing Walker*

Lily Helm, Anna Kauffman, & John O'Donnell (Dr. Paula DiBiasio) Department of Physical Therapy Education & (Dr. Sirena Hagrove-Leak) Department of Engineering

The goal of this project is to develop a walker-attached device that will play music when the walker is moving and stop playing music when the walker stops. This device will have the potential to change the lives of children with cerebral palsy, who can learn how to walk independently if they have the proper therapy and work to develop their muscles. The younger a child with cerebral palsy begins using a walker, the more likely they are to learn how to walk independently. It can be frustrating and challenging for children to stay motivated to practice walking, so it may often feel like a chore. This can lead to the child refusing to use their walker. The goal for this project is to turn walking practice with the walker into a fun activity that the child can look forward to rather than an unpleasant task. The design process and prototypes will be showcased. The working prototype consists of an Arduino attachment that is programmed to play music when the walker's acceleration is a non-zero number. By creating this device, we will be able to make using a walker more enjoyable for kids and in turn, allow them to grow the muscles to be potentially able to walk independently.

Developing a Lightweight Recovery Boot with Heating and Cooling Treatment

Avery Johns, Brooke Gehrke, & Apple Ngamwong (Dr. Jonathan Su) Department of Engineering

Walking boots are often prescribed to people recovering from foot or ankle injuries to immobilize and support the affected area. For many injuries doctors emphasize the importance of heating and icing the injury for twenty minute intervals. Heating promotes blood flow to help muscles relax from chronic pain while cooling helps slow blood flow to reduce inflammation. The possibility of heating and icing while still completing activities provides more incentive for injured people to follow their doctor's instructions since they do not need to remove the walking boot and take twenty minute rest breaks to heat or ice. Currently available walking boot models do not allow for temperature therapies to be applied while the boot is worn. A walking boot design is being modified to include the addition of pockets for heating and cooling gels to be inserted. The re-engineered boot also has the potential to benefit people by expediting their recovery. The research analyzed methods of securing the heat and ice gel packs within the boot over commonly injured areas while maintaining the rigid structure of the boot necessary for healing. The boot will be tested specifically by athletes to determine the effectiveness of the boot in hastening the post-injury healing process.

Improving the Stability of Organic Materials for Commercial Garment Dyeing

Lauren Hanchar, Mary L. Hermes, Vivian C. Krause, & Jordan A. Wels (Dr. Jonathan Su) Department of Engineering

The use of organic materials in garment dyeing, while not new, are an opportunity to further sustainability in the textile industry. Limited research on the industrial processing of these dyes has hindered application of organic dyes at larger production scales. A local garment dyeing facility has developed methodology to utilize organic materials such as local seasonal crops and food waste products for commercial dyeing purposes. However, proper storage processes for extracted natural dye has yet to be identified. Our team is developing an improved procedure for processing extracted dye material to address the degradation and resulting color change of organic dyes. We are testing various

methods of storage for four organic materials: pomegranate peels, madder root, Osage orange, and black walnut. Five storage conditions will be examined in this experiment. Lyophilization, refrigeration, and freezing processes slow molecular movement to prevent degradation. Storage at room temperature will demonstrate the impact of no storage method, and incubation has been used to accelerate degradation conditions and mimic a longer term of storage. After several months, the stored dyes will be used to dye fabric samples according to the dye procedures of the garment facility. Observations about degradation of the dye, and changes in the resulting color of the fabric compared to a control trial will be taken to gain insights into the success of various storage conditions. We will also use UV-Visual Spectroscopy to analyze the specific absorption peaks of the dye samples to identify even slight color changes. We predict that the conditions which expel water and arrest molecular motion, such as lyophilization and freezing, will yield the most similar results to the control. Conditions that accelerate degradation of the organic dyes are predicted to exemplify progressive changes in color over time. This project will produce protocols for improved methods of storage for each of these organic dyes for the facility to scale up for their production, and allow the facility to produce a consistent product with natural materials.

Developing a Footstool and Back Support for a Girl Who Has Cerebral Palsy*

Avery L. Johns & Ayesh Awad (Dr. Sirena Hargrove-Leak) Department of Engineering

Principles of engineering design are being applied to the development of a footstool and back support, custom-built to the specific needs of a young girl with cerebral palsy. Cerebral Palsy is abnormal brain development or damage to the brain during development, affecting an individual's ability to properly control their muscles. This results in greater amounts of fatigue for people with cerebral palsy since these individuals have to exert more energy during common tasks due to trying to combat spasticity, uncontrollable movements, and a lack of coordination. The footstool will provide respite for her legs by creating a place to rest instead of swinging freely while she sits in her chair. The back support will extend from the current back of the chair to where the girl prefers to sit towards the front of her chair. It will help her posture and enable her to rest her back muscles, actions that the current back of the chair does not provide since her small size does not allow her to rest against the back while sitting at the front. This study partners with a nonprofit organization in Raleigh called Made4Me that works with kids with special needs and their families to custom design, build, and deliver a product for the child that will help meet a specific desire. The final product is made completely out of cardboard and will have no cost to the family, aiming to last the child three years. The research will discuss in detail the design processes used to create these custom products for the young girl.

Effects of Surfactants on the In-Vitro Testing of Drug Implants

Kyra K. Johnson (Dr. Jonathan Su) Department of Engineering

Patient adherence to drug delivery has been a long-standing issue; the development of long acting drug implants (LAI) has been a useful solution. In vitro testing of these implants often requires the use of surfactants to solubilize the drug. It has been suggested that surfactants cause swelling of the polymer membrane, which could impact the rate of drug diffusion. This study sought to explore the impact of surfactants on diffusion. Model drugs aspirin and caffeine were run through PermeGear 15mm clear Side-Bi-Side Cells under temperature conditions that simulate those of the human body using Poly Lactic-co-Glycolic Acid (PLGA) as the polymer membrane separating the cells. The model drugs were run with and without the presence of Sodium Dodecyl Sulfate (SDS). Samples were taken twice a day

for a week and analyzed via a ThermoFisher NanoDrop UV-Vis spectrophotometer to measure how much drug had diffused across the membrane. Results were inconclusive. Trace amounts of drug were found to have diffused across the polymer membrane in two out of six trials with SDS addition; however, no drug was found to have diffused without SDS. Due to the inconclusive nature of the results and more trials being needed, further research is required to explore the relationship between polymer swelling and drug diffusion. The use of instrumentation with a better range of detection and less interference could provide an enhanced insight into the trace amounts of drug detected.

Factoring Out Racial Bias: Developing a Dual-Sensor System for Pulse Oximetry*

Vivian C. Krause (Dr. Jonathan Su) Department of Engineering

Pulse oximeters estimate oxygen saturation non-invasively by using the ratio of light absorption by oxygenated and deoxygenated blood in the fingertip. These relatively inexpensive tools have been vital in the recent fight against COVID-19. However, inaccuracy has been identified in pulse oximeter measurements, especially for users with darker skin tones. For example, “occult hypoxemia” has been identified in multiple studies, in which patients have arterial oxygen saturation below 88%, despite pulse oximetry reading between 92% and 96%. Occult hypoxemia has been found at higher rates in populations with dark skin tones. To address this, I will incorporate a skin color recognition system into a pulse oximeter to identify user conditions that indicate a risk for inaccurate readings and suggest a possible range of oxygen saturation levels. To maintain a level of accessibility for my device, I am using cost-efficient Arduino-based sensors for pulse oximetry and skin color detection. I have developed a working prototype for a color-recognition sensor, and I have conducted a study to calibrate the color recognition sensor by data collection of Red-Green-Blue (RGB) units of skin color in a wide range of participants, based on the Fitzpatrick Scale for skin tones. After performing statistical analysis of the collected data, the observed standardized range for RGB coordinates for each of the six Fitzpatrick types has been incorporated into the programming of the device so that skin color detection is more accurate, and data can be taken continuously. The skin color recognition system has been integrated with an Arduino pulse oximeter on one device, and it has been programmed to take both sensor inputs into account when identifying conditions where inaccuracy is most likely. Wearable sensors, such as pulse oximeters, can have tremendous benefits as tools for accessible and accurate at-home health monitoring. This project is addressing published discrepancies in the accuracy of these devices and offers a creative solution to a major public health issue that affects communities of color.

Hydrology of Pervious Surfaces and Runoff Analysis at Elon University

Sidney R. Lowe (Dr. Bethany Brinkman) Department of Engineering

This research aims to examine the effect of a paver system composition on water quality and runoff pollution. Elon University uses brick pathways across campus and flooding and stormwater runoff often occur as a result of the impervious surfaces. Runoff can be harmful to surrounding water bodies because it can transport elevated concentrations of nitrogen and phosphorus from fertilizers and alter the pH. This project examines Elon University's brick pathways in contrast to a pervious paver system, which will ideally provide walking paths for students while decreasing runoff and pollutants to nearby water sources. Two small scale boxes have been built; one mimicking the current design used by Elon University and the second containing bricks and gravel in an alternating design to filter storm water and allow for faster ground infiltration. A rain simulator was designed and placed above the boxes, and filled with simulated rain with varying levels of nitrates, phosphates, and pH levels to analyze the

effectiveness of subsurface filtration within the paver support matrix. Runoff from the boxes was collected and tested for filtration time, turbidity, pH, nitrate and phosphate concentrations, and dissolved oxygen. We found that the pervious pavement design results were different than the current, impervious design. This implies that a more sustainable design can improve water quality in surrounding water sources by decreasing pollutants, resulting in a healthier ecosystem with no loss of structural support for students to walk on across campus.

Construction of Stormwater Management Mesocosms to Model Full-Scale Systems

Tyler C. Musante & Sammy Tucker (Dr. Will Pluer) Department of Engineering

Excess nutrients in runoff from stormwater events damage aquatic ecosystems and have a detrimental impact on human health by creating the conditions for artificial eutrophication to occur. These nutrients, specifically nitrate and phosphate, generally come from fertilizers used for agriculture and residential or commercial landscaping. In urban systems, the dominance of impermeable surfaces exacerbates this issue as stormwater that would usually slowly percolate into soil instead quickly flows into streams and rivers. Engineered stormwater beneficial management practices (BMPs) can reduce the impact of these excess nutrients by treating runoff from impermeable surfaces before they reach surface water bodies. Some BMPs, such as constructed wetlands and bioretention systems increase infiltration, allowing stormwater to percolate through soil and be treated. Meanwhile, artificial solutions such as Lanthanum modified bentonite aim to target specific nutrients and bond with them directly to prevent them from entering the aquatic ecosystem. However, there is still much debate about when to use one BMP over another, which may change based on the given scenario or personal preference. In this study, we worked to answer this question by constructing lab-scale BMPs (a basic bioretention, bioretention with upturned outlet, bioretention with LMB clay addition, and constructed wetland systems) in order to simulate larger-scale systems in a controlled lab environment. This avoids running the risk of having confounding variables since full-scale stormwater BMPs aren't generally built in the same area and will encounter different environmental conditions. Simulated storms will pass through the BMPs and the effluent will be monitored to test for treatment effectiveness as measured by the removal percent of nitrate and phosphate. Different storm sizes and temperature conditions will be used to predict efficacy in different climates and climate change. This experiment will quantify predicted treatment in full-scale BMPs currently installed and help inform which systems should be used for future projects. The mesocosm BMP's have already been built and had water run through them, and by the end of the semester, we look to have these systems ready for data collection in the fall.

Floating Garden for Bioretention Basin

Rane V. Parr, Sidney R. Lowe, Lauren E. Hill, Bruce D. Vagt, & Seth M. Wolter (Dr. Scott Wolter, Dr. Bethany Brinkman, & Dr. Jonathan Su) Department of Engineering

This research aims to enhance water quality in a bioretention basin by adding economically important crop plants in the form of artificial floating gardens. The water basin mimics natural aquatic systems that provide a variety of ecological services including flood abatement, nutrient accumulation, and sediment removal in retained waters. This mitigates pollutant entry into adjacent aquatic systems. It is essential to examine the growth of vegetation in polluted water systems to determine which species will grow the best in ambient levels of nitrogen and phosphorus. While previous studies of artificial floating platforms in this specific basin focused on nonedible vegetation, this project explores the

impact of using common crops on the accumulation of nitrogen, phosphorus, and metals. An evaluation of the tolerance to different basin conditions and suitability for human consumption of the different crops grown in the artificial floating gardens was conducted. A set of two warm weather crops suitable for North Carolina's climate, tomatoes and green beans, were analyzed for germination rate, growth rate, and metal content. Crops were grown in an indoor hydroponics system to mimic the outdoor bioretention basin conditions prior to being tested outdoors in the existing water basin. In this indoor array, the concentrations of nitrogen and phosphate were varied, as well as the oxygen conditions. Growth was measured by recording root length and plant height, as well as observing qualitative details on leaf and stem appearance. Further chemical analysis of metal content using the Inductively Coupled Plasma (ICP) chemical analysis method provided information on the safety of plant consumption. In addition to the impacts on pollution mitigation, this hydroponic crop system creates additional implications for efficient land use and food security.

Solar-Powered Refrigerator on Wheels: An Engineering Design Challenge

Mallory R. Poff (Dr. Sirena Hargrove-Leak) Department of Engineering

In the United States, fresh produce travels an average of 1500 miles from farm to table and much of the produce requires refrigeration. The energy requirements with transportation and refrigeration provide an opportunity to utilize solar energy. This study focuses on the design and implementation of a solar-powered mobile cooling unit to power refrigerated storage and transportation units, specifically for small-scale farming. To inform the design process, small-scale farmers were interviewed about their refrigeration needs as potential stakeholders. A series of experiments were conducted to understand the performance capabilities of the internal cooling system and the solar set-up. Temperature studies were done to ensure that desirable temperatures could be achieved and maintained within the unit. These were conducted in different weather conditions to quantify external impacts. Different solar panel configurations were explored for optimal power output. A design manual and maintenance guide were created for the optimal design, allowing for use by the Elon community and future use in small-scale farming communities.

Affordable Medical Equipment for Cerebral Palsy: A Pediatric Reverse Walker made of PVC

Emmeline Roberts (Dr. Sirena Hagrove-Leak) Department of Engineering & (Dr. Paula DiBiasio) Department of Physical Therapy Education

We live in a world where many people with motor impairments struggle to find easily accessible and useful equipment to aid them. Often solutions such as wheelchairs and walkers are inaccessible to those who need them due to their high cost; a typical reverse walker, for example, can cost anywhere from $200 - $500. This project sought to design a reverse walker out of PVC tubing to assist a young boy with cerebral palsy in learning to walk. I have worked closely with him using durable, cheap, and lightweight products to build a personalized adjustable reverse walker that is adapted to a mobility issue in his left hand. The presentation will walk attendees through the design and building process along with the results of my product that is focussed on human centered design along with feature results from product testing. Successful completion of this project will not only serve as an inexpensive customized mobility for the current client but will provide proof-of-concept for future resource-limited people who may require mobility assistance.

Defect Detection and Characterization in SiC Wafers

D. Haydn Stucker, James W. Allen, Declan T. Elie, & Aidan D. Burnside (Dr. Richard Blackmon) Department of Engineering

Silicon Carbide (SiC) is a novel semiconductor material that has found application in computer chip manufacturing, telecommunication systems, and high-voltage electronics. These wafers are commonly integrated into light emitting diodes, automotives, and other applications where devices are regularly exposed to high temperatures. High purity, single crystalline SiC is grown into boules, diced into thin wafers, and polished chemo-mechanically. Material defects in the near-surface layers of SiC wafers can introduce operational failures in devices fabricated on the polished wafers. It is critical for SiC wafer manufacturers to have high levels of quality control in their products which requires an effective method for defect detection. Our work evaluates, non-destructive methods to detect defects accurately and efficiently in SiC wafers. The potential for automation in each method is also considered but not directly evaluated. Specifically, Raman Spectroscopy, Optical Coherence Tomography (OCT) and Photoluminescence are being compared. Deep-penetration OCT scans using 900nm light are being used to explore if physical defects were present in the scans. The generated images are to be analyzed using color thresholding and edge detection techniques to determine how consistently physical defects can be identified. Additionally, Photoluminescence spectroscopy is being investigated to compare the scan results and processing time with an accepted, but slower method of Raman Spectroscopy. We expect OCT to have a consistent detection rate of physical defects in SiC wafers and Photoluminescence to be a faster alternative to using Raman Spectroscopy, while still yielding accurate chemical defect characteristics. We will evaluate the reliability of scan results and processing times of these techniques for detecting material and physical defects in SiC wafers. Our background investigations into these methods suggest their reliability and efficiency will show promise for use in a manufacturing setting. We hypothesize that both methods will demonstrate high consistency in properly identifying defects and offer reduced processing times, suitable for use in industry.

Improving the Ergonomics of the Stihl Picking Cart

Dalton Thompson, Devin Guilbeau, & Moris Menjivar Alfaro (Dr. Jonathan Su) Department of Engineering

Stihl is an international company which manufactures chainsaws and other hand-held power equipment. The Stihl warehouse location in Hillsborough, NC is responsible for shipping parts and equipment throughout the mid-Atlantic region. Workers at this warehouse use a picking cart to hold the boxes for orders as they move through the warehouse to “pick” the items assigned to that box. Initially, this location used a standard off-the-shelf cart made from stainless steel. This cart has four caster wheels with two different configurations: all swivel wheels or two swivel wheels and two fixed wheels. Worker feedback was that this design was heavily impacted by over steering and that the cart became difficult to push under heavy loads. As a result, Stihl developed a second cart made of aluminum. High pull force and fishtailing impacts productivity and worker ergonomics. Improvements to the cart consisted of reducing over steering and decreasing the strain on the user. This project will focus on reducing the push/pull force necessary to move the cart to improve ergonomics for the workers. Changes in wheel material were tested and recorded to be used as applications to the cart's final design. Because the literature indicates wheel material hardness will decrease push/pull forces due to reduced deformation under loading and therefore a smaller rolling friction, we have explored wheel material hardness by evaluating polyurethane, phenolic, and polyimide.

Designing an Efficient, Single-Gear Powertrain for the Elon FSAE EV Race Vehicle

Benjamin Trainum, Ryan Cappel, William Collins, & Gabe Nicholas (Dr. Jonathan Su) Department of Engineering

The Elon Formula Society of Automotive Engineers (FSAE) team is designing and building a smaller scale Formula 1 style electric racecar to compete in the FSAE international competition. The goals of this project were to outline the design process taken to create a specific sub-system of the car, including why decisions were made as well as the constraints and requirements of the final powertrain. As this car is being built from scratch by the team, each system within the car needed to be properly researched and designed before materials were purchased and the system constructed on the physical car. One such system is the powertrain. It is the system that transfers power from the motor within the car to the back wheels. Our powertrain had three main requirements: it must be single gear to keep costs down, it must allow the car to reach satisfactory max speeds for endurance challenges but still produce enough torque to compete well in sprint challenges, and it must comply with all physical requirements put in place by the FSAE competitions guidelines. The main components of the powertrain have been decided: an Emrax 228 electric motor for power, a sing chain and custom manufactured sprockets for transferring power to the differential, and a Drexler FSAE Limited Slip Differential (LSD) for transferring rotational power toward the wheels. All these parts were picked due to two main factors: quality and ease of rulebook compatibility. The motor and LSD are from quality brands and implemented easily into the car; making our own sprockets saved money from having to order low-quantity, possibly custom parts and will allow more flexibility in the final gear reduction we decide on. We have designed a single-gear powertrain for the vehicle as well as all mounting hardware for the chassis. Future work consists of gear ratio testing, construction of motor and chain guards, and assembly into the chassis once it is built.

Modifying Ride-On Cars for Children with Disabilities*

Sammy C. Tucker, Gloria Kaso, & Allee R. Seering (Dr. Sirena Hargrove-Leak) Department of Engineering & (Dr. Paula DiBiasio) Department of Physical Therapy Education

Children that are born with mobility limitations are unable to enjoy some toys, especially at a young age. At this early stage in life, it is suggested that children play with toys for growth and development, so children with limitations are not receiving that significant growth. We have the opportunity to grant a child that growth by modifying a children's ride-on vehicle to support the child's needs. Literature supports the use of modified ride-on cars as part of the early developmental play to encourage the development of social-emotional and mobility skills in young children with developmental differences. Our goal is to create a final product usable for the child, grant the child additional mobility and sociability, strengthen/increase grip strength, upper body control, hand-eye coordination, and depth perception, and lastly design the car to fit the clients/child preferences, which includes colors, decorations, and add-on materials. This presentation will provide insight into the modifications we made to the car in order to promote mobility for the children we are working with. Some design ideas and approaches that we found a rational connection with our project were Made4Me, Bella’s Bumbas, and Amputee Vehicle Modification. Our focus from the Made4Me project and inspiration was communication with families and the child. By eliminating the use of petals, drivers use their arms for acceleration and braking with either a switch or button. Reverse engineering an amputee-adapted vehicle will translate well into this project. We are rewiring the pedal to a button, and providing addition supports and harnesses. These modifications will be done in the engineering workshop.

Results of this project will provide evidence for the increase of child development when given the opportunity to play independently. With the modifications made, the children's ride-on vehicle will be a great addition to our child's daily life, as well as the family. This will be a very large step for our child's development, and the families. With the growth of the child's abilities and social interaction, the child's family will be able to expand newer horizons regarding the user.

Factors that Contribute to Picking Cart Fishtailing Forces and Recommended Solutions

Sammy C. Tucker, Matthew J. McCourt, Lamar A. Williams, & Nicholas A. Muller (Dr. Jonathan Su) Department of Engineering

STIHL produces the number one selling brand of chainsaws and a full line of outdoor power tools, with eleven regional branches and distributors serving more than ten thousand authorized local dealers. As part of the process of shipping parts and tools throughout the Mid-Atlantic region, the Stihl warehouse in Hillsborough, NC uses picking carts which are manually loaded by a picker. The carts operated by this distribution center have a fishtailing problem when turning loaded carts: as a cart turns a corner, unwanted movement occurs as the end of the cart swings wide. The goal of this project is to determine which factors impact cart physics and the degree to which they affect fishtailing. These results will not only benefit STIHL but will improve cart design and usage in general warehouse environments. Our team has made trips to the STIHL warehouse to observe carts and behavior of pickers, along with load distribution. On these visits we collected data and feedback from the workers about their personal preferences. Doing so we will determine which variables make carts easier to pull, control, and safer to use in industrial environments. This will improve the working conditions and the efficiency of STIHL warehouses as well as picking cart mobility. Literature indicates that directional locking and fixed casters prevent fishtailing and enhances the stability of carts as they maneuver throughout the warehouse. Design of Experiments (DOE) was used to efficiently maximize factor impact identification with minimal testing. The DOE allowed us to create new factors within the tests such as wheel material, the number of wheels on the cart, the weight placed onto the cart, and the hand position on the cart. At the conclusion of our tests, we were able to determine the variables had the most and least effect on fishtailing. Successful completion of this project will improve the working conditions and the efficiency of STIHL warehouses as well as picking cart mobility.

English

Introducing Mr. President: Exploring Healthcare and Rhetorical Genre Studies (RGS) Within the State of the Union Address

Morgan E. Bassett (Dr. Jessie Moore) Department of English

Since 1934, the sitting President has given a State of the Union address to Congress and the nation. It's an opportunity to discuss national news, perceived progress and setbacks, and the President's priorities and legislative proposals for the year ahead. In addition to this routine content, topics classified as "healthcare" are consistently included in varying capacities. This research identifies specific healthcare topics referenced during the first and second State of the Union addresses of Presidents H.W. Bush, Clinton, W. Bush, Obama, Trump, and Biden. Qualitative and quantitative analyses were utilized to track references toward healthcare legislation, federally funded and private insurance plans, prescription drugs, and vaccines. These findings were compiled into a report for Presidential

speechwriters, which included data visualization methods in connection with topic frequency and context, trends between the first and second address, and trends between referenced topics and a President's political party affiliation. The report further implements a rhetorical genre studies (RGS) framework to evaluate the purpose and social action of the State of the Union address, in terms of a widely recognized political genre. Ultimately, this research analyzes the evolution of healthcare topics across two centuries, as well as the functionality and subsequent adaptation of the State of the Union for inciting public action.

Young Women's Violence as Protection in Young Adult Literature

Zoie M. Browder (Dr. Megan Isaac) Department of English

This research looks at representations of female violence in young adult literature written by American women between 2008 and 2020. This analysis examines violent female characters, specifically girls using weapons to commit murder, even if reluctantly. The stages of examination include the conditions that led to the characters' violence, the outcomes of that violence, and the impact on themselves and others, in order to seek patterns that occur across the books. Characters in several novels are examined, including Graceling by Kristin Cashore (2008), Scarlet by A.C. Gaughen (2012), Female of the Species by Mindy McGinnis (2016), and Skyhunter by Marie Lu (2020). These novels represent the genres of fantasy, folklore retelling, contemporary realism, and dystopian fiction. While the characters in these novels all kill violently, it is typically only when they or those around them are in physical danger. Whether they use the violence offensively or defensively, it is always in service of protecting others from physical danger. At some point in their lives, the characters either needed someone to protect them or failed to protect someone close to them, and this experience motivates their violence. Research about girls being victims of violence in young adult literature is common (McDermott, Storer); however, there is little information about girls in young adult literature using violence as a way to protect those who cannot protect themselves. This research begins to fill that gap, arguing that their lethal violence, more typically a masculine act, results in the characters being outcasts, relegating them to the fringes of society, even while protecting people within that society.

Exploring the Innovation of Artificial Intelligence Writers

Alissa R. Butler (Dr. Jessie Moore) Department of English

Are robots replacing humans? Since its emergence in the 1940s, artificial intelligence (AI) has transformed into a powerful phenomenon with implications for the professional world. Thanks to natural language processing (NLP) technology, AI is now capable of generating entire pieces of text given varying amounts of user input. These are called AI writers, and they've already started working in major newsrooms and media companies, threatening the jobs of real humans. Interactive chat bots have also made their way to the mainstream, with models available from Microsoft and Google. Anyone can access AI writers and use them to produce high quality writing for various purposes. To test the integrity and true quality of these AI writers, I selected three popular NLP software–ChatGPT, Writesonic/Chatsonic, and Anyword–and gave them three input prompts to be judged on their performances for 1) correctness in basic grammar conventions, 2) breadth of vocabulary, and 3) closeness to "human" writing. Each of these criteria were judged on a scale of 1-10, with 10 being the best score. The purpose of this study is to investigate the advancement of AI writers and seek to determine whether or not they are close to completely replacing that of their human counterparts. In addition to this performance analysis, I produced a list of recommendations for best practices of AI in

the workplace. This is to ensure that if AI writers are being heavily relied on professionally, they are being used with rectitude, yielding the most efficient and effective results.

Social Media 101: A Guide to Best Social Media Practices

Mia C. D'Agostino (Dr. Jessie Moore) Department of English

This study examines the topic of social media and which practices yield the best results for mid-market enterprises. Social media practices can include strategies such as appropriately utilizing the platform's conventions such as tagging other users, using hashtags, or replying to other user's comments. Each social media platform has unique conventions, and they can be understood as a sort of social code, similar to the social cues utilized in in-person communication. This study answers the question: what are the best practices for social media management for mid-market enterprises? The social media platforms included in the study were Instagram, LinkedIn, and Twitter. The methods used to study the social media platforms included examining pre-existing guidebooks, blogs, and websites. Reviewing the content of these sources helped to define an appropriate tone by looking at their word choice, design, and layout. The findings of this study culminated in a comprehensive manual outlining the best advice on social media practices. In addition to providing the best social media practices for each platform, the manual features a sample social media analysis so the audience can reference a real-world application of the concepts and strategies introduced by the manual. This project is important because many companies run successful businesses but lack a social media presence that could provide exponential benefits. The overall conclusion to this study is comprehensive review of multiple social media platforms and the strategies that yield the best results.

Generational Linguistic Evolution: How Gen Z is Using Social Media Platforms to Develop Language and How Companies Can Follow*

Alejandra Gonzalez (Dr. Jessie Moore) Department of English

Memes and slang are developed through social media and often come up as references in conversations. Today, the age group referred to as "Generation Z" takes the lead in creating or redefining words and phrases to communicate on social media platforms. This is an example of how generational linguistic trends occur. Because of this, online conversations are different from face-to-face conversations. We answer the following research questions: How is slang affecting the daily conversations Gen Z have with each other and other age group members? How much of the current trending slang do they know? And are Gen Z members likely to interact with companies that engage and communicate with their language? This study contained two phases. Phase one included analyzing the text provided in captions, comments, and videos of six large companies (Duolingo, Chipotle, NBA, Fortnite, Levis, and Fenty Beauty) with currently over one million followers on the platform "TikTok." Additionally, an analysis of comments on trending videos was looked at. If comments and media text are repeated with a positive response, they were added to the ongoing language index. Phase two included an online survey that was sent out to Generation Z members in the state of North Carolina. The survey explored the personal and company impact of the means and slang. Results showed that companies can use the current generational language trends to increase their awareness and engagement, the number of customers, relationship with the audience, and global reach. The final product includes a dictionary explaining terms for companies to use and a recommendation letter to encourage companies to use these marketing techniques for better social media presence.

Computers: How Technology Has Enhanced Communication in the Workplace

Bria Harmon (Dr. Jessie Moore) Department of English

Over the years, technology has become the new normal. The instant gratification of being able to communicate to others at such speeds is second nature. The technological advances that take place in today's day and age have allowed for so many different opportunities within the workforce. The first computer with a camera was actually made in the early 1990s, which is not long ago. At the same time, the first computer was made in the mid 1930s. Technology has made leaps and bounds, and since it is so advanced overall, the process for making newer technologies is quicker than ever before. This project reflects my interest in learning more about how technology has allowed more efficient communication within offices/classrooms by comparing strategies from 30 years ago to today. To conduct my research, I interviewed a select few of the university's staff members to learn more about their experience of the new technologies that they are able to use now that were not available to them years ago. This topic is important because it shows how important technology is. My fundamental research questions are the following: What new technologies have you had to learn how to use? Has the change in technology affected the workplace negatively or positively and how? What do you think the future looks like?

Writing Confidence and Self-Perception

Ally Laird (Dr. Heather Lindenman) Department of English

The essential question guiding this research was what factors inside and outside of school influence student confidence and perceptions of their writing abilities. Previous research on this topic found that negative perceptions of writing stem from lack of communication with educators and writers feeling they lack control over the writing process (Holmes, 2001). Furthermore, author John Warner aims to take blame off of students for why they "can't" write and instead examines the problems with teaching writing in the education system today. He believes these issues are systemic and that the "rules" of writing decrease intrinsic motivation and make it hard for students to find their true writing potential (Warner, 2018). Popular media also agrees with this research, highlighting how students do not enjoy writing because they do not see the relevance, they feel pressure to write perfectly, or they do not receive constructive feedback (Marco Learning, 2019). To seek answers to my essential question, I drew on data from interviews conducted by my fellow students in ENG2090, Writing Studies Survey, and conducted six additional interviews. Participants were all college students, representing various majors, racial identities, and sexual orientations. The goal of the original interviews was to examine students' perceptions of themselves as writers while the purpose of the additional interviews was to dive deeper into how students' experiences could be improved. I coded all interviews for self perception, causes of students' self perceptions, and proposed improvements. Participants voiced that they wanted more writing freedom and choice in their writing classrooms so they could write about their own lived experiences and things they are passionate about, one-to-one conferences with teachers so they could get more effective feedback on their writing, and clearer guidelines for when teachers do assign formal writing projects. Although this study was conducted with college aged students, many participants discussed experiences in high school that impacted them so I believe this research is generalizable to that level. Future research might investigate ways to educate and encourage faculty across university and secondary levels to implement specific feedback techniques or conference methods that increase students' writing confidence.

Investigating the Evolution of Rhetoric Surrounding Taylor Swift and the New-found Embracement of Successful Women (Camryn's Version)*

Camryn Z. Levin (Dr. Jessie Moore) Department of English

Taylor Swift is one of the most successful music artists in the business right now: she is the first artist in history to have all 10 spots on the Billboard Hot 100, has broken multiple records in streams and sales of her music, and in total has received 540 awards since her debut album in 2001. However, over the fifteen years in which she has been in the public eye, the opinion on her and her music has been ever-changing. In this project I study the rhetoric surrounding Taylor Swift and her ability to remain successful through her 15-year long career, along with the ramifications it has on other females in the music industry. Specifically, my project investigates this rhetoric surrounding Taylor Swift from the years 2016-2018, and 2021-present. 2016-2018 is the time in which Swift was the most criticized and faced the most controversy, and 2021-present is a time in which she was highly praised. I analyze news articles, social media posts, reviews, and interviews from each year, and investigate whether a shift in tone occurred when referring to Swift and, if so, when this shift came about. I believe that Taylor Swift is a prime subject to investigate this topic regarding language surrounding successful females due to her climb to fame coinciding with a rise in technological communication, as well as an interesting figurehead for what female artists can learn from.

Models and Myths: Unmaking the Bounds Between Gods and Saints

Aidan Melinson (Prof. Andrew Perry) Department of English

This project is a two-year undergraduate research effort that has culminated in a portfolio of semi-devotional and semi-autobiographical poetry that seeks to complicate the understandings of the pagan god and the Catholic saint, though I use the term “god” to reference a variety of pre-Christian mythological characters and creatures. While both the figures of the god and the saint are often recipients of veneration and in some sense representations of abstract values, the god is different than the saint in that the god is almost always categorically non-human. The saint is a person who has died but is remembered and exalted because of their example of leading a virtuous life. Most gods are understood to be involved in human affairs, but ultimately apart from them. Because of this difference, the gods are sometimes thought of as manifestations of larger cultural values that may point to right behavior but are not explicit exemplars of daily action, whereas the saint is typically treated as an object of daily imitation. In essence, the saint is treated as a model, the god as a myth. The poems in this collection expand and challenge the bounds of divinity and sainthood by inverting this assumption; they use mythology and hagiography to explore the gods as saints, as objects of direct imitation, and they challenge the patronages of the saints to configure them into distant, imperfect patron gods. With this understanding, the portfolio uses characters that are both myths and models to complicate the different ways of experiencing grief and loss, madness and monstrosity, in daily life and culture.

What You'll Do With That Degree: A Study of the Writing Lives of PWR Alumni

Emily K. Murrill & Alejandra Gonzalez (Dr. Travis Maynard) Department of English

Over the last decade, research in rhetoric and writing studies has been focused on the concept of writing transfer — how students adapt and apply their writing knowledge from prior contexts to new writing situations. Early studies focused on students’ transfer of knowledge from their First-Year

Writing courses into later academic work (Yancey, Taczak, and Robertson 2014) and how previous writing experiences influenced students' work in a classroom setting (Rosinski 2016; DePalma 2015). In recent years, research has pivoted towards the study of college alumni (Bleakney et al 2022) and how their undergraduate writing experiences have impacted their current writing lives.. However, this area of research is relatively new and understudied. To address this gap, a research team including two faculty members and myself designed a study that examines the writing contexts and processes that Elon University major alumni rely on in their current lives and the undergraduate writing experiences that contributed/failed to contribute to their current writing. Twenty-four Elon alumni who majored in Professional Writing and Rhetoric completed a Qualtrics survey with questions about participant demographics, their current writing experiences and writing processes, and which class assignments or experiences from which they still draw upon. We narrowed down a group of seven participants to participate in interviews based on their indicated interest in the survey, their demographics, and their industry. Over the spring semester, these alumni participated in one-hour Zoom interviews composed of activities and questions that elaborate upon their current writing contexts, undergraduate writing experiences, and their perceived relationships between them. Early results have shown that the majority of PWR alumni work in the media and communications industry, and that the primary reason for their joining the PWR program was that writing is part of their identities. Digital forms of writing and communication were reported as their most popular genres of writing, which is an important implication for the department curriculum as a whole. The results of this study will allow for an evaluation of Elon University's current PWR curriculum and can influence the development of the curriculum in a way that accurately reflects the needs of students post-graduation.

Rethinking Writing in STEM: Implementing Creative Writing to Foster Critical Thinking and Inclusion*

Zoë Rein (Dr. Heather Lindenman) Department of English

Creative and reflective writing styles are not as far removed from Science, Technology, Engineering, and Math (STEM) as many believe. Prior research shows some STEM educators utilizing unconventional writing styles for the purposes of comprehending complex content and acknowledging identity in a field that often minimizes diverse voices (Richardson et al., 2003; Ellison et al., 2020). However, despite the value in using creative and reflective writing, research shows that any junior and senior undergraduates write expressively and poetically less than 1% of the time (Melzer, 2006). Drawing from writing across the curriculum research (the study of writing in disciplines outside of English) and writing to learn (W2L) frameworks, this project investigates W2L with creative and reflective genres for STEM classes. The study seeks to answer how creative and reflective writing might support STEM students, especially underrepresented ones, in affirming identity, thinking critically, and W2L overall. Specifically, the project seeks to test these writings' use as a tool for active and inclusive student engagement. Two cooperating Elon faculty members, from math and engineering implemented the creative and reflective writing assignments in their classes with the goal of fostering critical thinking and inclusion. Students wrote math poetry about calculus to prompt critical thinking, while the engineering class completed reflective journals about their journeys to STEM. Following the written interventions, students completed a survey on their perceptions of the writing project. Several students and faculty from each class also participated in interviews about their academic journeys and experiences with writing, learning, and belonging in STEM. The qualitative study of the responses pulled major themes from these interviews, writing samples, and survey responses. Overall, the participants more accepted shorter poetry assignments than long ones, and the engineers most engaged with the first journal prompt. Findings indicate that participants often focused on the act of writing and

its demands over the targeted W2L, critical thinking, and identity reflection skills. Future writing projects may need to overcome the novelty of unconventional STEM writing to enact W2L purposes.

The Dark Side of Domesticity: Tracking the Female Gothic in Brontë Novels*

Cailey S. Rogers (Dr. Janet Myers) Department of English

This project seeks to track the recurring theme of female imprisonment within Gothic structures in two Brontë novels to ultimately draw parallels between non-literary texts that highlight themes of confinement relating to marriage law and domestic abuse and novels that represent the incarceration of women in the domestic sphere. My research extends the scholarly conversation about the female Gothic initiated by Gilbert and Gubar and Ellen Moers, who revolutionized feminist interpretations of 19th century Gothic literature. Using their seminal work as a base, my project centers on closely analyzing *Jane Eyre* (1847) by Charlotte Brontë and *Wuthering Heights* (1847) by Emily Brontë, and asks how the authors associate domesticity with terror, sexual violence, and fear in order to subvert idealized gender norms. With the application of both feminist and New Historical lenses, this inquiry creates a dialogue between the novels and Victorian divorce court cases to ask: How did Victorian women writers use the Gothic mode as a medium for feminist advocacy and a strategy that exposes cultural anxieties surrounding gender roles and female imprisonment in the domestic sphere? How did legal debates about marriage and domestic abuse described in trial transcripts from Victorian divorce courts influence these strategies? The overarching, yet continuous, conclusion to this project highlights the fact that the Brontës were clearly concerned with emerging themes of domestic violence and marital cruelty present in society, as their novels reflect similar themes of abuse and imprisonment which appear in court cases from the same period. They used the female Gothic mode as a vehicle in these texts to both accentuate and criticize the gap between the idealization and dark reality of domestic life, and as a means to shed light on the anxieties created by the clash between the ideal of companionate marriage and patriarchal ideology. This research forms the first chapter of my larger Lumen research thesis and advances my goal to contribute to the ongoing definition of the female Gothic represented in both canonical and marginalized works from the Victorian era.

Nationalism, Religion, and Identity Formations for the Sri Lankan Diaspora in Staten Island, NY*

Peyton Rohlfs (Dr. Dinidu Karunanayake) Department of English

This presentation explores how the Sri Lankan diasporic community in Staten Island, New York uses performance and materiality to generate narratives about what it means to be an “authentic” Sri Lankan living in the United States. Such narratives include a romanticized ideology of Sri Lankan history, nationalism, and religious identity. As I began building my literature review, I saw a lack of academic work around the Sri Lankan diasporic community in South Asian memory research; thus, this presentation aims to begin a conversation on diaspora identity and experience. By utilizing observations and 15 interviews from my five weeks in Staten Island, I aim to illustrate how narratives around authenticity and belonging emerge as an exclusive memory project focused on engraving the dominant Sri Lankan identity, Sinhalese Buddhist, into American spaces. With this in mind, I seek to answer the following questions: how is Sri Lankan identity formed, authorized, and performed within the Staten Island community? In what ways are Sri Lankan spaces in the United States a transnational reflection of mainstream Sri Lankan ideology of belonging? What role does materiality have in justifying the legitimacy to label such spaces as authentic and Sri Lankan? I begin with a discussion on

how Sri Lankan identity is embedded within communal spaces such as the Sri Lankan Arts and Cultural Museum or Lakruwana restaurant as artifacts to memorialize national consciousness, religious iconography, and traditions that authorize Sinhalese Buddhist identity as the only experience of Sri Lanka. Then, I explore the relationship between food and authenticity by drawing on the how Sri Lankan culture is commoditized as a consumed good to prescribe ideas on present belonging and a nostalgia for life before migration. I conclude these narratives and materials limit the acceptance of who counts as Sri Lankan within this community and establishes a tailored spectrum of "authentic" Sri Lankan-ness. Thus, the materials are reinforcing ethnic hierarchies that are transplanted from Sri Lanka and actively erasing experiences and narratives in Sri Lankan cultural that differ from the dominant one.

Exploration of Chinese and Jewish Femininity in Coming of Age Narratives*

Alexandra R.H. Schneider (Prof. Andrew Perry) Department of English

Jewish and Chinese mythology is filled with stories exploring female power that directly inform literary representation. This creative project examines the intersection of racial, gender, and religious identity, by critically drawing from Jewish and Chinese depictions of women in monstrous, submissive, sexual, and magical roles. In traditional mythologies women of both cultures were either seen as noble and pure, or sensual and dangerous. In more recent feminist understandings, however, these lines have become blurred, with depictions of Jewish characters like Judith and Vashti gaining agency. In recent years, the term intersectionality has been used to describe individuals or subsections of society who identify with a variety of social markers. Conversations about the overlap of Asian Jews —my primary identity— however, have not yet reached the forefront of scholarly or popular works. For instance, mythological beasts, power, sexual agency, and the role of women are explored in both canons. Using various genres, my final creative writing-based portfolio works to address this lapse in representation and give voice to diverse demographics by creating literature in predominantly white spaces. Through speculative fiction, poems, and narrative essays, this creative project seeks to examine the collision of personal identities by examining the depiction of power in traditional biblical and cultural mythologies. By engaging in conversations with these traditional portrayals, my writing strives to answer questions about personal, racial, gender, and religious identity. My research has culminated in a collection of works examining power and physicality through the lens of these biblical and cultural mythologies. By focusing my writing through an introspective lens, my work features stories that connect traditional myths to modern experiences, examining both effects of the stories we tell and the types of narratives we promote.

Environmental Studies

Waste-Deep in COVID-19: The Effects of COVID-19 on Waste Accumulation and Sustainability Programming on College Campuses

Caroline DiGrande (Dr. Robert Perdue) Department of Environmental Studies

The demand for disposable products like hand sanitizers, wipes, cleaning supplies, and plastic bags has increased dramatically since the spring of 2020. The environmental impact of this increased consumption, particularly on college campuses, has yet to be quantified. This is a critical gap, for while universities serve as think tanks for solutions to real-world problems, they also produce heavy waste

streams and have their own unique waste generation as a result of the communal living of young adults. This dynamic, played out across thousands of college campuses, must be studied within the context of COVID-19 regulations in order to understand the true implications of the pandemic on society and sustainability initiatives in the United States. This research captures the observations and suggestions of Sustainability Coordinators, Environmental Services Directors, and others with similar positions within collegiate environments regarding changes to their sustainability programs and waste accumulation since the establishment of pandemic regulations on campuses. Additionally, the research highlights Elon University as a case study for an in-depth look at waste accumulation and diversion during and after the height of the pandemic. Twenty-six survey responses of these sustainability leaders are the bulk of the data analyzed for this study, while fourteen interviews within a subset of this population augment these results. These data were open coded to unearth common themes related to waste accumulation during the pandemic, yielding categories of experiences, challenges, and solutions. Findings show that all participating institutions with majority students in residence saw increases in waste accumulation in the semesters following the pandemic. Themes of labor shortages, supply chain issues, shifting administrative priorities, and diminishing student involvement surfaced as symptoms of the pandemic within collegiate sustainability programs. Results and conclusions from this study will be used to create pragmatic policy suggestions specific to Elon University sustainability efforts in the future, serving as a resource for other collegiate institutions as well.

The Impact of Soil Compaction and Land Cover on Soil Carbon Sequestration at Elon University

Madison H. Eaton (Dr. Kelsey S. Bitting) Department of Environmental Studies

Soils have been identified as a major carbon sink, and as carbon emissions continue to increase around the world, attention is being turned to soils as a possible way to offset these emissions. Healthy soils may be able to sequester carbon from the atmosphere in a variety of different compounds, storing it underground for many years. College campuses are a unique place to study soil carbon sequestration because they typically have ample green space that can be closely monitored and maintained by the university. While prior research on college campus soil carbon sequestration has focused on the role of land cover, the call to further investigate the role of soil compaction is based on related research in agricultural environments. This study seeks to examine whether land cover or soil compaction has a greater effect on soil carbon sequestration on a college campus. The study area is the Historic Neighborhood of Elon University, which is the oldest area on campus, established in 1889. This part of campus features many different types of land cover with varying soil compaction levels. Areas of different current land covers have been mapped using GIS software and ground-truthed in order to provide error estimates throughout analysis. Compaction measurements and soil samples were taken from randomly selected points provided by the GIS map within each land cover type. Soil samples from each point were analyzed using Loss on Ignition (LOI) to determine the amount of soil organic carbon (SOC) present. Findings include that grassy lawns cover 67.4% of the study area, perennial beds cover 22.9%, and annual beds cover 2.1%. We found that compaction was strongly correlated with land cover, prohibiting us from distinguishing the impact of compaction vs. land cover on soil organic carbon content. The results of this study will inform best management practices for university landscaping crews to promote soil carbon sequestration on Elon’s campus.

How Much Carbon Do the Elon Forest Soils Hold?

Ryan D. Gibbons (Dr. Kelsey S. Bitting) Department of Environmental Studies

Soils sequester organic carbon, providing a potential mechanism to draw down CO2 from the atmosphere that is causing climate change. However, the role of past land use and other soil characteristics in determining how much carbon soils can sequester and how quickly remains poorly understood. Elon Forest includes soils impacted by different prior agricultural uses and different time periods under forested conditions, providing a unique opportunity to explore variables affecting carbon sequestration in the same geographic area. The aim of this research is to document the amount of carbon sequestered in soils of the Elon Forest, and to identify what factors play the largest role in affecting this soil's carbon storage capabilities. Soil core samples will be taken systematically from areas representing different former land uses and forest durations, and organic carbon content will be measured. Results will be compared to grain size, iron and aluminum oxide content, land surface slope, slope orientation, and leaf litter distribution to determine which factors are most strongly correlated to organic carbon content. Results will clarify how rapidly and to what degree reforested soils sequester carbon, and how prior agricultural land use may affect this sequestration process. Other researchers can then compare these results to other forests with different soil classifications. Currently, this project is in the preparation phase, and will proceed over the next two years.

Communicating a Crisis: Case Studies of Rhetorical Strategies for Modern Climate Communication by Experts

Hannah L. Miller (Dr. Michael Strickland) Department of Environmental Studies

There is a strong scientific consensus that climate change is happening, but there is controversy among the public about its cause, impacts, and even validity. This distrust of scientists and their message illustrates a shift in how the public views climate change communications, and therefore a necessary shift in how we communicate with them. Previously climate communication operated on the Deficit Model (Bauer et al., 2007), which is based on the assumption that there are gaps in individuals' scientific knowledge, and they would be more willing to change their attitudes, beliefs, or behaviors if they had the necessary information. Now, research shows that this does not apply due to its oversimplification of the nuanced relationship between knowledge and personal values. Instead, an approach that strategically targets an audience's personal concerns is necessary. This study is rooted in rhetorician Kenneth Burke's theory of identification, which emphasizes the importance of a communicator establishing a connection with their audience. Presented through a series of case studies, interviews with climate experts from diverse settings provide new insight into strategies for the modern world of communication, where environmental news may be on Tik Tok before an official news outlet. Complementing these interviews, a neo-Aristotelian approach for textual analysis was applied to the communicators' works to demonstrate the strategies in action. My research shows five main themes to make messages more effective: they must be simplified; feel personal, near and urgent; use cognitive framings that do not backfire; reduce dissonance by providing opportunities for action; and avoid polarization of the issue. Findings of this study prove that the modern nuances of the climate crisis and the ever-increasing trend of polarization in America will take not just scientists explaining their findings, but "everyday Joe's" speaking with their friends and family.

Enacting "Community" in Community-Based Natural Resource Management Projects: Discontinuities in Big Life Foundation's Crop-Protection Fence

Emerson Wells (Dr. Amanda Chunco) Department of Environmental Studies & (Dr. Richard Kiaka) School for Field Studies

In 2016, Big Life Foundation (BLF), a non-profit conservation organization centered on wildlife and habitat preservation in the East African Amboseli-Tsavo-Kilimanjaro ecosystem, built a 100km electric "crop-protection fence" in the Amboseli ecosystem in Southwest Kenya. The crop-protection fence aims to reduce crop raids by elephants and large herbivores in areas with high frequency of human-wildlife conflict (HWC); by reducing HWC, the fence also supports the livelihood strategies of the growing population of agriculturists and agropastoralists within the region. The fence is currently maintained through both donor and community funding, costing approximately 120,000 KSh per kilometer or 12 million KSh to maintain annually. To support maintenance costs, BLF asks community members benefitting from the crop-protection fence to contribute 1000 KSh annually. This study aims to assess ways in which BLF uses and establishes notions of "community" and ways this understanding is perpetuated in current governance structures of the crop-protection fence. This presentation examines modes of communication between BLF and communities within the crop-protection fence, the pre-existing community structures upon which BLF is reliant, and the differences across ethnicity and livelihood strategies as related to involvement with the fence and awareness of voluntary financial contribution toward fence maintenance. Surveys were conducted in 209 households in Namelok, Noomayainat, Oloile, and Oltepesi, four villages located within 1.5 km of the crop-protection fence, and seven key informant interviews were conducted with individuals who play a role in the management and maintenance of the crop-protection fence to develop an understanding of BLF governance structures and social categories within the crop-protection fence. The data shows that BLF approaches "community" as singular and homogeneous, largely understood as limited to individuals of the Maasai ethnic group, and as a result rely on pre-existing structures established within villages with majority Maasai membership. I argue that for BLF's long-term goals of voluntary compensation and notions of individual autonomy toward the crop-protection fence to be realized and effective, "community" must be viewed as dynamic, with non-Maasai individuals central in the governance strategies BLF implements.

Exercise Science

No Space? No Problem. Accessible Balance Control Using VR Player Movement

Ashleigh Azan, Madison George, Caleb Ogunmola, Alexa Roveri, & Andrew Weitz (Dr. Matthew Wittstein) Department of Exercise Science

Balance assessments are a common method of measuring vestibular and proprioceptive function as well as lower-body strength. Aside from observational clinician analysis of balance exercises, more detailed and conclusive assessments are typically performed using large, nonmobile, and expensive immersive systems. The purpose of this project is to replace existing balance testing equipment and provide an alterable environment for clinical postural control evaluation to enable development of personalized physical rehabilitation methods. To assess and train postural control, balance, and strength, this project incorporated real-time center of pressure data of a user on an on-floor force plate as the user completed a unique balance assessment in a Virtual Reality (VR) environment. Leaning or other movements altering the center of pressure location correspondingly caused movement through the VR environment. The VR environment was designed to assist ankle injury rehabilitation and included tasks to evaluate and compare mobility of the ankles. Quantitative measurements of 2-dimensional range of motion were coded to be recorded and coupled with clinician observational analysis for physical therapy applications. Lag between the force plate and VR device was minimal to prevent motion-sickness, and users could navigate through the VR environment, including tight areas,

using planted sway movements with ease. This project developed novel physical rehabilitation methods using quantitative postural control analysis and can be further expanded upon to improve numerous physiological or vestibular conditions.

Effects of Lifestyle Factors on Trabecular Bone Score during Transition from High School to College

Julia L. Burpeau (Dr. Svetlana Nepocatych) Department of Exercise Science

Substantial trabecular bone loss occurs in young adulthood (18-25 y/o), even in conditions of sex steroid sufficiency. It is unknown why trabecular bone loss occurs during this time (Farr & Khosla, 2015). We hypothesize that lifestyle-related factors such as diet, physical activity, sedentary behavior, and sleep may account for changes in trabecular bone score (TBS) in young adults from high school to college (transition). Therefore, the aims of this study are to determine the change in TBS during the transition and its relationship with lifestyle-related factors. The study will include high school seniors (n = 75, 50% female) aged 17-18 years with no history of chronic disease at study entry. Assessments will be performed at baseline during senior year of high school and follow-up after first year of college. Body composition, bone mineral density, and TBS will be measured via dual-energy X-ray absorptiometry (DXA) imaging and analyzed using TBS iNsightTM software. Changes in body composition, bone mineral density, and TBS over time will be analyzed using repeated measures ANOVA. Physical activity (24-hour activity cycle) and sleep will be measured over seven days via tri-axial ActiGraph GT9X Link accelerometers (Actigraph, LLC, Fort Walton Beach, FL), activPAL 4 posture monitors (PAL Technologies Ltd, Glasgow, Scotland), and sleep logs. The 7-day average will be recorded and used to assess sleep duration, sleep quality, amount of moderate-vigorous physical activity, and time spent in sedentary activity. A self-administered 24-hour dietary assessment tool (ASA-24) will be used to assess changes in dietary habits, including Health Eating Index score (HEI), total caloric intake, macronutrients, and micronutrients. We anticipate that changes in diet, sleep, and physical activity habits during the transition from high school to college will contribute to the decrease in TBS and increase in risk for bone fractures. It is predicted that participants that meet recommended diet, sleep, and physical activity guidelines will have normal TBS values for their age and sex. We anticipate that physical activity and sedentary behavior will be the strongest predictors of TBS change.

Disability Identity and the Disabled Student Experience in Neurodiverse and Disabled College Students*

Jordan E. Chizmadia (Dr. Caroline Ketcham) Department of Exercise Science

Research indicates that the support on a college campus is vital for individuals who identify as neurodiverse or disabled, but this support is often not received (Shmulsky et al. 2021). College students with disabilities often feel overlooked, struggle finding support on college campuses, and may struggle with self advocacy. As of 2015, the Center of Disease Control and Prevention (CDC) reported that 15% of adolescents identify as neurodivergent (CDC. 2015). The primary aim of the study was to understand the experiences of students who identify as neurodiverse or disabled on a college campus. Levels of disability identity, self-advocacy and accommodations were examined. It was hypothesized that the level of one's disability identity greatly influences the individual's level of self-advocacy and potentially the level of support they are receiving on a college campus. Individuals at a private post-secondary institution in the U.S. had the opportunity to complete a survey gathering information about the types of diagnoses, how they were diagnosed, levels of self-advocacy, what accommodations may

be in place, and how supported the individuals feel on campus. Eighty-seven participants were scored using the Disability Identity Development Scale (DIDS) (Gibson, 2006). The DIDS uses both internal and external elements to represent disability identity status. 86.2 % of the students who completed the survey self-identified as having low to low-moderate disability identity levels. Of those who choose to disclose their disabilities, 57.8% of students identified with more than one disability and disclosed their disability(s) in settings where they felt like their disability was impacted. Follow-up opt-in focus groups will help us gain more insight into the opinions of those with a disability on a college campus, and learn more in depth about the various experiences and perspectives of disability in college. Implications of these as well as future findings about the disability experience at college will be presented. More research needs to be done in the future about how to help these students feel more welcomed on campus, receive optimal accommodations, and overall how to increase the disability experience on college campuses.

Examining the Relationship between Concussions and Mental Health in Neurodiverse Athletes

Mark Dobson (Dr. Caroline Ketcham) Department of Exercise Science

This study examines the relationship between concussion history and mental health of neurodiverse (e.g., ADHD, Autism, Dyslexia) college athletes. Much of the existing literature is focused on ADHD, but there is some on dyslexia and other learning disabilities. ADHD is one of the most common neurodevelopmental disorders and is defined by impairment of executive function. ADHD specifically impacts inhibition, working memory, and cognitive flexibility resulting in issues with attention, impulse control, and emotional regulation. Previous research indicates that ADHD is a risk factor for both the frequency and severity of concussions. Concussions are traumatic injuries to the brain which inhibit cognitive function. A previous study of male college athletes with a history of three or more concussions found that ADHD individuals were 2.93 times more prevalent relative to those without ADHD. There is significant overlap between the symptoms of concussions and ADHD such as inattention and mood issues. ADHD and concussions are both individually known to increase the risk of mental health issues. In a previous study, baseline concussion testing has shown it could be effective in assessing mental health using the GAD-7 and PHQ-9 scales which assess anxiety and depression symptoms respectively. This study will assess mental health measures in neurodiverse student athletes (diagnoses of ADHD, Autism, dyslexia, and/or learning disabilities) with and without a history of concussions. This will help us better understand how to support this population in return-to-sport and return-to-learn protocols.

Role of Self-advocacy in Black College Athletes' Development of Mentor Constellations*

Danielle Nicole Dyer (Dr. Caroline Ketcham & Dr. Eric Hall) Department of Exercise Science

Existing academic mentorship programs lack cultural relevance for many black collegiate student-athletes because ways of speaking meaningfully to them are often lacking. At Elon, there are unanswered questions about the impact of mentoring relationships on black student athletes' college experience and the role self-advocacy plays in creating them. Research on self-advocacy (the ability to communicate one's needs and to make decisions about the required supports to meet them) suggests higher levels of self-advocacy skills result in better adaptation to college life, and these skills appear critical in forming effective mentoring relationships. The purpose of this study is to find effective ways to communicate with and support black college athletes in order to create long-lasting mentoring relationships that allow for a more well-rounded academic experience. Five focus groups were

conducted to explore this concept, including 20 Black athletes from football, men's and women's basketball, and track and field. These student-athletes were asked questions to understand their Elon experience as well as their knowledge of constellation mentoring (the use of multiple mentors simultaneously who provide comprehensive support of a specific need) and self-advocacy (the ability to communicate one's needs and wants and to make decisions about the supports required to achieve them.) General themes found included; 1) student-athletes defined a mentor as one who takes a genuine interest, is an inspiration, and is consistent and honest. While for many student-athletes, coaches filled this role, athletes desired more connection with their professors. For many student-athletes, coaches were their primary mentors throughout their academic and athletic experience and student-athletes desire more connection with their professors, not strictly on the basis of their sport. 2) Student-athletes find the idea of self-advocacy intriguing but struggle with it as many value acquiring mentors who have either gender, race, or interests in common. There seems to be a disconnect between student-athletes and faculty on these identifying factors. In conclusion, the Implementation of education on self-advocacy within academic support may improve the student-athlete experience, faculty must make efforts to find common ground with student-athletes to create genuine mentoring relationships, and mentoring relationships can be implemented within the Elon community formally or informally as long as mentors take a genuine interest and are honest and consistent with mentees.

Mentoring Relationships in Black- Identifying Students*

Ellery M. Ewell (Dr. Caroline Ketcham) Department of Exercise Science

Mentoring relationships have been shown to be an important tool for undergraduate student success and satisfaction. These relationships can be integral for campus communities especially for underrepresented student groups. For students of color at Predominantly White Institutions (PWI), there may be additional barriers to finding meaningful mentors, both among peers and among faculty/staff. Lack of mentoring for these groups of students has negative effects on aspiration and attainment (Davis, 2007). Holistic peer mentoring has positive effects on well-being, social integration, and cultural support (Ward et al., 2012). Due to these observed effects of mentoring, this study examines mentoring relationships for African American/Black identifying students at Elon. Mentoring, in the context of this study, is defined as individualized, developmental relationships (between faculty, students, community members and/or professional staff) that promote multi-faceted learning/growth and are experienced as reciprocal and mutually beneficial (Vandermaas-Peeler et al., 2022). Broadly, mentoring is examined, with a focus on who mentors are to students, what qualities they possess and how they support students. Belonging, academic and social integration, well-being and identity are all explored as well. This present study incorporates data from Division I Black-identifying student-athletes and non-student athletes to determine comparisons between these groups, and to investigate mentoring in the whole university community. Impacts from being on a team or in a cohorted program are also examined. Conclusions are drawn from these groups to determine support for students already in place as well as how a PWI can foster mentoring relationships for Black students.

The Impact of the HealthEYou Program on Metabolic Disease Risk Factors

Talya E. Geller (Dr. Svetlana Nepocatych & Prof. Elizabeth Bailey) Department of Exercise Science

Metabolic syndrome (MetS) is a growing concern in the United Sates, and many communities lack the resources to effectively address the contributing behaviors. MetS is a cluster of cardiovascular disease and type 2 diabetes risk factors such as hypertension, hyperlipidemia, hyperglycemia, and obesity. The purpose of this study was to deliver and assess the efficacy of a 12-week (HEY2.0) nutrition and

physical activity education program (HealthEYou) in mediating metabolic disease risk factors associated with cardiovascular disease and type 2 diabetes. HEY2.0 was modified from a 16-week version of the program that was associated with significantly reduced MetS risk factors. 18 female participants (age 53±11y; BMI 31± 3kg/m^2, body fat 46±5%) were recruited to participate in the HEY 2.0 program. The 12-week program consisted of pre- and post-testing, weekly 60-min group education and weekly 15-min individual goal setting sessions. For program testing participants completed assessments including blood pressure, body composition via Dual-energy X-ray absorptiometry (DXA) and waist circumference, 6-minute walk test, handgrip strength test, dietary intake via the Automated Self-Administered 24-hour (ASA-24) dietary assessment tool, and quality of life questionnaire. In addition, blood was drawn to assess MetS. Repeated measures ANOVA was used to assess differences from pre- to post-intervention, with significance set at $p<0.05$. A 22% reduction in the prevalence of MetS was observed from pre-to post-intervention. A significant improvement in HDL cholesterol was observed (63.8 ± 13.6 vs. 66.5±11.7mg/dL, p=0.038). While no significant differences were observed in body fat % (45.9±5.0 vs. 45.5±5.6%, p= 0.37), and 6-minute walk distance (503±114 vs. 529±72m, p=0.18). Additionally, there were no significant differences observed in systolic blood pressure (p=0.34), diastolic blood pressure (p=0.97), fasting blood glucose (p=0.28), total cholesterol (p=0.44), and Triglycerides (p=0.50) from pre- to post-intervention. Although no significant mean differences were observed for individual risk factors, 22% of participants were able to reduce the risk of MetS suggesting potential benefits of the workplace education program for some individuals.

The Role of Social Support in Identity Reconstruction in Individuals after Stroke

Abigail Kroll (Dr. Eric Hall) Department of Exercise Science

Understanding the residual psychosocial aspects of stroke, including post-stroke depression (PSD), is crucial for a practitioner to prepare the individual, and the care partners, making the practitioner an integral part of the rehabilitation process. The purpose of this research is to discover how after a stroke, individuals have utilized their rehabilitation process and social support systems (e.g. care partners, practitioners, etc.) to cope with changes in lifestyle after stroke, as well as potentially reconstruct their pre-stroke identity. Participants included both practitioners (n = 14) and individuals post stroke (IPS; n = 7). Participants engaged in a 25-minute, semi-structured interview via Zoom, which was recorded for transcription and analysis for the emergence of consistent themes. Practitioners include physical therapists, occupational therapists, speech-language pathologists, a nurse practitioner, and a student physical therapist. For one IPS with aphasia, their care partner was present for the interview, to aid with communication. Based upon a review of the transcripts and identification of themes by the investigators, the psychosocial aspects of identity reconstruction, including post-stroke depression, are far more detrimental to the survivor than the potential physical impairments. Survivors tend to rely on their practitioner for guidance through these issues, but practitioners appear to be overwhelmed by the amount of support needed, having received little formal education about these aspects of rehabilitation. Furthermore, IPS expressed challenges of the sudden reliance on another for activities of daily living (ADLs), specifically when the care partner is the IPSs child, or a parental figure with their own healthcare needs. Further and continuous education for practitioners as more nuanced research becomes available about the psychosocial aspects of rehabilitation is necessary. A potential future line of inquiry is to interview social workers and psychologists who work with IPS to understand their role in helping IPS and caretakers adjust to life with a disability. Support for all parties involved in stroke rehabilitation is important, including the individual, the care partner(s), and the practitioner, to best offer support at all parts of the rehabilitation process.

Examining the Relationship Between Trained Lateral Bias and Stress Response in Pirouette Habits of College Dancers

Olivia R. Lanter (Prof. Jasmine Powell) Department of Performing Arts & (Dr. Matthew Wittstein) Department of Exercise Science

Dancers often encounter the phenomenon of having a 'good side' and 'bad side,' resulting in a developed leg dominance and preference in their training. Past research has been completed to determine a disproportionate lateral preference in dancers, but psychological effects pertaining to this laterality are yet to be explored. The ongoing study aims to find if a perceptual stress response is elicited when a dancer is required to pirouette, an act of turning on one foot, on their unfavored leg. To begin, each participant (dance major/minor ages 18 to 22 and fully participating in movement classes) completes a self-report survey concerning their dance training history, leg preference, and experience with the phenomenon. Polar Heart Rate Monitors are used to collect heart rate variability data as instructions are given and participants are randomly assigned to their preferred or unpreferred side for primary performance. Participants are led through a warmup and traveling combination focused on pirouettes, with rotation demands increasing. Heart rate variability is analyzed using Kubios Software and statistical analysis of T-tests analyzing correlations between and within-subject groupings. Preliminary data collection illustrates a statistically significant contrast ($p=0.0256$) between the Frequency Ratio which represents Low-Frequency Power/High-Frequency Power measured in Hz/Ms^2 in the preferred vs. unpreferred group. The significant distinction in the Frequency Ratio demonstrates that when dancers are asked to perform pirouettes on their unpreferred side, their sympathetic nervous system becomes active as indicated by an increase in heart rate. This stress response connects to survey data where many participants claimed to have feelings associated with anxiety when asked to turn on their bad leg. Qualitative data in the survey manifests in dancers using negative language to describe how they feel turning on their bad leg such as "nervous," "uneasy," "stressed," "unconfident," and "anxious." The goal of this research is to identify the psychological and physical effects of bias developed in dancers due to dance instruction. As the mental well-being of athletes is often overlooked, this research supports conversations prioritizing not only physical health, but also the cognitive welfare of dancers.

The Impact of Lifestyle Factors on Heart Rate Variability during the Transition from High School to College

Anna D. Lipsman (Dr. Svetlana Nepocatych) Department of Exercise Science

The average American spends 6.5 hours sitting per day. College students, specifically, sit for long hours during class and leisure, which allows less time for moderate to vigorous physical activity (MVPA). Additionally, the increased stress and changes in dietary habits associated with college adjustment further contribute to changes in heart rate variability (HRV) and disease development. Although research has identified a positive relationship between sedentary behavior (SB) and disease risk, little is known about how changes in SB and other lifestyle behaviors (e.g., physical activity, diet, stress) as adolescents transition to college influences disease risk development. Therefore, the purpose of this study is to evaluate how the changes in the ratio between SB and MVPA, dietary habits, and stress affect HRV as an indicator of cardiovascular health during the transition from high school to college. This longitudinal study will recruit high school seniors (n=75, 50% females) aged 17-18 years old. Baseline assessments will occur during their high school senior year with a follow up one year later during the second semester of college. HRV will be assessed as the root mean square of

successive differences in R-R intervals obtained from a 5-minute standard lead II ECG recording (Biopax ECG 100C, BIOPAC Systems Inc.) following 15 minutes of supine rest. ECG data will be analyzed with Kubios software (v3.4: Kubios Oy, Kupio, Finland). Sedentary behavior and physical activity ratio will be assessed via ActivPal (PAL Technologies Ltd). Dietary habits will be assessed using the Automated Self-Administered 24-hour Dietary Assessment tool (ASA-24-2018). A 10-item Perceived Stress Scale (PSS) and cortisol levels analyzed via ELISA immunoassay will be used to assess stress levels. Statistical analysis will be completed using a linear regression model. We anticipate that SB will increase while MVPA will decrease during the transition from high school to college. Dietary habits will change, and cortisol levels will increase. Each of these behavioral changes will be associated with decreased HRV independent of other behavioral changes.

Moderate Intensity Exercise and Cognition in Young Adult Cancer Survivors

Ryan Mancoll (Dr. Aaron Piepmeier) Department of Exercise Science

Cancer related cognitive impairment (CRCI) affects 25-27% of young adult cancer survivors (18-35yrs). Our study's objective was to assess the feasibility and acceptability of a web-based exercise protocol that investigates the effects of a moderate to high intensity calisthenic workout on cognition in young adult cancer survivors. Information relating to feasibility (i.e., retention rates, recruitment rates), and acceptability (i.e., satisfaction) will be used to design future efficacy studies. This feasibility study recruited participants (N = 8) via facebook advertising. We used Qualtrics for the screening and the online research platform, Gorilla, to administer the experimental protocol. We used a randomized control design with participants randomly assigned to either an exercise or non-exercise (control) condition. The exercise condition consisted of following along to a 20-minute exercise video, and the control condition watched the video while remaining inactive. Secondary outcomes included multiple measures of health-related quality of life (anxiety, depression, fatigue, physical activity, sleep quality, and medication/vitamin/supplement history), objective cognitive performance (verbal memory, executive function, processing), and subjective cognitive effort. Primary feasibility results showed a screening rate of 7.75%, an eligibility rate of 3.12% , a 75% retention rate, and 88% completed measures. Web-based acute exercise protocols are a feasible option and can bring new levels of research to under researched minorities.

Mental Health and Physical Activity Amongst the Military Populations: A Survey Study*

Josephine C. McWhorter (Dr. Eric Hall) Department of Exercise Science

Because of the stigmatization of mental health in the military, military populations tend to focus less on supporting their mental health, despite Service making individuals 5 times more likely to develop major depression, and 15 times more likely to develop PTSD than the general population. The purpose of this study is to evaluate the perception of mental health and help-seeking behaviors in military populations, and to ultimately use this data to create effective low-stigma assistance, decreasing negative symptoms of mental health. 35 Veteran and Active Duty Members (21 and 14 participants, respectively) of the U.S. Military completed an anonymous online survey regarding perceptions of mental health/wellbeing, physical activity levels/preference , and help-seeking behaviors. Given the sample (26 Male, 9 Female), 19% scored within the "moderately active" and 81% scored within the "active" category on the Godin scale. According to the questions regarding physical activity preference, the activity that the most participants indicated being interested in doing was resistance training (RT) (63%), while the least popular activities were aerobic exercise at home (14%) and

exercise videos (14%). Using the PHQ scale, it can be concluded that from this sample, 27% of individuals exhibited moderate to severe anxiety, while 24% of individuals exhibited moderate to severe depression. The most common help-seeking resources utilized for mental health purposes was individual therapy/ counseling (59.3%) and the least was medication prescribed by a psychiatrist (18.5%). There is a negative correlation between strenuous physical activity and depression/anxiety (-.o67 and -.070, respectively). The sample was highly physically active, however, there was a prevalence of mental health issues. Individual therapy/counseling being the most utilized mental health resource did not support findings from research, but is important because it shows that this population still values therapy, and utilization may increase if more de-stigmatization occurs. Based on the high preference for RT and its preliminary negative correlations to depression and anxiety, future studies should combine group therapy/RT intervention for Military Members to improve mental health.

Family Dietary Characteristics and Changes in Eating Habits Across the Transition to College

Anna C. Morton (Dr. Svetlana Nepocatych) Department of Exercise Science

Accelerated weight gain during young adulthood is associated with increased lifetime risk of obesity and heart disease. Characteristics of the family environment, such as how often the family eats per day, whether those meals are home cooked, and family food choices play a significant role in the development of eating habits. Thus, the purpose of the study is to, first, establish cross-sectional associations among characteristics of the family environment and eating habits during youth, and second, determine whether those same characteristics are associated with changes in eating behaviors following the college transition. 10 high school seniors (70% females), 17.6±0.5 years of age, and body fat percent 32.3.1±3.8 %, with no history of eating disorders were recruited for this cross-sectional study. Family dietary environment was assessed using modified Family Eating and Activity Habits Questionnaire (FEAHQ) with lower score indicating better family dietary environment. Dietary intake was assessed twice, once in high school and once in college, using automated self-administered 24-hour (ASA24) dietary assessment tool and Healthy Eating Index (HEI-2015) score was calculated. Simple linear regression was used to determine the relationship between modified FEAHQ and HEI scores. The modified FEAHQ was negatively correlated with HEI score while in high school and college ($r=-0.67$ and $r=-0.69$, $p<005$). The modified FEAHQ explained 44% of the variation in HEI score while in high school ($F(2,8) = 6.399$, $p = 0.035$) and 47% of the variation while in college ($F(2,8) = 7.110$, $p = 0.03$). In conclusion, family units with a better dietary environment in high school eat better overall, in high school and college.

Stressor or Supporter? Students' Perceptions of Their Learning Experiences and Disordered Eating Behaviors

Ashley M. Pehan (Dr. Matthew Wittstein) Department of Exercise Science

A 2011 study showed 20% of female and 10% of male college students on average are diagnosed with eating disorders (White). Both external (e.g., trauma, athletic participation, socioeconomic status, etc.) and internal factors (e.g. genetics, psychological, etc.) may cause the onset of disordered eating in college, but it has been less studied how classroom experiences may influence disordered eating. This study aims to explore disordered eating at Elon University and how pedagogical practices may impact students' beliefs and behaviors. Current students that completed two or more courses in the food studies minor were invited to participate. Thirty-five (age: 19-24 years, sex: 33 F, 2 M) completed an online survey including demographic data, and the Eating Disorder Examination Questionnaire (EDE-

Q) screening tool, which allowed participants to opt-in to one-on-one interviews. The existing EDE-Q scoring system resulted in item, subscale (restraint, eating concern, weight concern, and shape concern), and global scores. Separate one-way t-tests were used to compare the subscales and global scores of sample data to normative data (Fairburn and Beglin 2008). Comparison with statistical analysis of the two data sets provides valuable information on how incidents of disordered eating at Elon compare with the global average. Simple linear correlations (Pearson's r) demonstrate the relationships between participants' EDE-Q scores and their age, family income, or Body Mass Index (BMI). There was no significant difference in disordered eating risk scores (all $p>.05$) despite participants having higher global scores ($M = 2.288$, $SD = 1.6$) than the normative sample ($M = 1.404$, $SD = 1.13$). Overall, these results suggest incidences of disordered eating behaviors may be higher on Elon's campus compared to normative data, though further investigation is needed to understand why this may be. Future work includes a thematic analysis of interviews from select consenting students across risk levels to better understand how their classroom experiences (with instructors and peers) may influence behaviors and beliefs. These results will provide valuable insight into the student experience, particularly in classes with a base in nutrition, fitness, body image, or mental health, and may improve pedagogical practices in these courses.

Athletic Identity as a Mediator for Injury and Mental Well-Being

Michael O. Sanderson (Dr. Eric Hall) Department of Exercise Science

The impacts of injury to the mind or body are potent as they relate to the mental well-being of athletes. This relationship between injury and well-being is mediated by one's athletic identity. In some cases, injury represents a threat to athletic identity, most often when individuals are previously foreclosed to their athletic identity. Here, identity foreclosure refers to individuals who are over engaged with a dominating athletic identity, restricting them from a more nuanced development of their identity. The theoretical model proposed in this research suggests that injury may have the inverse effect, as well, bolstering athletic identity in individuals. This paper seeks to interrogate this psychological deviation in athletes, wherein injury elicits a more complex response than grief alone, as one may expect to see exhibited by the athletes. Researchers label athletic identity as treading between a "Hercules' muscle" and an "Achilles' heel" (Britton, et. al., 1993). A fortified athletic identity can improve performance and provide athletes with a stronger sense of self and self-worth. However, when an injury poses a threat to one's athletic identity, the latter can become corrupted as the mediator between an athletes' sense of self and mental well-being. In this case, athletes can experience a regression in mental well-being, catalyzed by an injury which exposes the shortcomings of a foreclosed athletic identity. This research bears topical importance as it seeks to present a platform upon which athletic identity ought to be studied and understood in greater detail. Furthermore, a developed individual identity, in partnership with a strong athletic identity, has the potential to prevent the possibly tragic outcomes of identity foreclosure in the case of injury or otherwise. A more holistic comprehension of a strong athletic identity, as well as its dangers, stands to proliferate the mental well-being of athletes, with a particular regard for those experiencing an injury. This research proposes a theoretical framework paired with ideas for future research to understand the relationship between injury, athletic identity, and the mental well-being of athletes.

The Relationship Between Sex Hormones, Cognitive Function, and Mental Well-Being Across the Menstrual Cycle

Abigail H. Thomson (Dr. Caroline Ketcham, Dr. Takudzwa Madzima, & Dr. Eric Hall) Department of Exercise Science

Research shows women typically experience more concussion symptoms than men; however, there is little understanding of why. One of the most significant differences in males and females is their fluctuations in sex hormones. The goal of this study was to examine the relationship between estradiol and progesterone level fluctuations, neurocognitive performance, and concussion and mental well-being measures across a menstrual cycle, first in participants without concussions for baseline. In a sample of 12 female identified participants, progesterone and estradiol levels were measured across the span of a month at week zero, two, and four, from both blood and saliva samples. At the time of each sample collection, the participants completed the Four-Dimensional Symptom Questionnaire (4DSQ; distress, depression, anxiety, and somatization scales), King-Devick (oculomotor assessment), and Immediate Post-concussion Assessment and Cognitive Testing (ImPACT; neurocognitive testing and concussion symptom scale). On the weeks not in the lab, the participants completed a survey asking about concussion symptoms (ImPACT) and their overall mental well-being (The Warwick-Edinburgh Mental Well-being Scale). In this survey, participants were also asked about the typical length of their period and the date of their last menstrual cycle. Using this information, the phase of the menstrual cycle at which each of the samples were collected was estimated and the change in each of the measures, including hormone levels, between the luteal and follicular phase was calculated. The data shows that as the decrease in estradiol levels between phases increases, the verbal memory score on ImPACT decreases ($r=-.801$, $p<0.05$) and anxiety and depression measure scores on the 4DSQ also decreases ($r=-.828$, $p<0.05$; $r=-.739$, $p<0.05$). No other significant correlations were found. The implications of this research is to add to the current literature and provide opportunity for education on the relationship between sex hormones, cognitive function, and mental well-being.

Tick Tock – No Time for TikTok: An Examination of Procrastination and Mental Health in Undergraduate Students

Chad Urquhart (Dr. Eric Hall) Department of Exercise Science

Undergraduate students' academic careers are saturated with an abundance of tasks, responsibilities, and distractions. Often class assignments are postponed until the deadline is imminent. One explanation for this delay could be the use of mobile phones. We believed limiting mobile phone use could decrease academic procrastination. 27 participants (6 males, 21 females) began the interventions and 18 finished the first intervention and 19 finished the second. The first intervention consisted of one week of locking one's mobile device in a phone-locking device for one hour during periods of academic work. The other week consisted of 2 periods of the Pomodoro Technique with 25 minutes of work and a 5-minute break, totaling for a one-hour period. A quantitative/qualitative survey was given at the end of the intervention to analyze which intervention was preferred and if there were any complications. Results indicated a positive feeling towards the phone locking intervention and the Pomodoro Technique with decreased procrastinatory behaviors. However, some individuals preferred the phone locking intervention over the Pomodoro Technique due to the frequent breaks involved in the Pomodoro Technique. Some complications of the phone locking intervention were accessing one's mobile device for DuoPush and carrying around the lockbox. Future research would consist of

examining the effect of tablet use within the classroom and academic self-efficacy through a two-part intervention of tablet and paper usage.

The Relationship Between Sleep Behaviors, Alcohol Consumption, and Mental Health in High School Seniors

Christina Westbrooks (Dr. Svetlana Nepocatych, Dr. Simon Higgins, & Dr. Eric Hall) Department of Exercise Science & (Dr. Mark Weaver) Department of Mathematics & Statistics

Diagnoses of mental health disorders are rising in high school students. Little is known about the relationship between changes in sleep and the development of mental health issues, or whether other lifestyle factors (e.g., alcohol consumption) impact this relationship. Underage drinking is a significant public health concern with 57.8% of high school students reporting binge drinking. PURPOSE: To determine the relationship between sleep, alcohol consumption, and stress as an acute marker of mental health among high school seniors. METHODS: The cross-sectional study included 50 high school seniors (76% female, 17.4±.5 years, Body Mass Index 23±3.2 kg/m2, relative body fat 17.3±12.8%). Characteristics of sleep were measured via the 19-item Pittsburgh Sleep Quality Index (PSQI) and Sleep Hygiene Index (SHI). Stress was assessed using the 10-item perceived stress scale (PSS). The 10-item alcohol use disorders identification test (AUDIT) was used to screen for alcohol consumption. Linear regressions were used to assess the relationship between sleep behaviors, alcohol consumption, and mental health. RESULTS: Significant correlations were observed between PSS and SHI ($r = 0.358$), AUDIT ($r = 0.180$), and PSQI ($r = 0.279$). CONCLUSIONS: These data suggest mental health risk factors may begin to develop during adolescence. Those with a greater number of risk factors may experience increases in adverse alcohol-related behaviors. In addition to alcohol, sleep quality may serve as a key target for behavioral intervention efforts. Underage alcohol consumption was reported by 20% of participants, putting them at moderate risk for an alcohol use disorder in the future.

A Campus Analysis of Barriers and Facilitators to Physical Activity at Elon University

Abigail B. Winters (Prof. Elizabeth Bailey) Department of Exercise Science

Physical inactivity is a continuous challenge for college students (S) and faculty/staff (FS), affecting them physiologically and emotionally. Numerous research studies have shown a linear relationship between physical activity (PA) and positive health outcomes for those of all ages. Access to opportunities for PA is available at Elon University, but a large number of people are not taking advantage. The purpose of this study was to discover the factors that deter and encourage participation in PA for S and FS using survey and focus group data. Participants were recruited via flyers, mass messaging, and email; 232 individuals (S=149, FS=83) completed the online survey with embedded questionnaires to evaluate attitudes, knowledge and participation rates in PA. Subsequently, 40 individuals (S= 35, FS= 5) attended in person focus groups to explore information obtained from the survey. Results from the embedded Barriers to Being Active Quiz (BBAQ) indicated important barriers for FS included lack of skill, lack of resources, lack of willpower, and fear of injury, respectively. Student responses suggested barriers of lack of skill, fear of injury, lack of willpower and social influence, respectively. All participants reported spending a mean of 7 h ($\pm$ 2.5 h) of their typical day in sedentary behavior. Results from the embedded Evaluation of the Perception of Physical Activity (EPPA) questionnaire suggested that all participants perceived they have plenty of opportunity to be physically active, but low motivation to do so. 51% of FS and 54.6% S reported wanting to become more physically active, but not being able to get started. Additional qualitative data suggested

a potential lack of understanding of what counts as PA and a need for greater support and incentives to get involved. While further analysis is ongoing, data from this study may provide valuable information to aid in planning new wellness initiatives on campus (ie. HealthEU) and may facilitate a campus culture providing both motivation and novel opportunities for PA, enabling subsequent potential health benefits for all.

The Impact of a 12-week Education-Based Program on Metabolic Risk Factors and Mental Health Measures

Gabby Witherell, Payton Robinson, & Talya Geller (Prof. Elizabeth Bailey & Dr. Svetlana Nepocatych) Department of Exercise Science

Metabolic Syndrome (MetS) is prevalent worldwide and is often associated with a decrease in measures of mental health. MetS is diagnosed when a person presents with at least 3 of the following risk factors: hypertension, hyperglycemia, hyperlipidemia and abdominal obesity. MetS is associated with an increased risk of heart disease, stroke, and diabetes. A group education program coupled with individual goal setting (HealthEYou) has been found effective in mediating the risk of MetS; however, its impact on mental health has not been explored. The purpose of this study is to evaluate the impact of a 12-week nutrition and physical activity education program on reducing the risk of developing MetS and measures of mental health. Faculty and staff at a small liberal arts institution will be recruited to participate in a 12-week education-based intervention program. Participants' weight, height, waist circumference, systolic and diastolic blood pressure, triglyceride (TRY), total cholesterol (TC), and fasting blood glucose (FBG) levels will be measured at baseline and upon completion of the 12-week intervention. In addition, participants will complete several questionnaires including 21-item Depression, Anxiety, and Stress Scale (DASS-21) and Quality of Life (QOL). The intervention program will include weekly 60-minute group education sessions and 15-minute individual sessions for goal setting. The program will consist of interactive sessions including mindful eating, meal planning, understanding nutrition labels, stress management, importance of sleep, mindfulness, physical activity, resistance exercise and other relevant content. Repeated measures analysis of variance will be used for statistical analysis. We anticipate that participants will gain necessary knowledge and motivation to make significant lifestyle changes that could lead to improvements in their overall health (physical and mental) and quality of life.
(Elon University Undergraduate Research Program and Faculty and Staff Wellness Initiative.)

History and Geography

Representation, Objectification, Derivatization: How Contemporary Feminist Artists Can Be the Problem and the Solution

McLean Bell (Dr. Kirstin Ringelberg) Department of History & Geography

The degradation of women is a topic of interest for contemporary artists as they process and share the narratives of survivors of gender-based violence. Thus feminist visual culture acts as a site to consider how works of art, both activist and political, can make a larger impact on society. How can the work of these artists and the insights that they inform and generate challenge dominant ideologies and thought patterns? Drawing connections between Ann Cahill’s theory of derivatization and Elizabeth Grosz’s theory of objectification, this research highlights the places where contemporary feminist artists

creating representations of women's bodies are trying to disrupt the systemic violence that harms women. Using examples from contemporary feminist artists Jenny Holzer, Mona Hatoum, Suzanne Lacy, and Leslie Labowitz, the different ways that this disruption has been successful and unsuccessful are analyzed. Disruption opens doors for future artists to continue the feminist fight against a system that oppresses women. Such solutions include distancing, abjection, and denial of pleasure. In this research, the success of each is assessed through a variety of different mediums of contemporary feminist art.

Investigating Displacement in Burlington, NC: A Critical Geographic Analysis of the Historic "Black Bottom" District*

Lucy A. Garcia (Dr. Ryan Kirk) Department of History & Geography

This thesis examines the history and geography of a little-known former Black business district in Burlington, North Carolina, known as "Black Bottom." Black-owned or -frequented businesses were located in the district from the late nineteenth century through the mid-1970s when several buildings were torn down as part of a major Urban Renewal project. From a theoretical perspective of critical geography, this research examines the "slow displacement" of the district as businesses closed or moved to other areas of the city. Methods include: reconstructing the district using historic maps and City Directories, data visualization of historic trends, archival research of government documents and oral histories, and case study analysis based on racialized theories of place. This project illuminates a longer timespan and more diverse history of the district than previously suspected, including over 40 businesses. This case study provides visualizations to aid in uncovering hidden histories of the local African-American community and a key finding is that it follows broader trends of racialized 'slow violence' in urban environments around this time.

The Resurrection of God: Kierkegaard and Schopenhauer's Religious Revolt Against Reason

Daniel R. Saltsgaver (Dr. Michael Carignan) Department of History & Geography

The philosophers Søren Kierkegaard (1813-1855) and Arthur Schopenhauer (1788-1860) were wrestling with Friedrich Nietzsche's (1844-1900) "death of God problem" - the absence of any identifiable transcendent meaning in the world - decades prior to the publication of Nietzsche's first written work, which means that the orthodox intellectual-historical view of Nietzsche and his death of God problem as being directly tied to the context of the late 19th-century merits reconsideration. Kierkegaard and Schopenhauer developed religious responses to this problem, principally in how they believed that there were limits to reason's utility for answering questions of human purpose and morality, meaning the utility of scientifically observing, contemplating, and categorizing the natural world for answering the questions of who we are and how we should behave. They therefore constructed systematic philosophies that posited the necessity of "something beyond" the observable. Kierkegaard, for his part, formulated a Christian philosophy centered around a three-stage progression between levels of consciousness, in which the individual begins in the "aesthetic" stage of being, moves through the "ethical" stage, and ends in the "religious" stage. The emptiness of both aesthetic and ethical existences leads, in Kierkegaard's mind, to the religious stage, in which individual purpose is secured from a consciously irrational faith in an unfalsifiable God. Schopenhauer's implicitly mystical philosophy, meanwhile, spoke of two metaphorical "worlds," those of "representation" and of "will." In short, the world of representation is the domain of scientific knowledge and of intellectual objects, of reason. Schopenhauer asserted that, although the world of representation can explain the

"how" of the world, i.e., how things happen, it could never explain the "why" beyond the how of the world, and that there must be a world of will that glues together all things. With his idea of the will, Schopenhauer reinvented an invisible pantheistic God whose existence gave purpose to not only all natural phenomena but also to human life. In summation, Kierkegaard and Schopenhauer developed unique religious philosophies that ought to be regarded as responding to Nietzsche's death of God problem before it was formulated, implying that this problem is not tethered to historical context.

Black Women, Political Power, and Their Impact on the Civil War and Reconstruction*

Kayla R. Spalding (Dr. Amanda Kleintop) Department of History & Geography

This study explores the changing ways scholars have described Black women and their quest for liberation before, during, and after the Civil War, approximately 1858-1877. Historians ignored the role Black women played in liberation efforts for many years, falsely assuming that women played a more marginal role because they could not participate in traditional politics. For this approach, I read and analyzed from a variety of books and scholarly sources from historians that focused on the experiences of the Black family, and more specifically Black women during this period. Furthermore, I evaluated secondary sources and explored the changing historiography on the topic following the years after Reconstruction. With this approach, I narrowed down the list of secondary source books I would use to address the question about the ways Black women asserted themselves politically. From there, I focused on books that explained the unique experiences of Black women compared to other racial and gender groups. At the same time, I evaluated how these discussions about Black women, their experience, and their politics shifted over time. Based on the new scholarly consensus that Black women initiated grass roots movements, and advocated for the liberation of Black people in unconventional ways, I did a close reading of some primary sources from and about Black women. Mainly, I examined diary entries and other written works by Black women during the period, to understand the depth of their experiences, efforts, and actions toward liberation. The results of my research will be demonstrated through a digital timeline that explores the history of Black women and their politics toward liberation throughout the Civil War and Reconstruction. These examples support the conclusion that Black women asserted political autonomy and advocated for the rights and liberation of Black people both during the Civil War and Reconstruction, through the creation of grassroots organizations, community contributions, and artistic pursuits.

Mattering and Belonging: Pursuing Equity Through Partnerships in Higher Education*

Heidi Weston (Dr. Peter Felten) Department of History & Geography

The construct of "belonging" is commonly used to understand and explain student learning and experiences in higher education. Recent research demonstrates that institutions and staff can foster belonging among students (Meehan & Howells, 2019). For example, student-faculty relationships positively influence belonging (Miller et al., 2019). A student's sense of belonging is positively correlated with learning and graduation rates (Strayhorn, 2012; Thomas, 2012) as well as mental health and wellbeing (Bye et al., 2020). Despite this research, scholars have increasingly identified limitations to the construct of belonging, perhaps most significantly related to students within historically underrepresented groups (HUGs) in higher education. Efforts to promote belonging can alienate students who wonder if they do -- or if they want to -- "fit" in a community. The rhetoric of "belonging" can place an assimilatory pressure on students. As a result, scholarship on belonging may misinterpret feelings of marginalization among certain groups of students and also might miss

opportunities to understand what leads these same students to learn and thrive in higher education (Cole et al., 2020). This study explores "mattering," a concept related to but distinct from belonging: "Mattering is the feeling of being significant and important to other people" in a shared context (Flett et al., 2019, p. 667). Drawing on interviews with student partners from HUGs at three U.S. higher education institutions, and existing literature, this study asserts that student-faculty and student-student relationships are essential to students developing a sense of mattering in higher education. In addition, it confirms that mattering, unlike belonging, is transferable between academic contexts (Cook-Sather & Seay, 2021). This study concludes by suggesting that mattering is a construct that deserves additional attention in higher education research, and that practices linked to mattering can be effective ways to pursue equity, justice, and learning in higher education. Focusing on mattering rather than belonging would maintain the positive benefits of belonging relating to student academic performance, graduation rates, and wellbeing, without placing an assimilatory pressure that furthers marginalization among students from HUGs.

Human Service Studies

A Virtual World: How the COVID-19 Pandemic Has Changed Play Therapy

Lila R. Bensky (Dr. Judy Folmar) Department of Human Service Studies

The COVID-19 pandemic brought about several unprecedented changes in the world of play therapy involving the shift from in-person play therapy to virtual-based play therapy through telehealth. This major shift had dramatic effects on both clients and providers of play therapy. It was clear that using play along with structured mental health services helped a child adequately cope with any level of stress they might have experienced throughout the pandemic. However, the providers of these services were challenged with shifting a primarily interactive therapeutic approach to a virtual platform. The purpose of this study was to gain the perspective of registered play therapists and registered play therapist supervisors (RPTs/RPT-Ss) on how they have adapted their services to be more accessible during the pandemic and their perceptions of this overall shift to telehealth. An initial questionnaire was used to gather primary information about RPTs/RPT-Ss in North Carolina, Virginia, and West Virginia and their experiences and opinions on telehealth. Those who consented were then contacted for more in-depth interviews, with the goal to gain insight into the challenges faced by play therapists throughout the COVID-19 pandemic. Preliminary findings showed a dominant negative perception of telehealth as an effective modality to provide play therapy services. Additionally, play therapists reported a shift from non-directive approaches to more directive methods of play therapy in order to best adapt to a more virtual platform.

The Cultural Sensitivity of Elon's Love Your Body Week: Intentions, Outcomes, and Student Perceptions*

Kaitlyn R. Freeman (Prof. Monica Burney) Department of Human Service Studies

Only one formal study on eating disorders has been conducted at Elon, which found that 95% of women surveyed know someone at Elon who has an eating disorder (ED) (Thompson, 2016). The study recommended an ED awareness program like Love Your Body Week (LYBW) as a solution to the high rates of EDs on college campuses. Seven years later and in light of research showing that ED scholarship is skewed towards the white female experience, this study assesses the degree to which

LYBW is culturally sensitive, stigma-breaking, and overall inclusive (Strother et. al, 2012; Rodgers, Berry, and Franko, 2018; Protos, 2020). Using mixed methods, the primary researcher engaged in participant observation during LYBW, and distributed an original survey that gauges the student perceptions and experiences of LYBW events, particularly as it relates to cultural sensitivity and inclusivity. The researcher also conducted interviews with event organizers and selected students to better understand LYBW event planning and the experience of diverse students in relation to LYBW and Elon's healthy eating culture. All data was then aggregated and coded as one source using the same codebook. The study found through the survey that the student experience of LYBW is overwhelmingly positive, and that language around cultural background, gender, and healthy eating was very inclusive. Event organizer interviews found that intention to include a diverse group of Elon students at LYBW is certainly present in nearly every area of study, however participant observation found that diverse students are still not attending LYBW events. Whether this is due to insufficient marketing or a greater stigma around attending ED awareness events, the researcher cannot be entirely sure. This study serves as the first culturally aware and all gender inclusive ED research conducted at Elon, opening the discussion for future research and on creating campus spaces that welcome and intentionally include minority groups at Elon.

The Perceptions of Mental Health Providers on the Use of Teletherapy

Jaimee C. Nachwalter (Dr. Bud Warner) Department of Human Service Studies

The expansion of the counseling field as well as technological inventions introduced the world to teletherapy, conducting therapy sessions through an online, HIPAA compliant website. The Covid-19 pandemic popularized these platforms and expanded the use of them. To examine the effectiveness of teletherapy as compared to traditional in-person therapy, four clinical mental health practitioners in North Carolina were interviewed. Two interviewees had positive feelings towards teletherapy, while the other two had better feelings about in-person therapy. Positive components of teletherapy were: allowing the client to feel most comfortable in their own setting, increasing access to services, allowing the therapist more time between sessions and overall convenience. The negative components of using online platforms included: issues surrounding confidentiality, clients' ability to find a private spot to conduct sessions and clients' willingness to be honest. These findings aligned with current professional literature about teletherapy.

The Sex Talk: Conversations Between Fathers and Sons About Familial Upbringing and Impacts on Perceptions of Contraceptive Responsibility

Kate M. Wirth (Dr. Judy Folmar) Department of Human Service Studies

Sexual socialization is the process in which children and adolescents develop a knowledge and understanding of sexuality, sex, and safe sex practices. Family discussions, specifically discussions between fathers and sons, have the opportunity to encourage male adolescents to learn about the complexities of sex in a safe and honest environment. The significant gendered gap in sex education often encourages women to be responsible for learning about sex and using contraception, leaving men's voices out of the discussion. Although mothers and other trusted adults can start these conversations, this research focuses on how fathers today are in a unique position to start new conversations with their children; breaking the cycle of toxic masculinity and gendered divisions of labor in the home (Fennell, 2011; Smith et al., 2005). While previous research has shown a strong interest in the influence men have on the use of contraception, there is a lack of knowledge about the

impact that conversations between fathers and sons can have on young men's views about sex, contraception, and family planning (Bennett, 1984; Guilamo-Ramos et al., 2018). The current research asks three important questions: 1) How do perceived gendered divisions of labor impact feelings of responsibility for contraception among men? 2) When, how, and if at all do conversations about sex and contraception happen between fathers and sons? 3) In what ways do these conversations impact masculinity, fatherhood, and men's influence on contraceptive management? Through surveys and interviews of fathers and college-age sons, this research aims to gain insight into father-son conversations about sex, contraception, and gendered division of responsibility across generations. Findings can help inform policy decisions around sex education programs and pinpoint opportunities to support and educate men on these topics. Preliminary findings and emergent themes will be highlighted in this presentation.

Journalism

Stories and Resolutions: The Cultural and Environmental Impacts of the Tungkum Gold Mine on the Villagers of Na Nong Bong, Thailand

Megan E. Curling (Dr. Glenn Scott) Department of Journalism

For the last 15 years, the village of Na Nong Bong and five others in the Wang Saphung district in northern Thailand have been struggling to recover from environmental degradation caused by a gold mining operation in their area. These communities, located in the Loei province, were receptive to the opportunity to host Tungkum Limited before noise and dust pollution began, polluting dozens of local streams. Soil, water, and blood tests would later show high levels of arsenic, manganese, cadmium, lead, and cyanide. In 2007, residents of the six affected villages formed Khon Rak Ban Kerd Group (KRBKG) to protest the mining and bring attention to harsh living conditions caused by the operation. In the years since, the group has coped with intimidation from local law enforcement, legal battles, and government inaction. This study explores the lived experiences of 30 residents to understand the effect of community organizing on the participants and on their efforts toward resolution. To do this, the student researcher conducted in-depth interviews with the community members that focused on past and present experiences in their hometowns. Relying on convenience sampling, the researcher selected interviewees based on recommendations from the prior interviewees, pulling from a wide variety of ages and positions. These interviews combined strategies from both journalism and community-based participatory research, allowing for a clearer understanding of the public health crises through the context of storytelling. Qualitative coding yielded a set of findings consistent with varied observed responses toward the eventual closing of the gold mine and subsequent efforts towards environmental restoration. The results of this project provide insight into how a history of organizing in Thailand has contributed to this situation, how community organizers interact with long term restoration projects, and how communities move toward healing after traumatic experiences.

Corporate Social Responsibility in a Post-Roe v. Wade World: The Importance of Critical Thinking*

Elizabeth Driggers (Israel Balderas, J.D.) Department of Journalism

Corporate Social Responsibility (CSR) is how companies align their values and actions with certain social movements and ethical standards. Recent movements include Black Lives Matter (BLM),

LGBTQ+ rights, women's rights, child safety, environmental protection, and general attention to Diversity, Equity and Inclusion (DE&I). Studies show that Gen Z consumers are the generation most likely to consider a company's CSR initiatives before making a purchase. A recent study conducted by Aflac Health Insurance reported that 77% of consumers are motivated to purchase from companies who are committed to certain CSR initiatives. The same study found that 73% of investors tie their business decisions to certain social responsibilities (Aflac, 2019, p. 1). Needless to say, CSR is a crucial part of business decision-making for companies and their consumers. However, Dobbs v. Jackson Women's Health Organization — the case that removed the federal protection for abortion in 2022 — severely changed the course of what CSR may look like. This study examined the websites of the top 75 Fortune 500 companies in 2022 for information regarding company policies and perspectives relation to reproductive health rights. This data was compared to how the same companies publicized information related to DE&I commitments. Through a qualitative analysis, this study found that 90.7% of the companies examined in this study do not have any reproductive health-related information or a commitment to bodily autonomy rights on their website. Of those that did have reproductive health information, only one company in this study had extensive information about this issue. Each company was much more likely to publicize information related to DE&I than to reproductive health rights. The results of this study teach consumers, employees, and students not to just take companies at their word—but by their actions. As another wave of Elon University students prepare to graduate and enter the workforce, it is crucial to think critically about the brands we support and represent. Corporate Social Responsibility may continue to change, but critical thinking gives us the upper hand.

Management and Entrepreneurship

Exploring the International Diffusion of Innovation Through the Lens of the Slow Food Movement

Bella Roy (Dr. Scott Hayward) Department of Management & Entrepreneurship

Slow Food is a non-profit organization that began in Italy in 1986. Its purpose is to "prevent disappearance of local food cultures and traditions" and "counteract the rise of fast life" by focusing on plate, planet, people, and culture. Today, there are more than 1,600 Slow Food communities across 160 countries. This thesis investigates the diffusion of Slow Food Communities: what makes some countries more fertile for these communities than others? I test three country-level factors influencing the number of communities in that country: urbanization, globalization, and agricultural land. I expect the diffusion of Slow Food will be higher in countries with higher levels of these factors. I create a cross-sectional dataset including 2021 counts of Slow Foods communities and recent country-level percentages of agricultural land and urban populations. I also include the KOF Index (a globalization measure using economic, social, and political criteria). Because my dependent variable is non-negative, discrete count variables, I use negative binomial regression in Stata to test my hypothesis. Early results suggest a positive influence of globalization and agricultural land on community counts. Urbanization's effects appear insignificant.

Marketing and International Business

Optimal Pricing Strategy for Recycling Supply Chain

Emma K. Ciccotosto (Dr. Xin Liu) Department of Marketing & International Business

The goal of this research is to find the optimal pricing and optimal recycling compensation. Previous studies have reviewed that ignoring consumers' strategic behaviors may lead to negative impacts on retailers' performance. However, there is little literature examining the effects of the consumers' strategic waiting on second-hand transactions. To analyze the effect of offering recycling/trade-in service on retailer's pricing decisions and profitability, we developed an analytical model to examine the optimal pricing strategy and will conduct a survey to obtain consumer's behaviors regarding second-hand transactions of vehicles. From the pricing models, we compared the retailer's profit with a recycling service vs. without. Given the cost and salvage value of cars, we determined the retailer's optimal price and recycling compensation to the consumers who are willing to trade in their used cars. Our findings indicate that when salvage value of a used car is relatively low, offering a trade-in to consumers is more beneficial by providing higher prices. We extend our basic model by focusing on the behaviors of strategic consumers. The existence of product depreciation causes strategic consumers to have uncertainties in their purchase valuations. The consumers will estimate the product depreciation before deciding to purchase. The survey was first distributed among Elon University's students, to collect their purchasing and recycling behaviors. In our preliminary findings we discovered that people expect about a 55% discount on their trade-in for a new vehicle. We plan to expand our data in a second round of surveying to the entire Elon community. The survey will identify the percentage of strategic consumers and record the responses of the student's preferences or behaviors regarding participating in second-hand transactions, the channels in which they complete their second-hand transactions, and the pricing valuation of second-hand products.

Efficacy of Artificial Intelligence as a Sales Training Tool

Benjamin Corrado (Dr. George Talbert) Department of Marketing & International Business

This critically appraised topic paper provides data and recommendations for sales training purposes. More specifically, the study will discuss the effectiveness of implementing artificial intelligence. Working from the premise that practice is the most impactful form of sales training. We have found there is significant evidence to support the use of artificial intelligence as a way of teaching early career sales professionals. Therefore, artificial intelligence and other non-CRM technology should be incorporated into training to cope with problems around the current training status quo. Our study utilizes the PICO research method to narrow the scope for our particular question on implementing advanced non-CRM technology.

Marketing Backlash: Ad Perception and Consumer Behavior on Utilitarian and Hedonic Banner Ads

Gabriella Garcia (Dr. Smaraki Mohanty) Department of Marketing & International Business

This study explores the ways in which mobile coupon and advertisement can influence consumers attitude and purchase decision. For years coupons have been used as a marketing strategy by producers to encourage unplanned spending, boost retailers' revenues and help consumers feel validated in

saving money (Danaher et al., 2015). Due to the rise of the digital age, coupon apps on mobile devices have replaced paper coupons (Grewal et al., 2011). When users click on a coupon in the coupon-apps, they are often required to watch a banner advertisement in order to activate the coupon. Conventional wisdom suggests that exposure to multiple promotions from the same brand reinforces customers' positive attitude towards the brand. Further, the type of the advertisement could influence the way consumers behave. In this research we focus on two ad types (hedonic and utilitarian) to demonstrate how the ad type affects consumer attitude and further influences their purchase intention. However, we suspect that the time and attention that the customers have to spend in order to watch the banner advertisement could be perceived as a nuisance. Using two studies and data collected from Amazon CloudResearch, we find that customers' positive attitude towards coupon products and banner advertised products decrease when customers are made to watch a banner advertisement in order to activate a coupon. Furthermore, we find that manipulating the banner advertisements format or content does not help in preventing the reduction in positive attitude and there was no significant evidence for the increase in attitude and purchase intentions of consumers with either hedonic or utilitarian ads. This research contributes to both theory and practice in several ways. This is a pioneering study focusing on the coupon-banner interaction effect; fundamentally explaining the mechanism and outcome of the strategy. For managerial implication, we demonstrate that while firms assume that they could relocate the sunk cost of coupons to become investment in banner advertisement, in reality, the combination completely takes away from the coupon's positive impact and results in reduced customer attitude. The overarching conclusion to this study offers insights that can promote future research in the domain of coupon and banner advertisement.

The Effects of Color vs. Black and White Imagery in Luxury Good Ads on Consumer Brand Evaluation: An Empirical Study

Jennifer L. Goldberg (Dr. Larry Garber) Department of Marketing & International Business

With the rise of the internet and social media in recent years, the world has seen a shift in marketing communication strategies and the use of color, or lack thereof, in advertisements. Prior research, specifically concerning color versus black and white imagery in luxury brand advertising, is not only sparse but includes conflicting findings regarding which is the better tactic. This prior research has examined the effects of color vs. B&W imagery on certain goods – clothing, leather goods, and watches – all of which can be seen on or with the person and thereby serve as extensions of the self. This current study aims to help resolve this conflict by extending color vs. B&W research to another type of luxury good, represented by champagne, which, rather than being an extension of the self, plays a social role in the lives of consumers. In a single factor between-subjects design, 115 respondents drawn from a Prolific panel were exposed to one of two faux ads for Veuve Clicquot champagne. The ads are identical apart from the fact that one is in full color and the other is in B&W. Participants were then asked to rate the ad, the brand itself, and its packaging, as well as to complete an abbreviated version of the Richins and Dawson (1992) materialism scale. Results from this study generally show support for the proposition that color is a stronger tool for advertising luxury goods compared to B&W. Since prior research finds the opposite, this study suggests that the answer to the question of which condition is better lies in the nature of the luxury good being advertised. While past studies have found support for B&W imagery over color imagery, their work has only examined luxury goods that are worn, and therefore serve as extensions of the self. This work differs by examining champagne, which is not a self-expressive good that separates one person from others through exclusivity, but rather, it brings people together through its use in social settings and special occasions. Theoretical and managerial implications are discussed.

What Determines Business Resilience in the Pandemic Era?

Chris Lee (Dr. Long Xia) Department of Marketing & International Business

The tourism and hospitality industries have been particularly impacted by the unprecedented COVID-19 pandemic, which emphasizes the need for businesses to increase their resilience. While many businesses are still suffering or have altogether gone under, many have prevailed and are even doing better than before the pandemic. However, we lack a holistic view of the various factors that lead to overall business resilience. In this study, we investigate pre-disruption characteristics that predict business robustness when a crisis hits and the response strategies that can help with a quick recovery. Using two large datasets in the hospitality industries, we reveal that pre-disruption characteristics are strong predictors of business resilience and that the effectiveness of response strategies highly depends on business characteristics. This finding suggests the adoption of customized response strategies rather than one-size-fits-all approaches. The study makes theoretical, methodological, and practical contributions to crisis management research and can benefit multiple stakeholders.

Mathematics and Statistics

Statistical Modelling of Alaskan Coral Biodiversity

Schuyler Cady (Dr. Nicholas Bussberg) Department of Mathematics & Statistics

Cold-water corals are incredibly diverse marine organisms, ranging from deep water habitats in the tropics to shallow depths at the poles. They have an enormous range of structures, provide food and shelter for many organisms, and are the foundation upon which oceanic health rests. Warm-water corals have experienced a decline over the past few decades, but less is known about cold-water corals. Current research points to shifting environmental conditions (e.g., climate change) and fishing practices leading to decreased coral biodiversity. My research seeks to better understand how environmental trends affect coral biodiversity around the Gulf of Alaska, the Aleutian Islands, and the Chukchi Sea. I used the National Oceanic and Atmospheric Administration's Deep-Sea Coral Database, one of the largest spatial and temporal data sets available. There are nearly 30,000 coral records in the database for these regions. Using these records, I analyzed the biodiversity of cold-water corals through time and space, and in my poster, I show how this diversity is distributed around Alaska. I discuss the potential effects of these results, as understanding biodiversity trends is vital in predicting how coral reefs may change in the future and in protecting this ecologically crucial region.

Computational Sensitivity Analysis of a Mathematical Model of Chemotherapy

Catherine M. Capodanno (Dr. Karen Yokley) Department of Mathematics & Statistics

One of the main cancer treatments administered to patients is Chemotherapy. In order to be successful, these chemotherapy treatments must balance effectiveness of treatment with an acceptable level of toxicity to healthy tissue. A previous study considered a pharmacokinetic/pharmacodynamic mathematical model of chemotherapy treatment to determine optimal drug regimens. This delay differential equation (DDE) model was investigated to determine factors that have the greatest effect on tumor growth and on toxicity to the individual (based on predictions of the white blood cell count). Differential equations are used as a basis for modeling many different applications such as modeling

the flow of salt in a well mixed tank. Instead of the “flow in” and “flow out” of salt, we are looking at the entrance of the chemotherapy drug into the body and how it is transferred. In order to investigate the predictions of the chemotherapy DDE, we performed simulations on the original model with the software Mathematica. We then used the simulation results as a basis of adapting the DDE into an ordinary differential equation (ODE) model. Three different delay functions were investigated as options for the ODE model. Once one delay function was selected, the ODE model was then used to simulate three main treatment scenarios. Simulations with the adapted ODE model appear to reasonably model chemotherapy treatments.

Analyzing The Effects of The COVID-19 Pandemic In Adults' Anxiety Levels With Children and Without Children

Keriann Croy, Saffie Hollingsworth, Madison Horner, Molly Hunt, & Olivia Pozytko, Williams High School (Prof. Larry Cantwell) Department of Mathematics & Statistics

This research analyzes how school shutdowns due to the COVID-19 pandemic affected the anxiety levels of people with and without children in their household. Data was obtained from Household Pulse Surveys administered by the US Census Bureau during the pandemic, and our analysis focused on the states of New York and Florida, which had markedly different school shutdown rates. This is of interest in the light of the COVID-19 pandemic, especially as educators try to determine how these school shutdowns influenced students and parents. If similar shutdowns were to occur in the future, this research could be used to help predict the effects of said shutdowns on mental health, and may suggest a precedent for providing support to students and parents in times of national crisis. To process this data, comparisons between the timelines of school shutdowns due to the pandemic and adults’ anxiety levels in the states of New York and Florida were tested. Confidence intervals were used to assess the statistical significance of the difference between the stress levels of parents and non-parents. We found that, on average, adults with children in their household experienced more anxiety than adults without children. This trend was true in both New York and Florida, over the course of the 2020-21 school year.

Investigating Food Security in Local High Schools and Universities

Abigail Choi, Eman Dweik, Samantha Fish, & Rana Ligue, Williams High School (Prof. Larry Cantwell) Department of Mathematics & Statistics

Food scarcity is a serious issue that impacts millions of students across the United States. By better understanding the demographics associated with food scarcity, we can learn which groups need the most assistance in order to create targeted strategies that effectively partition resources to mitigate this problem. To this end, we analyzed data from the U.S. Census Bureau's Household Pulse survey, and designed a similar survey that will be administered at Williams High School and Elon University. We will present the results of these surveys and use statistical techniques to estimate the extent to which food security is affected by demographic factors. We will also look to ascertain the overall level of satisfaction that diverse populations of students have toward their dining options, and explore how COVID has impacted food quality and security.

Mathematical Model of Obesity Trends in the United States

Danielle DaSilva (Dr. Karen Yokley) Department of Mathematics & Statistics

The prevalence of obesity in the United States has increased drastically, which is putting a strain on our health system as obesity puts people at greater risk for a variety of diseases. Factors such as socioeconomic status, income, race/ethnicity, geographic location, and personal connections have all been shown to contribute to one's likelihood of experiencing obesity. Using mathematical models, this project aims to investigate and forecast the impact of these factors on the past, current, and future obesity rates in the United States. Since the rise in obesity levels mimics the spread of infectious diseases, utilizing previously established epidemiological modeling techniques will enable the analysis of data and the consideration of previous research to develop a coherent model that can analyze obesity trends on a micro- and macro-level. Specifically, an SIR-model was constructed and fit to data based upon researched parameters to compare obesity trends in each state. Once these obesity trends in each state were established and defined by parameters, these parameters were compared to other demographic features of each state. No strong, defining trends were recognized. Thus, different approaches and models are being investigated to determine trends on a state level. This model will eventually enable policymakers to implement effective strategies to combat rising obesity trends.

Modeling Treatment Strategies for Transplant Patients

Danielle DaSilva & Lia Rotti (Dr. Karen Yokley) Department of Mathematics & Statistics & (Dr. Julia Arciero) Indiana University-Purdue University Indianapolis (IUPUI), Department of Mathematical Sciences

The standard of care for solid organ transplants is life-long immunosuppression to prevent acute graft rejection. However, immunosuppression increases the risk of complications from opportunistic infections and other diseases. Thus, finding alternative therapies to decrease dependence on immunosuppression is a desirable clinical goal. One possible alternative is the adoptive transfer (AT) of regulatory T-cells (Tregs), through which a high dose of Tregs is administered to protect the graft. However, this strategy has been largely unsuccessful when used as a monotherapy. Our research project uses mathematical modeling to reproduce the clinical outcome of graft survival with immunosuppression and to understand the mechanisms of the immunosuppressive drug Cyclosporine A (CsA) in a murine heart transplant. We also model the use of AT in combination with immunosuppression to predict combination therapies that promote graft acceptance while minimizing the use of immunosuppression. The impact of different immunosuppression dosing strategies, including constant, tapered, bolus intravenous, and bolus oral dosing, is simulated in the presence and absence of AT. Immunosuppression and AT factors (such as dose level, mechanism of action, timing, and frequency) are varied. The model was used to predict the immunosuppression dosing levels at which AT could prevent graft destruction for different immunosuppression administration types. This work provides a framework for better understanding the dynamics and mechanisms of immunosuppressive drugs and AT in transplantation. This theoretical model is a first step in predicting treatment using AT in combination with immunosuppression and can guide future experimental design for therapeutic interventions.

Text Mining for the Intersection of COVID-19 and Mental Health

Rachel N. Dietert (Dr. Heather Barker) Department of Mathematics & Statistics

Social media has consistently been a place where people vent about their mental health, and that remained unchanged after the COVID-19 pandemic. This research explores how topic modeling can be used to categorize tweets regarding the intersection of COVID-19 and mental health. Topic modeling

is an unsupervised learning method that can be used for the classification of large groups of texts into discrete groups of words. For this project, researchers compared how two topic modeling methods performed at analyzing approximately 2,000 Tweets. Seeded topic modeling was one method used to identify what level of interpersonal impact a tweet was discussing according to ecological systems theory. The seeded dictionary was created using traditional qualitative methods to analyze 30 college students' free response essays on their experiences with mental health and COVID-19. The other type of topic modeling the researchers used was unsupervised topic modeling. The unsupervised topic modeling method creates themes using a latent dirichlet allocation model. These themes consist of a collection of words associated with each topic that were interpreted by ChatGPT in order to form a coherent theme from the words. The researchers then analyzed how well the themes were assigned to random tweets in the dataset. Findings show that the unsupervised topic model assigned themes more appropriately than the supervised topic model. The findings of this research will help those in psychology to better understand what concerns people are still facing between the intersection of COVID-19 and mental health. The methodology will also prove useful for those interested in analyzing large amounts of textual data using topic modeling.

Analysis of Factors That Affect a Billboard Hot 100 Song's Popularity

Thomas Fasan, Grace Gabrielli, Gracie Hartle, Britton Isley, Ella Porfilio, & Lauren Turner, Williams High School (Dr. Ryne VanKrevelen) Department of Mathematics & Statistics

This research attempts to identify the factors that contribute to a given song's popularity. We defined popularity as the number of weeks or best rank on the Billboard Hot 100. Determining what makes a song popular is important to musicians and music producers alike. Musicians can use these findings to determine what type of songs they should create (in order to be popular). Producers and record labels can also use this knowledge to make better informed decisions about the artists that they are choosing to sign. The data used was from every song on the Billboard Hot 100 between 2012 and 2021. Initially, we used a platform, CODAP, which allowed us to explore correlation between different characteristics of a song. We compared different variables to a song's weeks on the Billboard Hot 100, such as its tempo, key, ‚Äúspeechiness‚Äù, etc. We found that there is not one specific variable that directly makes a song popular, but many factors are related to a given song's popularity. Next we took a random sample of 100 songs from the original data set and added our own information. That allowed us to examine factors including the genre of the song, the gender of the singer, and whether the song was performed by a solo artist, duo, or group. After interpreting the data, we conclude that the majority of the Billboard Hot 100 songs were performed by a male lead and over half the songs were by a solo artist.

How Fan Attendance Affects Home Team Win Percentage

Bobbi Foster, Santiago Herrera, Franklin Nguyen, & Kenna Talhelm, Williams High School (Dr. Ryne VanKrevelen) Department of Mathematics & Statistics

In professional team sports, there is a phenomenon known as home team advantage. It is believed the home team possesses benefits over the visiting team, possibly due to how familiar the home team is with their environment or fan attendance. This research investigates the extent a home advantage affects NFL and NBA teams' performances over the past 5 seasons. When COVID-19 occurred, fans were prevented from being present during certain games. We compared data from the games without fans in attendance to previous seasons and were able to look at the difference in team performance

with and without fans to investigate how this advantage varied by team. This is important in determining whether fan attendance improves team performance and if so, the factors that may contribute to creating said advantage. Using the data collected from Sports-reference.com, we constructed confidence intervals to determine a range within which a home team's true win percentage and point margin likely lies. Looking at teams that share an arena, we found that since neither the Giants and Jets nor the Lakers and the Clippers had similar home team advantages, we could likely rule out the idea of it being the specific arena that causes the advantage but rather other factors such as attendance or time of day/week. The findings from our research could be applied to aiding team management by motivating team executives to encourage fan attendance.

Congruence Subgroups of the Virtual Braid Group

Alexa L. Goldberg (Dr. Nancy Scherich) Department of Mathematics & Statistics

Braid theory is a mathematical field that studies knotted structures in the world around us. For example, hair can be braided and DNA is braided. There are two categories of braids which are distinguished by crossing information. The standard braid group consists of braids with regular crossings (which can be thought of as two roads crossing at an overpass). The virtual braid group has braids with both regular crossings and virtual crossings (which can be thought of as two roads crossing at an intersection). A common theme within braid theory research is generalizing known theories about standard braids and extending those ideas to virtual braids. This project investigates a particular subsection of virtual braids which is well established for standard braids.
Two braids are said to be congruent if they are indistinguishable after a translation process through the Burau representation. A useful analogy is to think of the Burau representation as an interpreter that translates braids into another language. Two braids are congruent if they get translated into the same word. For standard braids, the theory of congruent braids is well studied and understood. This project is the first of its kind to study when two virtual braids are congruent. This project is computation-based in nature, requiring an implementation of the Burau representation. Our approach uses computer computation to search for examples of congruent virtual braids. We expect to find that congruence in the virtual setting is much more generic than in the standard setting, which would spark a whole new avenue of investigation.

Preparedness and Self-Efficacy of Elon Pre-Service Teachers to Teach Statistics

Emma M. Hallock (Dr. Heather Barker) Department of Mathematics & Statistics

Often, pre-service teachers do not feel confident enough to effectively educate students in all mathematics topics, specifically statistics. The preparation of these future educators is essential. Revisions may need to be made at Elon University so that pre-service math teachers (PSMTs) feel more confident teaching statistics in grades 6-12. This study was an effort to determine how prepared Elon PSMTs feel to teach statistics. The participants in this research are undergraduate, pre-service, middle, and secondary teachers at Elon University. Our goal was to analyze the relationship between statistical opportunities in university courses and feeling prepared to teach statistics content. For this inquiry, I used a mixed-method research approach while gathering the information. I first used a quantitative method through an exam called LOCUS to assess their understanding of middle and high school statistics concepts and then a qualitative method, interviewing, to measure their self-efficacy. These were then compared for dissonance between self-efficacy and actual statistics knowledge. Participants agreed that they would like to see more options with statistics courses they can take to

prepare themselves for future endeavors. Many participants also agree when thinking about statistics resources and shared they would like to see more opportunities to learn how to use technology to teach statistics and think that is something very relevant to students' futures. Because there are no courses offered that purely overlap statistics and education, participants feel like they have had a limited opportunity to learn how to adequately teach statistics relevantly to their students. They want to see more communication between the education and math departments on what they can do for their PSMT preparation. The findings from this study will be used to shape the way we prepare our PSMTs at Elon University so they are well-equipped to teach future students.

Mathematical Modeling of Immune Response to SARS-CoV-2

Mary Hermes, Lauren Hill, Griffin Pace, & Thomas Wilson (Dr. Hwayeon Ryu) Department of Mathematics & Statistics

In response to the profound impact the COVID-19 pandemic has had on society, the mathematics and broader scientific community has focused considerable research efforts to understand the spread of the virus. Despite a tremendous volume of research in this area, how the human immune system responds to SARS-CoV-2 has not been yet fully understood due to limited analysis of the experimental or clinical information to date. Mathematical models that account for the interaction between SARS-CoV-2 and the human immune system may help clinicians develop targeted treatment strategies. Our in-host model explicitly represents the virus, innate immune cells, selected cytokines, and their interactions. These interactions are formulated in a system of coupled ordinary and delay differential equations in order to identify key mechanisms of disease severity and molecular pathways of successful viral clearance. We conduct parameter estimation based on experimental data and literature review and investigate qualitative and quantitative behaviors of the model via numerical simulations. Using this model, we then determine the implications of variation of parameters by sensitivity analysis. Our model demonstrates key aspects of immune response to SARS-CoV-2, specifically its sensitive pathways, which might be responsible for differences in disease severity exhibited by COVID-19 patients. Our preliminary results of the mechanisms involved in COVID-19 pathology could identify several therapeutic targets that would provide hypotheses to be tested clinically, thus, serving as a foundation for the development of evidence-based therapeutic strategies.

Shuffling Cards, Flipping Polygons, and Group theory

Lucas Hoffses (Dr. Jeff Clark) Department of Mathematics & Statistics

Group theory has a wide variety of applications, from cryptography to chemistry. One motivation behind group theory is as a study of symmetry. A symmetry is considered as an action that you can do to an object that leaves it indistinguishable from its original state. For example, you can rotate a square 90 degrees clockwise around its center, leaving it unchanged. You can also flip it along a vertical line going through the center. If we label the corners and rotate the square four times, we get all the corners in their original places. Likewise if we flip it twice. More subtly, if we rotate it, then flip it, and do that procedure twice, we get back to where we started. This is enough to describe how a vertical flip and a 90-degree clockwise rotation can interact, and we can describe how to get to each possible state of the square by flipping and rotating. This idea is called a group presentation. In this talk, we will go over some introductory group theory. We will look at how group theory applies symmetries of regular polygons, and shuffling a set of objects. We will also dive more into the concept of a group presentation, as well as how we can combine the presentations of two groups to come up with a third

group. Plenty of examples of groups, group presentations, and their applications will be discussed during this talk.

Estimating the Causal Effect of Pandemic-Induced League Shutdowns on Hockey Player Development

Jacqueline A. Jovanovic (Dr. Ryne VanKrevelen) Department of Mathematics & Statistics

The COVID-19 pandemic disrupted all aspects of life when it began in 2020, and professional sports were no exception. In 2020-2021, many hockey leagues had shortened or canceled seasons due to the pandemic. Some prospects participated in alternative leagues or tournaments while others did not record any official games for that season. The goal of this research was to investigate the impact of pandemic disruptions on hockey player development. Treatment was defined as whether a player participated in at least one official game during the COVID-19 impacted season (2020-2021). A player was assessed on their points per game in the OHL the following year. Causal analysis was performed through propensity score matching and Bayesian Additive Regression Trees. Results suggested little to no benefit for players who recorded an official game during the pandemic-impacted season. Findings from this research can be particularly useful for situations such as the draft, where teams are comparing prospects with varying levels of prior experience and evaluating their capability to play at a professional level.

Detecting Change: Bat Response to the COVID-19 Stay-at-Home Order in NC

Nicole LaMont (Dr. Nicholas Bussberg) Department of Mathematics & Statistics

Human activity occurs in patterns that can affect the environment and wildlife. For example, in urban settings, more people are active in city centers during weekend nights compared to weekday nights. In response, bats have been found to alter their activity. This phenomenon is known as the “weekend effect” in which bats move from city centers to avoid larger congregations of humans during weekends as compared to weekdays. In 2020, Greensboro, North Carolina, issued a stay-at-home order in response to the COVID-19 pandemic from March 13 – May 8 during which urban areas experienced a major decrease in human activity. To investigate whether bat activity changed in response to the reduction of human activity caused by the stay-at-home order, data from March 30 – May 8 in 2018 – 2021 was analyzed. The data was collected from two sites near the city center at the University of North Carolina Greensboro and one site near the city periphery at the Greensboro Science Center. Multiple zero-inflated negative binomial models were constructed to analyze the effect of lockdown on total and species-specific bat activity. The research found that the changes in human activity caused by the lockdown had an effect on the activity of some bat species. Thus, the findings support the conclusion that bats respond to short-term changes in patterns of human activity.

Investigation of Silent Transmission: Mathematical Modeling Incorporating Asymptomatic and Presymptomatic Spread of COVID-19

Sarah M. Mirrow & Colton R. Waller (Dr. Karen Yokley) Department of Mathematics & Statistics

Since appearing in the United States in January 2020, COVID-19 (caused by the SARS-COV-2 virus) has caused nationwide lockdowns, medical care shortages, and the allocation of billions of dollars to vaccine research. COVID-19 is especially dangerous because it can spread through silent transmission;

people with mild or no symptoms can unknowingly infect others with the virus. This research project uses two SIR-based models to investigate the impact of silent transmission on the spread of COVID-19 in early 2020, specifically highlighting the significance of the presymptomatic period and asymptomatic infections. Through a modification of the basic SIR model into the SEAIR and SEPIAR models, this project considers both viral latency and symptom severity to examine how presymptomatic and asymptomatic populations impact the transmission of COVID-19. After completion of both models, they were compared to data from the CDC, which measured the new daily cases in the early months of the pandemic. A visual sensitivity analysis was conducted on both models, finding that changes to infected and presymptomatic parameters had the most impact on model output. Finally, the basic reproduction number, R_0, was calculated for both models: 3.65305 for the SEAIR model and 3.0977 for the SEPIAR model. Comparison between the models has demonstrated the importance of accounting for a presymptomatic period when modeling COVID-19. As many preventative measures are oriented towards different symptomatic severities, such as the isolation of a severely symptomatic individual or the preemptive testing of an individual without symptoms, understanding silent transmission of COVID-19 is crucial in determining how the virus spreads as well as how to prevent it.

County-Level Factors Associated with COVID-19 Vaccine Uptake in the U.S.

Grace E. Simpson (Dr. Mark Weaver) Department of Mathematics & Statistics

Since the onset of the COVID-19 pandemic and the emergency approval of vaccines, different areas of the United States have seen differing rates of vaccine uptake among their residents, and we have seen a concerning trend of vaccine hesitancy among many Americans. In our research, we explore the relationships between county-level demographic, socioeconomic, and political factors and the rate of uptake of the COVID-19 vaccine in the United States. While previous studies have used a cross-sectional approach to explore factors related to intention to receive a vaccine, we aim to identify key factors that help to explain why counties differ in their residents' rates of COVID-19 vaccine uptake using a longitudinal mixed-effects logistic regression approach. We obtained data for vaccinations by county over time from the Centers for Disease Control and Prevention and obtained data for potential predictor variables from the Office of the Assistant Secretary of Planning and Evaluation, the United States Department of Agriculture's Economic Research Service, the MIT Election Lab, and the United States Census Bureau, all of which we merged to create a single analysis dataset in SAS. This analysis dataset includes a diverse array of county-level variables for 3125 counties in the U.S., such as voting data, median household income, racial and ethnic makeup, region, and vaccine hesitancy estimates. Results show that many of our selected variables are, in fact, significantly related to vaccine uptake over time. One of the most significant results was the strong positive relationship between a county's proportion of votes for the Democratic presidential candidate in 2020 and its rate of vaccine uptake. Other notable results were the relationships between rate of vaccine uptake and unemployment rate, median household income, and COVID-19 Vaccine Coverage (CVAC) Index, which is a one-time measure of each county's level of concern due to barriers to vaccine coverage. The results of our research could help inform public health policy for future vaccine rollouts in the United States.

Country-Level Factors Associated with International COVID-19 Vaccine Uptake

Rylei W. Smith (Dr. Mark Weaver) Department of Mathematics & Statistics

The World Health Organization declared the COVID-19 pandemic in March 2020. Since then, researchers and drug companies around the world have worked to develop vaccines to alleviate symptoms and slow the spread of the disease. Although multiple vaccines have been approved for use, much of the world's population has yet to be inoculated because of inequitable distribution of the vaccine. Of particular concern is the uptake in low-income countries, which have experienced the highest morbidity and mortality rates during the pandemic but have the lowest vaccination rates. The current study aimed to investigate what factors at a country-level are related to the uptake of these COVID-19 vaccines internationally. To explore this research question, we first aligned and merged publicly available data from multiple online sources, including Our World in Data, the CIA World Factbook, and the World Bank. We used longitudinal mixed-effects modeling to analyze how vaccine uptake occurred over time across 215 countries and territories. Our models included country-level factors such as gross domestic product (GDP) per capita, income group, geographical region, and maternal mortality rate, among others, as potential explanatory variables, with vaccine uptake measured as percentage of the country's population that has received at least one dose of a COVID-19 vaccine as the response variable. We used backwards elimination to select the explanatory variables for our final model such that all remaining variables were significant at the 0.05 level. Results indicate that, at the country-level, vaccine uptake was positively associated with time, education expenditures, location on some continents, and GDP per capita, and negatively associated with unemployment rate and child mortality rate. These model results align with the conclusion that lower-income countries and countries with fewer resources to dedicate to healthcare systems tend to have lower rates of COVID-19 vaccine uptake. In the context of a global pandemic, this has implications for how we develop systems to distribute vaccines to the countries most in need.

Comparing Secondary Mathematics Teachers' Technology Use Across Three Countries

Isabelle J. Stimson (Dr. Aaron Trocki) Department of Mathematics & Statistics

Technology integration in the classroom has been established for years, introducing new teaching styles and execution of pedagogical approaches. Due to the remote learning many schools experienced during the COVID-19 pandemic, technological advancements for teaching have intensified, along with the support these advancements provide teachers. Therefore, the field of mathematics education must develop more accessible ways to assist teachers in utilizing technology. This study sought to determine the impact fluctuating classroom environments, such as virtual, hybrid, and in-person, had on secondary mathematics teachers' ability to teach mathematics within the International Baccalaureate (IB) system, and how these fluctuations affected teachers' ability to promote accessibility, equity, and achievement for students. This research reports on qualitative research and utilized thematic analysis when conducted with IB secondary mathematics teachers in the United States, United Kingdom, and Australia during 2021 and 2022, and consisted of a questionnaire, interviews, and field observations. The questionnaire encouraged the participants to reflect on their experience during in-person and virtual learning and highlighted two educational frameworks, Hughes' 2006 RAT (Replacement, Amplification, and Transformation) Framework and Schoenfeld's 2016 TRU (Teaching for Robust Understanding) Framework. The interviews presented an opportunity for the participants to expand upon their questionnaire responses and communicate more nuanced expositions regarding their teaching experiences with technology in the in-person and virtual classrooms. The field observations created the space to analyze how the use of technology in the classroom impacts students' abilities to understand the mathematical concepts, and whether the teacher's perspective of their teaching aligns with what actually occurs. Understanding the language used by the participants when they reflect on their teaching and students' learning allowed for comparisons across the three countries. Through

analysis, frequency-based themes were constructed from the questionnaire responses to create an evolution of questions for the interviews. These insights led to the creation of the analytical lens used throughout the field observations. Findings from the questionnaire, interviews and field observations will be shared along with implications for the preparation and development of mathematics teachers regarding technology use.

Numerical Simulation of Jellyfish Swimming

Jillian M. Thomas & Atira Glenn-Keough (Dr. Karen Yokley) Department of Mathematics & Statistics

Jellyfish have been previously studied by researchers in order to examine their characteristic swimming patterns. The expansion and contraction of the jellyfish bell generates unique vortex dynamics around the jellyfish. These vortices play an essential role in swimming and searching for food. During swim cycles, vortices rotate against each other to propel the jellyfish forward. This research project uses two-dimensional point vortices to model the jellyfish swimming. The differential equations used to model the motion of the vortices are solved numerically using the fourth order Runge-Kutta method. The goal of this project is to examine the jellyfish's propulsion and maneuvering mechanism. We then examine how this mechanism impacts material transport in the vicinity of jellyfish and the implication for food acquisition by inserting massless particles into the fluid flow. In our work, we observe how the jellyfish and particles around it move through the water as affected by the fluid vortices. These results have significant implications on fields such as bioengineering.

The Relationship Between Sleep Behaviors, Alcohol Consumption, and Mental Health in High School Seniors

Christina Westbrooks (Dr. Svetlana Nepocatych, Dr. Simon Higgins, & Dr. Eric Hall) Department of Exercise Science & (Dr. Mark Weaver) Department of Mathematics & Statistics

Diagnoses of mental health disorders are rising in high school students. Little is known about the relationship between changes in sleep and the development of mental health issues, or whether other lifestyle factors (e.g., alcohol consumption) impact this relationship. Underage drinking is a significant public health concern with 57.8% of high school students reporting binge drinking. PURPOSE: To determine the relationship between sleep, alcohol consumption, and stress as an acute marker of mental health among high school seniors. METHODS: The cross-sectional study included 50 high school seniors (76% female, 17.4±.5 years, Body Mass Index 23±3.2 kg/m2, relative body fat 17.3±12.8%). Characteristics of sleep were measured via the 19-item Pittsburgh Sleep Quality Index (PSQI) and Sleep Hygiene Index (SHI). Stress was assessed using the 10-item perceived stress scale (PSS). The 10-item alcohol use disorders identification test (AUDIT) was used to screen for alcohol consumption. Linear regressions were used to assess the relationship between sleep behaviors, alcohol consumption, and mental health. RESULTS: Significant correlations were observed between PSS and SHI ($r = 0.358$), AUDIT ($r = 0.180$), and PSQI ($r = 0.279$). CONCLUSIONS: These data suggest mental health risk factors may begin to develop during adolescence. Those with a greater number of risk factors may experience increases in adverse alcohol-related behaviors. In addition to alcohol, sleep quality may serve as a key target for behavioral intervention efforts. Underage alcohol consumption was reported by 20% of participants, putting them at moderate risk for an alcohol use disorder in the future.

From "Statcast" to the "Pitch Clock Era": Solving Baseball Analytics Challenges Using Quantitative Data and Traditional Baseball Knowledge

Evan Wu, Nick Ullian, Will Carroll, Teddy Freeman, & Jackie Jovanovic (Dr. Mark Cryan) Department of Sports Management & (Dr. Ryne Vankrevelen) Department of Mathematics & Statistics

This presentation will be centered on the work of the Elon Baseball Analytics Case Competition Team, jointly supported by the School of Communications and College of Arts & Sciences. The case was developed by former Society for American Baseball Research Board President Vince Gennaro. Teams were asked to measure the "impact of incorrect ball-strike calls" and analyze "the ways in which these calls might have affected the final score and outcome of selected games." The idea of "robot umps" and an automated strike zone has grown increasingly popular lately, and this research takes a look at what impact that may have had on two specific games. Using a predictive model and an expectancy matrix, we attempted to individually evaluate the costliness of each incorrect call. We found that the great majority of the most impactful calls were made when a batter had two strikes, where the call was the difference between whether or not the current batter was out. When accounting for the differences between run expectancies for the correct call (versus that of the one on the field), both games would have had a different winner, which demonstrates the weight that incorrect ball/strike calls can have on runs and game outcomes. This research project includes identifying and defining the research question being asked, defining relevant terms, and deciding what data is appropriate and what assumptions must be made. The goal is producing a solution that isn't necessarily the "right" answer, but is a logical, data-based solution. Student researchers employed traditional baseball knowledge, statistical programming, and utilized currently available analytics metrics, both historical and predictive. The case competition provided the students a platform to showcase their skills in front of judges that included major league team employees.

Media Analytics

Dancing Queen and the Idolization of a Teen: How Fifty Years of Lyrics, Media, and Culture Have Influenced the Way Society Views Young Women*

Jessica M. Baker (Prof. Brian Walsh) Media Analytics Program

Music is often used as a means for communicating messages to the public and influencing popular culture. Nationally, over 2/3 of adults aged 18-34 report listening to music on a daily basis (Ferjan, 2023). Due to the widespread nature of music, lyrics that contain sexualization, fetishization, or idolization of young women are perpetuated and accepted as normal (Hall, 2011). This project seeks to understand the historical trends in sexualizing, objectifying, and idolizing lyrics over the last 50 years to better understand the overall effect that these lyrics may have on audiences by analyzing Billboard music data, conducting field research, and using visual media as a supplemental data source. This data will be collected from Billboard archives and then analyzed using R Studio. The lyrical data will be analyzed using text analysis in order to determine if a song contains sexualizing, idolizing, or objectifying lyrics using both a literal lexicon of words and a euphemistic lexicon of words. In addition to the lyrical data, this study also intends to analyze magazines and music videos from the same era to identify instances where teen girls and young women are regarded as sex objects rather than people, using a codex that previous researchers have compiled. Finally, to understand if there is a potential correlation between what is featured in lyrics and audiences' interpretation and sentiment, interviews

and surveys will be carried out to examine the effect of music on audiences beyond their private listening habits and how sexual lyrics affect audience behavior at live venues. The findings from the analysis of the research will be presented as a website, with an ultimate goal of better understanding the sexualization of young women in music both historically and currently, with an emphasis on audiences aged 18-34 to inform media companies and industries.

Music

Understanding Musical Expression: A Rehearsal Technique

Sage Z. Albert (Dr. Cora Palfy) Department of Music

Through the development of a dramaturgical approach, this project explores how an understanding of emotional expression in music strengthens the communication of emotions between the performers and the audience. With knowledge collected from scholarly literature that focuses on musical elements such as melodic form, musical structures, and performance patterns, a detailed analysis of the musical "The Last Five Years" by Jason Robert Brown was completed. This analysis was used to guide a greater understanding of the emotions expressed within the music. Furthermore, upon production of the musical, such found emotions informed performance choices, resulting in the creation of a new rehearsal technique. This technique took on a performance-practice form meant for directors to use in the development of their own musical productions.

More Than Meets the Eye: Harnessing the Power of Sound in Student Film

Nicholas T. Asprea (Dr. Todd Coleman) Department of Music

Sound in film is widely underappreciated by audiences, filmmakers, and film theorists. On a university level, this phenomenon holds true. Courses on film audio only scratch the surface while student filmmakers routinely underutilize and/or neglect the soundtracks of their films. Despite these attitudes, sound can have a substantial effect on the emotional impact and meaning of a film. Through extensive research on sound theory, analysis, and practice, this project seeks to fill educational gaps and serve as both an explanation and demonstration of the transformative power of sound. The creative portion of the project demonstrates these theoretical frameworks and techniques by taking sequences from student films and re-imagining the sound and/or music in contrasting ways. A website houses the entire project, and serves as a resource for student filmmakers to further their understanding of film soundtracks and their creative possibilities. This website can be used by educators, students, and anyone in the broader film community that would like to deepen their understanding of sound.

Performing Arts

Investigating the Application of Anatomical Information on a Dancer's Sense of Technical Execution and Performance

Devyn G. Battaglia (Prof. Lauren Kearns) Department of Performing Arts

Dancing is a complex activity involving simultaneous integration of bodily tasks, spatial awareness, rhythmic patterns, and performance execution. The anatomical underpinnings of movement are rarely

forefront in a dancer's mind, if known at all. Human science studies and dance are highly related in that both focus on efficient use of the body. This project is an educational intervention study aiming to connect anatomical information to a dancer's perceived technical and performance execution. A recent survey shows 83.4% of dancers believe having an injury increased their knowledge of the body (Kozai and Ambegaonkar 2020). Teaching dancers about their bodies before injury could improve pre-preventative skills and understanding. A proven gap exists between dancers' perceived and actual knowledge of anatomy among various genres. (Kotler et al. 2017). Medical professionals have expressed struggle when working with dancers who hesitate to comply with treatment guidelines due to a lack of understanding and knowledge. Dancers also feel these relationships could be improved if the medical professionals understood more about dance, there is work to be done on both sides (Lai, Krasnow, and Thomas 2008). Intentionally setting goals to combine anatomy information with dance movement may have a positive impact on a dancer's perceived execution and this project sets out to do exactly that. My research is an educational intervention study of college dance majors, consisting of a pre- and post-intervention survey and three one-hour sessions. Though the literature review, interventions, and surveys have been designed and approved by IRB, the interventions will take place mid-March. The surveys gauge the participants' anatomy experience and perceived learning styles and if/how their perspective while dancing changed from the sessions. At each session a 15 second dance phrase focused on a specific musculoskeletal region (upper limbs, pelvic region, or lower limbs) will be taught and performed by participants before learning the corresponding anatomical details of that region. A survey will be given about body awareness and perception of learning. After the anatomy lesson, they will perform the sequence again, followed by a survey on how/if their thought process changed after gaining the relevant anatomical information.

Always Room in the Circle: A Re-Imagination of Space for BIPOC Actors*

Kelly Belarmino (Prof. Courtney Liu & Prof. Julio Matos) Department of Performing Arts

Though theatrical settings are largely assumed to be progressive and inclusive, even highly-esteemed Broadway theatres find themselves stereotyping and exploiting their performers of color, making it near impossible to find a theatrical work environment devoid of discrimination. This discrimination reaches beyond Broadway and trickles down into National Tours, Regional theatres, and finally into community and educational settings. In an industry that financially caters to white audiences, what safe space, if any, can BIPOC performers enjoy in their field? This study aims to answer this question through creative process and theatrical form. Fifteen, hour-long interviews of Broadway BIPOC veterans and newcomers were conducted in the winter of 2021 asking performing artists of color what their experiences were in the industry, how they saw their respective races being portrayed, and where they see the industry going in regards to inclusivity. After a careful analysis of the transcriptions, these interviews served as the baseline text for a new work of performance art. The product was a one hour performance in late February of 2023 with adaptations of the words of the interviewees in a theatrical form. By combining song and script, the devised piece of theatre explored the sense of placeless-ness felt among the Broadway BIPOC community, the humor they found within it, and the hope they felt in spite of it. This performance was followed by a group talkback that sought to deliberately carve space for people's opinions to be heard regarding the work.Building upon the principles of Devised Theatre, Theatre of the Oppressed, and Anna Deavere Smith, this project has successfully reimagined the theatrical rehearsal process and product. The rehearsal process of this research forged a unique, and rare "safe space" in which people of color in the performing arts felt empowered to express ideas unapologetically and without fear of judgment. This was achieved through the shared identities held in the rehearsal settings and the ability to deliberately carve ample time out for potentially triggering

conversations regarding race. The piece created from the research works directly counter to the oppression felt in the industry at large.

The State of Dance for Health in the US and the UK*

Lauren M. Davenport (Prof. Lauren Kearns) Department of Performing Arts

Dance for Health is a growing field in both the US and the UK due to the abundance of interest, education, and resources in Dance Medicine and Science. Dance for Health is based on three pillars: dance for mental health; dance for physical well-being; and dance for special populations. All three pillars are foundational to the Dance for Health field, and as such, all three should be equally developed and emphasized. My research extensively defines each pillar of Dance for Health and investigates if there is a discrepancy between the US and the UK in terms of formal education, training certifications, and clinical applications. Thus far, my research has shown that the US has fewer formal degrees and training certifications in Dance Medicine and Science than the UK, however, there are more clinical applications of Dance Medicine in the US. Clinical practice is defined as having to do with the examination and treatment of patients (National Cancer Institute, n.d). Dance for Health may be found in a variety of settings, including private dance studios, public community centers, nursing homes, academic institutions, and in clinical/hospital settings. An essential aspect of my research is defining each pillar and investigating if each pillar receives adequate support in the US and the UK, and if the implementation of public policy is necessary for the continued development of the Dance Medicine and Science field. This research is in the early stages. I am currently engaged in a thorough literature review, utilizing the vast resources available on the International Association of Dance Medicine and Science research engine, the American Journal of Dance Therapy, Safe in Dance International, as well as the One Dance UK resources. Once the literature review is completed, I will conduct a comparative analysis and report my findings on a poster to be presented.

An Exploration of Drag through Theatrical Design*

Riley Gibson (Dr. Susanne Shawyer & Prof. Jack Smith) Department of Performing Arts

The art of drag performance is rooted in decades of historical, underground, and queer identity-building. Though this allows for the most critical questioning of society, one obstacle that this form of performance faces is its accessibility. With the only ‘mainstream’ showcases of the art of drag being “RuPaul’s Drag Race,” most yearning to learn about this craft must personally experience the LGBTQ+ nightlife to pick up tips and tricks from within the community. To expand access to knowledge of the art form of drag, I have chosen to use my technical theater background to approach drag through the theatrical costume design process, to explore what can be learned of drag aesthetics and ideals. This project is structured to (1) allow exploration of creative processes and construction techniques that are involved in drag performance and (2) document the steps that are taken in order to achieve a successful design. These thoughts were documented in design journals, which was compiled to provide a comprehensive manual to the art of drag design. By studying the creative process from a firsthand vantage, I was able to see the similarities between theatrical costume design and drag costume design, as well as recognize where the two processes do not intercept as much. By creating an instructional body of text that will go along with this project, I will hopefully create a sense of ease in the costume shop, by providing a reference for any character that might need to be costumed in a “drag aesthetic”.

Examining the Relationship Between Trained Lateral Bias and Stress Response in Pirouette Habits of College Dancers

Olivia R. Lanter (Prof. Jasmine Powell) Department of Performing Arts & (Dr. Matthew Wittstein) Department of Exercise Science

Dancers often encounter the phenomenon of having a 'good side' and 'bad side,' resulting in a developed leg dominance and preference in their training. Past research has been completed to determine a disproportionate lateral preference in dancers, but psychological effects pertaining to this laterality are yet to be explored. The ongoing study aims to find if a perceptual stress response is elicited when a dancer is required to pirouette, an act of turning on one foot, on their unfavored leg. To begin, each participant (dance major/minor ages 18 to 22 and fully participating in movement classes) completes a self-report survey concerning their dance training history, leg preference, and experience with the phenomenon. Polar Heart Rate Monitors are used to collect heart rate variability data as instructions are given and participants are randomly assigned to their preferred or unpreferred side for primary performance. Participants are led through a warmup and traveling combination focused on pirouettes, with rotation demands increasing. Heart rate variability is analyzed using Kubios Software and statistical analysis of T-tests analyzing correlations between and within-subject groupings. Preliminary data collection illustrates a statistically significant contrast ($p=0.0256$) between the Frequency Ratio which represents Low-Frequency Power/High-Frequency Power measured in Hz/Ms^2 in the preferred vs. unpreferred group. The significant distinction in the Frequency Ratio demonstrates that when dancers are asked to perform pirouettes on their unpreferred side, their sympathetic nervous system becomes active as indicated by an increase in heart rate. This stress response connects to survey data where many participants claimed to have feelings associated with anxiety when asked to turn on their bad leg. Qualitative data in the survey manifests in dancers using negative language to describe how they feel turning on their bad leg such as "nervous," "uneasy," "stressed," "unconfident," and "anxious." The goal of this research is to identify the psychological and physical effects of bias developed in dancers due to dance instruction. As the mental well-being of athletes is often overlooked, this research supports conversations prioritizing not only physical health, but also the cognitive welfare of dancers.

Exploring Paid and Unpaid Theater Internships: Surveying Interns on Their Experiences in Theater

Laura A. McGuire (Prof. David J. McGraw & Dr. Wen Guo) Department of Performing Arts

This research aims to examine the culture of paid and unpaid internships in theater to unveil the reasons behind the rise of theater internships by exposing the interns' experience. With the pandemic putting many internship programs on hold, paid and unpaid theater internships are now being examined closer than ever before due to a new change in the theater industries' mindset on how to make this career livable. Theater workers in a variety of fields are wondering why the culture of unpaid theater internships has become so normalized, especially with some colleges requiring internships to graduate. Through a nationwide survey I conducted in September 2022, responses on participants' perceptions of their internship are recorded and analyzed in a report. Questions such as the location of the internship, possible forms of compensation, and the involvement of the supervisor will help to show disparities between paid and unpaid internships. A date report has been created and listed the demographics of interns in both internships and their opinions on each type of internship. A final report will show the interns' perspectives on their theater internships and what they felt were their benefits and deficits. By utilizing quotes from their responses and statistics from the data report, paid

and unpaid internships will be compared side by side for one of the first times. This report will be able to show what benefits and deficits come from each internship, as well as how feasible these internships can be.

Queering the Stage*

Jack M. Morrill (Dr. Susanne Shawyer & Prof. David McGraw) Department of Performing Arts

Currently, many American theatre organizations use hierarchical structures based on a traditional, heteronormative value system. A consequence of this is theatre that appeals to broad audiences, but the creation of the art often uses harmful practices for the people involved. I ask, how might a queer value system change the way theatrical organizations operate? I defined and imagined a queer theatrical value and practice system, built from queer theory, analysis of scripts, organizational manuals, queer arts festivals materials and marketing, and embodied experiences with queer-identified artists through workshops and performances. Using Design Thinking methods, I developed a queer values guidebook for re-structuring how theatrical organizations operate. I tested my guidebook principles with a qualitative analysis of participants' experiences at a three-part zoom workshop series "How do queer artists create space for themselves?", an in-person Drag workshop, "Critical Drag", and a three-day Queer Arts Festival titled "LUMINOSITY" that I hosted for the Elon community. This queer values guidebook will provide theatres with an alternate model of operating with the goal of creating a space where each individual feels like they can bring their full authentic self to the table and be seen for who they are.

Physical Therapy Education

Bike Pedal Adapter for Children with Motor Impairments: 3D Printable and Accessible*

Ashleigh N. Azan (Dr. Sirena Hargrove-Leak) Department of Engineering & (Dr. Paula DiBiasio) Department of Physical Therapy Education

Many children learn how to ride a bike at a young age, exercising and gaining independence. Children with motor control difficulties may have a harder time moving their legs in the controlled, circular motion necessary, which often makes it challenging to maintain their feet on the pedals and thus control of the bike. Therefore, they may need assistance with riding a bike. One common therapeutic approach that helps with pedaling as well as developing motor control and strength in the legs is to attach the children's feet to the pedals using an adapter. There are only a few, expensive commercial options for bike pedal adaptors and most caregivers do not have the tools to fabricate adaptors on their own. By combining the engineering design process and the human-centered design process, a pedal adaptor was designed to assist children with motor control difficulties. The accessibility of this adaptor will allow children to bike for physical therapy or leisure. Every detailed change in prototypes was made with an effort to create a device that is safe and useful. The device was designed to allow for use with any bike pedal. It was created using the computer-aided modeling software, SolidWorks and can easily be 3D printed and completed with attachment hardware available at any home improvement store. As a result, an inexpensive and accessible bike pedal adaptor was created for children with special needs so they can experience the joy of riding a bike along with the benefits of being active.

Pediatric Movement and Development Through an Engineering and Physical Therapy Lens*

Gisselle Garcia-Jose (Dr. Sirena Hargrove-Leak) Department of Engineering & (Dr. Paula DiBiasio) Department of Physical Therapy Education

Retrieving everyday items is not a concern for most. Now, consider a young child with shortened upper extremities who has difficulty retrieving items from the floor. Pediatric reachers or grabbers for individuals with similar issues regarding physical mobility are commonly available but require substantial grip strength. This project seeks to develop a pediatric reacher compatible with their grip strength. By reverse engineering the mechanics of a traditional grabber, one can understand the required force for movements. The objective is to provide the child with a device to retrieve items from the ground and allow the child to have enhanced independence. The approach began by interviewing the child's family to gather information about their daily routine, physical limitations, and desires for the product. To establish the qualifications the product needed to satisfy, emphasis was placed on defining the problem. Consistent testing and prototyping assisted in the compatibility and personalization of the product to meet the child's needs. The final prototype of the product will be a pediatric reacher that is attached to a harness support system and allows the child to develop movement and independence.

Putting the Right Foot Forward: The First Women's Pole Vault Spikes*

Madison K. George (Dr. Scott Wolter) Department of Engineering & (Dr. Shefali Christopher) Department of Physical Therapy Education

Despite evidence that women's feet are proportioned differently than men's and react differently to load, sports shoes are still designed without attention to women's lower extremity biomechanics and there are no women's pole-vaulting shoes. This project includes a biomechanical study comparing men and women's foot force distribution during a pole vault approach, mechanical and material evaluations of existing track and field spikes, and the development of women's pole vault spikes. The biomechanical research study provides evidence of male and female foot force patterns which was used to determine design parameters such as spike placement and heel design of the midsole and outsole of the new shoe. The mechanical evaluation included energy return measurements of existing pole vault spikes to determine effective materials for the shoe and X-ray diffraction technology was used to identify existing pole vault shoe material makeup. A women's pole vault shoe was constructed to female foot dimensions and pole vaulter foot force distribution during a runway approach. This study provides a methodology for determining effective shoe designs for specific users, contributes gender differentiable data to the footwear industry, identifies possible materials used in existing pole vault shoes, and provides a women's pole vault shoe engineered to enhance performance, prevent injury, and promote gender equality in sports.

Incentivizing Walking for Children with Cerebral Palsy: The Singing Walker*

Lily Helm, Anna Kauffman, & John O'Donnell (Dr. Paula DiBiasio) Department of Physical Therapy Education & (Dr. Sirena Hagrove-Leak) Department of Engineering

The goal of this project is to develop a walker-attached device that will play music when the walker is moving and stop playing music when the walker stops. This device will have the potential to change the lives of children with cerebral palsy, who can learn how to walk independently if they have the

proper therapy and work to develop their muscles. The younger a child with cerebral palsy begins using a walker, the more likely they are to learn how to walk independently. It can be frustrating and challenging for children to stay motivated to practice walking, so it may often feel like a chore. This can lead to the child refusing to use their walker. The goal for this project is to turn walking practice with the walker into a fun activity that the child can look forward to rather than an unpleasant task. The design process and prototypes will be showcased. The working prototype consists of an Arduino attachment that is programmed to play music when the walker's acceleration is a non-zero number. By creating this device, we will be able to make using a walker more enjoyable for kids and in turn, allow them to grow the muscles to be potentially able to walk independently.

Cognitive Performance and Dual Tasking in Collegiate Athletes

Amber Olson, Amy Smelko, & Ashlyn Loring (Dr. Srikant Vallabhajosula) Department of Physical Therapy Education

Introduction: Previous studies have investigated single and dual task conditions with tandem gait amongst collegiate athletes with a history of concussion to examine motor performance, but there is limited research on cognitive performance associated with tandem gait within this population. The information from this study can provide insight into how cognitive function is affected when an athlete is performing challenging motor tasks like tandem gait. The purpose of this study was to evaluate how cognitive accuracy during tandem gait is affected based on sex and task complexity. The addition of a simultaneous cognitive task during a tandem gait assessment may affect performance due to attention demand being elevated. ***Methods***: Healthy collegiate athletes (31 female and 25 male) performed four trials each under three conditions (listed in increasing order of task complexity): a stationary cognitive task, cognitive task during forward tandem gait, and cognitive task during backward tandem gait. The order of conditions was randomized. Cognitive tasks consisted of counting backwards by six or seven from a given number, listing the months backwards, or spelling a selected five letter word backward. A 2-way ANOVA was conducted between sex and task. ***Results***: Males showed significantly higher cognitive accuracy while stationary than females across all three tasks (stationary, male: 95.4±1.2%, female: 89.0±1.1%; forward tandem, male: 95.3±1.9%, female: 88.9±1.7%; backward tandem, male: 93.8±2.0%, female: 88.4±1.8%; all $p < 0.001$). No significant difference in cognitive performance was found between forward and backward tandem gait while dual tasking. No significant sex x task interaction was found. ***Discussion***: These findings contradict prior studies where female athletes scored higher on cognitive tasks compared to males. As the task complexity increased from forward to backward tandem gait, participants seemed to focus more on cognitive task. ***Conclusion***: Cognitive accuracy while performing tandem gait could be dependent on both sex of the participant and task complexity.

Affordable Medical Equipment for Cerebral Palsy: A Pediatric Reverse Walker made of PVC

Emmeline Roberts (Dr. Sirena Hagrove-Leak) Department of Engineering & (Dr. Paula DiBiasio) Department of Physical Therapy Education

We live in a world where many people with motor impairments struggle to find easily accessible and useful equipment to aid them. Often solutions such as wheelchairs and walkers are inaccessible to those who need them due to their high cost; a typical reverse walker, for example, can cost anywhere from $200 - $500. This project sought to design a reverse walker out of PVC tubing to assist a young boy with cerebral palsy in learning to walk. I have worked closely with him using durable, cheap, and

lightweight products to build a personalized adjustable reverse walker that is adapted to a mobility issue in his left hand. The presentation will walk attendees through the design and building process along with the results of my product that is focused on human centered design along with feature results from product testing. Successful completion of this project will not only serve as an inexpensive customized mobility for the current client but will provide proof-of-concept for future resource-limited people who may require mobility assistance.

Modifying Ride-On Cars for Children with Disabilities*

Sammy C. Tucker, Gloria Kaso, & Allee R. Seering (Dr. Sirena Hargrove-Leak) Department of Engineering & (Dr. Paula DiBiasio) Department of Physical Therapy Education

Children that are born with mobility limitations are unable to enjoy some toys, especially at a young age. At this early stage in life, it is suggested that children play with toys for growth and development, so children with limitations are not receiving that significant growth. We have the opportunity to grant a child that growth by modifying a children's ride-on vehicle to support the child's needs. Literature supports the use of modified ride-on cars as part of the early developmental play to encourage the development of social-emotional and mobility skills in young children with developmental differences. Our goal is to create a final product usable for the child, grant the child additional mobility and sociability, strengthen/increase grip strength, upper body control, hand-eye coordination, and depth perception, and lastly design the car to fit the clients/child preferences, which includes colors, decorations, and add-on materials. This presentation will provide insight into the modifications we made to the car in order to promote mobility for the children we are working with. Some design ideas and approaches that we found a rational connection with our project were Made4Me, Bella's Bumbas, and Amputee Vehicle Modification. Our focus from the Made4Me project and inspiration was communication with families and the child. By eliminating the use of petals, drivers use their arms for acceleration and braking with either a switch or button. Reverse engineering an amputee-adapted vehicle will translate well into this project. We are rewiring the pedal to a button, and providing addition supports and harnesses. These modifications will be done in the engineering workshop. Results of this project will provide evidence for the increase of child development when given the opportunity to play independently. With the modifications made, the children's ride-on vehicle will be a great addition to our child's daily life, as well as the family. This will be a very large step for our child's development, and the families. With the growth of the child's abilities and social interaction, the child's family will be able to expand newer horizons regarding the user.

Physics

Computational Modeling of Active Magnetic Films

Catherine M. Capodanno (Dr. Ben Evans) Department of Physics

Soft magnetic polymers may be useful materials for a variety of applications that can benefit from remote actuation of flexible structures, such as soft robotics. Recently, engineers have developed sheets of soft magnetic polymers cut into a pattern, which they can then manipulate using magnetic fields. By carefully applying time-dependent magnetic fields, they can cause the films to transport non-magnetic objects on their surface. Magnetic polymers are very complex materials and so it is challenging to predict their behavior, and yet such predictions are critical to employing and optimizing such systems. In this work, we learned how to utilize COMSOL Multiphysics Finite Element Analysis

(FEA) software to model these actuating magnetic fields, and the output from COMSOL then informed a predictive model built in Matlab. Together, the use of these models has allowed us to gain a greater understanding of the processes involved in the manipulation of these films, and the fundamental phenomenology responsible for the movement of the magnetic polymers. The models that we created are also beneficial in identifying problem areas, solving future geometries, identifying new behaviors, and optimizing current systems. These models allowed for us as a team to gain a greater understanding of how the magnetic polymer material behaves, and therefore we were able to more efficiently and effectively manipulate these materials for a variety of purposes.

Design and Simulation of a Resonant Swing Set

Grady S. Cooke (Dr. Martin Kamela) Department of Physics

The goals of this project were (i) to design possible adjustments in a commercially available swing set to make it a coupled resonator, and (ii) to simulate the proposed designs under various conditions to predict the swing's behavior. A coupling bar connected two parallel swing sets such that the motion of one swing is transferred into motion of the other swing - the swings are coupled oscillators in that the oscillation of one swing encourages the sympathetic oscillation of the other swing - the two swings are then allowed to resonate, wherein the oscillation of one swing allows the other swing to oscillate at a greater amplitude when a certain resonance frequency is achieved. The goals mentioned are founded on the notions that a coupled swing set may provide users with a unique and enjoyable experience as well as the opportunity to better understand the effects of resonant phenomena. The various conditions simulated via Mathematica, a computer program, included lengths between swings and coupling bar, varying from 0-0.5 meters, and masses added to each swing, from 0-100 kilograms (representing the mass of a person on the swing). Our findings from the simulation helped develop our conclusion that the rate of transfer of energy through the oscillators (swings) increases as the distance from the coupling bar to the swings decreases. User experience as well as simulation results were used to determine the optimal placement of the coupling bar.

Multiwavelength Diagnostics for Active Intermediate Mass Black Holes in Dwarf Galaxies

Samantha J. DiRenzo (Dr. Chris Richardson) Department of Physics

Black holes (BHs) are objects where gravity is so strong even light cannot escape. Stellar mass BHs measure between 3 and 10 solar masses, mass relative to that of our Sun, whereas supermassive black holes (SMBHs) have a mass range of 0.1 million to 10 billion solar masses and reside in the center of most galaxies, including the Milky Way. Intermediate mass black holes (IMBHs) are those within masses 100-10,000 times that of our Sun and fall between these classifications. The formation process of SMBHs is unclear, although it is proposed that SMBHs form through BH evolution, originating as stellar mass BHs and growing over time with their host galaxy. Since less massive galaxies host less massive SMBHs, IMBHs could be linked to dwarf galaxies, which are about 10 times less massive than the Milky Way. IMBHs in isolation are difficult to identify, however IMBHs actively accreting material from their surroundings result in a dwarf active galactic nucleus (AGN). Spectroscopy, the analysis of the intensity of light at different wavelengths when produced through light and matter interaction, can distinguish dwarf AGN from pure star forming (SF) regions. Diagnostics used from emission lines, where intensity strongly peaks at a specific wavelength, allow for further analysis of various properties of the galaxy. In specific cases, mid infrared (mid-IR) spectroscopy aids in the identification of dwarf AGN or SF galaxies, although strong star formation and interstellar dust often

lead to the possible misclassification of dwarf AGN candidates as SF. Different emission line diagnostics result in varying classifications of a dwarf AGN or SF galaxy, highlighting the importance of referencing a variety of diagnostics in a particular galaxy sample. In crossmatching archival mid-IR spectroscopy with optical spectroscopy in two dwarf galaxy catalogs, we created a new sample of objects with multiwavelength observations that allows for more robust classification of dwarf AGN or SF galaxies. Our results produced 153 matches. By visually comparing the objects in each match and introducing a system for identifying false positive matches, we eliminated galaxies with mislabeled spectral matches, narrowing the sample size.

Assessing the Utility of WISE Photometry in Identifying Dwarf AGN

Thomas Vivona & Jordan Wels (Dr. Chris Richardson) Department of Physics

Stellar-mass black holes (BHs), objects with masses of less than 100 times the mass of the Sun, are commonly created after the explosion of high mass stars. On the other hand, supermassive black holes (SMBHs) with masses greater than a million times the mass of the Sun can be found in the centers of all large galaxies. Intermediate mass black holes (IMBHs) between these mass ranges are surprisingly rare. SMBHs appear hundreds of millions of years after the Big Bang, which indicates that they formed in the early universe. Most theories of how SMBHs evolve include a stage where they are an IMBH. Dwarf galaxies show promise for finding IMBHs that were evolving into SMBHs because they resemble galaxies of the early universe. However, detecting IMBHs in dwarf galaxies is difficult. A prominent way of detecting BHs is to look for active galactic nuclei (AGN) which are bright BHs due to the gas and dust around them releasing radiation. One can identify AGN using photometry, which is the summation of light intensities over different wavelength ranges. Comparing resulting photometric values in each wavelength band can reveal signatures for AGN activity. In particular, infrared (IR) photometry that uses the W1, W2 and W3 bands from the Wide-field Infrared Survey Explorer (WISE) has been successful in identifying AGN with SMBHs. This study uses code that simulates dwarf AGN WISE photometric values and tests IR photometry's ability to detect dwarf AGN. A majority of the simulations are not flagged as AGN using WISE photometry. The parameters that result in a correct classification of the dwarf AGN are mostly characteristic of dwarf AGN. Our simulations broadly agree with dwarf AGN samples found using the Chandra X-ray Observatory and the optical Hubble Space Telescope. However, they cannot recreate observations from other AGN catalogs. In the future, we seek to expand the range of the simulations that are classified as AGN and provide unique constraints on the physical conditions within those galaxies, which would make progress in understanding the hosts of IMBHs.

Investigating the Diagnostic Potential of Optical Emission Lines for Finding Dwarf AGN

Jordan Wels & Thomas Vivona (Dr. Chris Richardson) Department of Physics

Understanding the evolution of intermediate mass black holes (IMBHs) may help to piece together a better timeline of the early stages of the Universe. IMBHs are between one hundred and ten thousand times the mass of the Sun. Dwarf galaxies, which are around one hundred times smaller than the Milky Way, are thought to be very similar to early universe galaxies because many larger galaxies were formed by dwarf galaxies merging. Since dwarf galaxies are proxies for early universe galaxies they are of interest to astronomers who try to understand galaxy evolution. Dwarf galaxies serve as a test bed for understanding how IMBHs evolve into the supermassive variety (a billion times the mass of the Sun) found at the heart of massive galaxies. Photoionization simulations of dwarf galaxies

containing actively accreting black holes continue to be a useful tool to analyze IMBHs through emission line predictions. Emission lines consist of unique wavelengths of light from specific elements, similar to an element's own fingerprint. These simulations, however, make many assumptions about physical parameters without observational constraints. These parameters include information about the black hole (e.g., mass) but also its surrounding environment (e.g., gas density). One pertinent constraint is the relationship between the mass of a black hole and its host galaxy. We have interpolated emission lines from simulations of varying mass black holes that were made through the spectral synthesis code, Cloudy. This process uses two previously known empirical relationships to create a black hole mass to elemental abundance relationship, thus removing one parameter. Using ratios of different emission line strengths from the interpolated measurements, our results show that diagnostic diagrams involving emission from doubly ionized helium have the best potential to find active IMBHs in dwarf galaxies. We also show that emission line intensity ratios including emission from neutral oxygen are the best at differentiating black hole masses and show the greatest sensitivity to the relations between black hole mass and galaxy elemental abundance. By understanding how these ratios evolve with different parameters, the process of looking for IMBHs will become significantly easier.

Magnetic Hyperthermia Therapy Using Microparticle-Silicone Composites for Implantable Medical Devices

Alexa D. Roveri (Dr. Benjamin Evans) Department of Physics

Implanted medical devices such as joint replacements and implants following mastectomy have limited lifetimes, and their most common cause of failure is due to the growth of bacterial biofilms on their surfaces. One way to address this issue is by heating the surface of the device within the body to eliminate the bacteria, preventing infection and inflammation. The heat, however, needs to be delivered directly to the surface without affecting nearby tissues. Localized heating may be accomplished by inserting magnetic particles directly into the implanted device. Our lab has developed a novel magnetic silicone composite that can be heated remotely with alternating magnetic fields which are able to pass through healthy tissue with no effect. In this study, we inserted the magnetic silicone into a material that mimics human tissue, known as a tissue phantom, which was then used to investigate the effect of heating on surrounding tissue. The tissue phantom was constructed from polyacrylamide gel. A thermochromic dye was incorporated into the phantom to measure temperatures upon heating. The color change occurred on the surface and within the phantom, resulting in visual temperature profiles. These profiles help determine if substantial tissue damage resulted from magnetic heating. Preliminary results indicate that to protect surrounding tissues, heating should be applied for periods no longer than 75 seconds. Our expectation is that this research may contribute to a novel method of addressing bacterial films in implanted medical devices, leading to longer-lasting devices and better outcomes for patients.

Political Science & Policy Studies

Climate Culture: Comparing Environmental Attitudes, Environmental Policy, and Cultural Context

Sara K. Arora (Dr. Aaron Sparks) Department of Political Science & Policy Studies

Worsening natural disasters place the Climate Crisis as a top priority in domestic and international policy. In democracies, we expect climate policy to reflect public opinion as we expect policy to reflect representation. Denmark is a leading country in environmental policy, especially in the energy sector, and public opinion often favours environmental protection. In contrast, the United States has been a laggard on climate policy and public opinion shows more polarized environmental attitudes. In North Carolina, in particular, the environment is a politically divisive issue, as it is a purple state that is often impacted by hurricanes and sea level rise. Individualism versus collectivism is a significant cultural dimension and the distinction between horizontal and vertical to the individualism-collectivism scale adds an important layer of difference. This study examines how cultural context drives the difference in environmental attitudes between Denmark and North Carolina by asking how environmental attitude mediates the relationship between cultural attitudes and policy support. We additionally conduct a survey experiment to see if these cultural lenses can be activated in a way to encourage greater support for climate policies within these two distinct samples. Data collection for NC is complete, and the Denmark survey is in the field. We will test our hypotheses with moderation-mediation models and structural equation modeling according to a pre-registered analysis plan.

Meta-Analysis of Usage of the NEP, CNS, and EID to Predict Pro-Environmental Behaviors

Nicole Cason & Sara Arora (Dr. Aaron Sparks) Department of Political Science & Policy Studies

Environmental attitudes have been measured by researchers for decades using various scales to understand how and why people potentially act in an environmentally-conscious way or not. The New Ecological Paradigm (Dunlap et al 2000), Connectedness to Nature Scale (Mayer and Frantz 2004), and Environmental Identity (Clayton 2003) measure have all been widely shown to predict pro-environmental behavior. Recent work shows the CNS to be a stronger predictor than the NEP of 13 public and private behaviors (Sparks et al 2020), however there has not been any meta-analytic comparison of these scales. We hope to better understand through this meta-analysis how environmental attitudes have been measured over time and the predictiveness of each scale for pro-environmental behaviors across all studies, so future research is able to utilize the most appropriate scale in their analysis. Our methodology follows the PRISMA-P protocol for meta-analysis by Moher et al (2015). We lay out several key questions in our methodology that we hope to answer with this meta-analysis: How has the use of each scale changed over time? Does effect size vary based on type of pro-environmental behavior? Which measure shows stronger correlation with behavior across cultures? How has each measure's efficacy changed over time? Are the measures sample-dependent? Based on the literature, we hypothesize: The NEP will be the weakest predictor of pro-environmental behavior; NEP and CNS will be weaker than EID in collectivist cultures based on work by Eom et al (2016); All three measures will generally perform better in industrialized Western countries because that is where they were initially developed, even though they have been found to work globally; All three have become weaker predictors over time as item language becomes less relevant or more obsolete. Findings from this project will support the research base by highlighting the relationship between different environmental attitude scales and pro-environmental behaviors.

Examining Media Coverage of Local Reparations in Evanston, Illinois

Alicia G. Clanton (Dr. Jessica Carew) Department of Political Science & Policy Studies

In March of 2021, the city of Evanston, Illinois became the first in the nation to establish a local Black reparations program. Titled the Restorative Housing Program, it provided a $25,000 housing grant to

16 Black residents in recompense for the city's past of housing discrimination. This marked a new development in the long fight for Black reparations, and its reception may pose implications for similar programs in other locales. Black reparations have always been a topic of heated controversy, and this particular program has drawn debate over accusations that it does not reach far enough. The goal of this research is to analyze news media narratives surrounding Evanston's reparations program. Digital articles published from March 2019 to June 2022 were selected from a collection of local and national news sources, and a content analysis will be conducted using the coding software Dedoose. The results of this study may hold insights regarding how media messaging may influence public opinion on the long-debated subject of reparations.

Exploring the Differences Between Lower Federal Court and Supreme Court Opinion Writing of Female Justices

Abigail M. Dumas (Dr. Elisha Savchak-Trogdon) Department of Political Science & Policy Studies

Scholarship has shown important variations between white male and female and non-white judges within the United States federal courts. Scholars have also established that structural differences within the U.S. federal judiciary hierarchy matters for how judges do their jobs. However, we know little about the experiences of female U.S. Supreme Court Justices' opinion writing in comparison to their opinion writing on lower federal courts. This study explores the ways in which female U.S. Supreme Court justices' opinion writing has shifted from their time on federal appellate courts to the Supreme Court. By analyzing the judicial opinions of three female U.S. Supreme Court justices (Amy Coney Barrett, Sonia Sotomayor, and Ruth Bader Ginsburg) and their use of language, tone, and opinion length, we will be able to begin to understand whether any differences exist between opinion writing on federal courts. In this project, I collect a unique dataset of their majority opinions on both the U.S. Court of Appeals and U.S. Supreme Court. From there, I identify several important variables (case name, case citation, date delivered and majority size) within their written opinions and use Linguistic Inquiry and Word Count (LIWC) to analyze and code for length, types of language used, and tone.). While data collection is still in progress, I expect to find an identifiable difference between the opinions written on the Supreme Court by the aforementioned justices, compared to the opinions they wrote while serving on the federal appellate courts. Understanding the way in which female justices construct their opinions will allow us to acknowledge the differing expectations of males and females in high positions of power.

Policy Solutions Waiting to Be Seen: Applying Intersectionality Policy Process Analysis to State Anti-Poverty Programs*

Amaya M. Gaines (Dr. Dillan Bono-Lunn) Department of Political Science & Policy Studies

This paper examines fifteen years of policymaking around welfare reform and Temporary Assistance for Needy Families (TANF) using a novel intersectional policy analysis design. Individuals located at the juncture of multiple social identities often encounter hyper-visibility of single components of their identities as well as the invisibility of their layered experiences. Given the inseparability of welfare policy and social identities including race, gender, and class, it is imperative that an intersectional lens be applied to anti-poverty policies. Despite the recognized utility of intersectionality in policy analysis, there is a lack of research that explores the varied ways in which people experience anti-poverty policy based on intersecting identities. This research employs the Intersectionality Policy Process Analysis (IPPA) model (Bishwakarma, Hunt, and Zajicek, 2007) to assess state-level variations in Temporary

Assistance for Needy Families (TANF) in a comparative case study of six U.S. states (California, North Carolina, Louisiana, New York, Illinois, and Texas). The IPPA model examines each phase of the policy process—agenda setting, formulation, implementation, and evaluation—to determine the extent to which an intersectional approach is needed. During the 1996 welfare reform era, prominent stereotypes like the "welfare queen" weaponized the intersection of race, gender, and class-- often providing the ideological justification for social policies that produced inequitable and oppressive outcomes (Hankivsky & Cormier, 2011). Qualitative and quantitative analysis using local news coverage, Census data, and TANF eligibility and benefits data from the Welfare Rules Databook (Urban Institute, 2019) highlights consistent racialized, gendered, and anti-poor framing of welfare receipt, which is reflected in the formulation and implementation of state TANF policies. Consistent with earlier stages of the policy process, differential experiences of poverty and anti-poverty policy across social groups are evident. This research emphasizes the importance of an intersectional policy analysis framework that is accessible to policymakers and accounts for the lived experiences of individuals facing layered forms of marginalization.

The Biden Campaign and the Youth Vote: Evidence that Social Media and Progressive Climate Policy Attracted Younger Voters

Hailey Kennedy (Dr. Aaron Sparks) Department of Political Science & Policy Studies

A September 9, 2020 article in the Washington Post reported that Biden was struggling to excite younger voters. According to a Pew poll in October of 2020, 68% of likely Biden voters rated climate change as "very important." A March 2021 article in Wired describes the climate activism of TikTok users. Evidently, younger generations utilize social media platforms and groups much more frequently than other generations. Moreover, they are also, generally, much more progressive on issues related to climate change and environmental justice. Thus, it is for these reasons that Biden's presidential campaign required the success of attracting younger, climate-oriented voters. Lastly, it is the purpose of this research to investigate what effects can be found for the campaign trying to mobilize young climate voters through social media engagement. To test these claims, we first turn to the ANES 2020 data and find mixed evidence for the effects of social media on support for Biden. Then to try to better determine causal effects of social media and climate campaigning we collected an online sample through prolific. The embedded experiment did not show any effect for participants viewing a pro-Biden and climate video, and only mixed support for reading a transcript of the video. Regression analysis reveals that Biden's support is significantly impacted by the respondent's views on climate change, even while accounting for partisanship and ideology. Moreover, age and climate views show an interactive effect. However, there do not seem to be strong effects of social media usage in being key to persuading young voters.

Evaluating Colombia's Justice and Peace Law Using a Restorative Justice Framework

Elissa M. Rizzo (Dr. Damion Blake) Department of Political Science & Policy Studies

In the late 1990s, Colombia was nearly a failed state (Beittel 2019). Periods of violence between political factions, paired with the emergence of insurgent and drug trafficking activity, and later failed peace agreements all accumulated, quickly wreaking havoc on the state. The Clinton administration of the United States government responded with Plan Colombia in 2000. Money funneled from US Congress to the Colombian state attempted to strengthen statehood and combat drug activity. Within this plan emerged the Justice and Peace law, which grants lesser sentences for ex-paramilitaries and

guerillas who confess to their crimes. Although advertised to be victim-oriented, the literature suggests conflicting conclusions, regarding the extent to which the Justice and Peace law reflects restorative justice goals. Furthermore, definitions of restorative justice in the literature do not always coexist. This research conclusively outlines restorative justice values and methods in order to identify the successes and shortcomings of the Justice and Peace law. In this project, I evaluated more than 20 restorative justice scholars to create an outline that details where these thinkers agree and disagree. My original framework includes seven main categories: definition, victim needs, offender needs, offender obligations, role of the community, role of the state, and potential problems. I also include in this study several subcategories which define restorative justice. This project not only presents a uniformed method of evaluating laws deemed "restorative" but also contributes generally to literature surrounding Plan Colombia and narcotics trafficking and violence in Colombia. This research finds that the Justice and Peace law reflects some restorative justice methods identified in the framework, but as a whole cannot be accurately categorized as restorative.

Examining Undercoverage in Rural Areas of the United States in Survey Methodology

Ashley N. Vann (Dr. Jason Husser) Department of Political Science & Policy Studies

Since the 2016 election cycle, political polls and surveys, particularly those predicting elections, have faced enormous scrutiny for their failure to accurately predict several key races, especially the Presidential race. Since that time, many theories have been suggested that may explain the errors in election polling in recent years, with some being discredited, and others applying only to specific political polls. This study posits that, rather than specific issues in election polls, the errors seen in 2016 and 2020 were, in fact, a symptom of a much larger, systemic issue in survey sampling: that surveys, at large, undercover rural populations and fail to account or weight for this undercoverage. This research examines whether or not rural undercoverage is a statistically significant issue in the General Social Survey (GSS), in particular, as the GSS is held up considered to be the "gold standard" in survey research within the social sciences; if the GSS does suffer from undercoverage issues, it could indicate that the same issue pervades many other significant surveys, including political polls. To examine rural coverage (or lack thereof), the GSS samples from 2000 to 2010 were compared to the U.S. Census data, specifically looking at the proportion of the samples coming from rural or urban areas in the GSS and the recorded population proportions for those areas in the Census. Through this research, two key shortcomings were identified. Firstly, that there was statistically significant evidence that the GSS undercovered rural populations compared to the Census benchmark, and, secondly, that the GSS weighting variables actually increased this discrepancy, making the problem worse. These findings could have far-reaching implications on the field of survey research, as a whole, highlighting the need for further research and work to identify and help to correct the issues that rural undercoverage may cause.

Psychology

Exploring Antecedents of Team OCB in Collegiate Sports

Maria Ahm (Dr. Christopher Leupold) Department of Psychology

The current study explores organizational citizenship behavior (OCB) at the team-level in collegiate sports. OCB was first formally introduced by Organ (1988) who defined it as "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and in the aggregate

promotes the efficient and effective functioning of the organization" (p. 4). Since its inception into academic literature, OCB has been one of the most often studied variables in organizational behavior research and consistently found to predict positive performance and socioemotional outcomes for organizations and the individuals in them. OCB research has historically been examined as an individual-level variable within a traditional work organization context; however, recent researchers have begun to consider team-level OCB within an athletic team context. Given the considerable commitments and resources invested into collegiate athletics by athletic departments and their student-athletes, it is important to identify means to enhance not only athletic performance, but overall team and student-athlete experiences. The current study examined four potential antecedents of OCB at the team level: Leader-member exchange (LMX; i.e., relationship between a student-athlete and their head coach), team-member exchange (TMX; i.e., relationships among their teammates), athlete satisfaction (i.e., general positive feelings about their athletic experience), and group environment (i.e., their perception of and attraction to the team). Via an on-line survey methodology, data were collected from 139 (93 females, 45 males, 1 other) 18–24-year-old NCAA Division I student-athletes across gender and nine different sports teams and examined to determine each variable's relative influence on team-level OCB. After controlling for demographic variables, a hierarchical multiple regression analysis found that the relationships between team-level OCB and TMX (β=.47) and team environment (β=.26) were statistically significant at the $p < .05$ level, whereas neither LMX nor athlete satisfaction accounted for significant incremental variance. Additional analyses, limitations, and implications of these findings are discussed.

Disclosure Issues for Faculty with Learning Disabilities*

Sophia Aimone (Dr. Alexa Darby) Department of Psychology

Individuals with learning disabilities (LD) are graduating from graduate and professional schools and entering professions such as law, medicine, and the professoriate in increasing numbers (Hiscock & Leigh, 2020; Neca et al., 2020). While some research exists on lawyers and doctors with LD, very little research has focused on college professors with LD (Hiscock & Leigh, 2020; Neca et al., 2020). The purpose of this study was to explore whether higher education faculty with LD did or did not disclose their disability in the workplace; to whom, if anyone, they disclosed; and their reasons for disclosure or non-disclosure. Ten white female faculty members from multiple U.S. institutions participated in a one-hour semi-structured Zoom interview asking about disclosure?. The sample consisted of 10 white female participants who worked in the disciplines of STEM, education, psychology, and sociology. Interviews were transcribed verbatim with identifiers removed. Inductive data analysis involved coding each transcript and looking for patterns across transcripts. Findings showed that six participants reported disclosing their LD to colleagues and/or students. Only one participant reported disclosing to their chair or dean, and none requested ADA accommodations through Human Resources. Faculty chose not to disclose because they believed their disability did not affect their work, because they did not feel comfortable sharing the information with colleagues or students, because they had experienced previous discrimination due to their disability, or because they feared discrimination due to the disclosure. Two participants disclosed their LD in their job interviews because their work deals with people with disabilities and this would therefore be seen as an asset. One faculty member was denied the choice of disclosure when her advisor disclosed her LD during a reference check. Others disclosed to colleagues and/or students as a way of explaining problems with their written expression. With a growing number of college students requesting disability accommodations, some faculty feel the need to support these students by sharing that they, too, have a disability. While faculty are becoming more comfortable discussing their learning disabilities with colleagues and students, however, they remain

reluctant to disclose to administrators and/or Human Resources for fear of discrimination or negative career consequences.

Exploring Experiences of Sexual Harassment on Social Media Among Emerging Adults*

Jay E. Bennett (Dr. Ilyssa Salomon) Department of Psychology

Sexual harassment has been researched extensively, largely focusing on harassment that happens in person at schools and the workplace (Hill & Kearl, 2011). The rapid development of social media over the past two decades introduces new contexts in which sexual harassment may occur. Recent data suggests that 33% of women and 11% of men have experienced sexual harassment online (Pew Research Center, 2021). While researchers have begun exploring forms of sexual harassment online, challenges remain in defining sexual harassment in the online sphere and understanding how people respond to it (DeMatteo et al., 2017; Ståhl & Dennhag, 2021). The study utilized Braun and Clarks' (2006) reflexive approach to thematic analysis, which involved identifying, defining, and analyzing recurrent themes. This qualitative study sought to explore what young adults consider sexual harassment on social media, and how they respond to instances of sexual harassment online. Participants were 96 undergraduate students from a large university in Kentucky (88.5% cisgender women; M_{age} = 19.12, SD_{age} = 1.84). As part of a larger study, participants answered open-ended questions about their experiences in an online survey. Two primary types of harassment emerged from the data: cyberbullying and sexual harassment. Within this study, cyberbullying was defined as hostile behavior intended to cause harm that occurs online, while sexual harassment referred to a more specific form of online harassment with sexual or gendered components. Types of cyberbullying participants experienced included acts of relational aggression (e.g., spreading rumors), threats of violence, name-calling, and appearance-based insults. Types of sexual harassment included unwanted romantic or sexual contact, harassment around sending or requesting explicit photos, and requests for paid sexual services. Two primary themes emerged in how participants responded to harassment: active and passive responses. Active responses involved directly addressing the harassment, including confronting the aggressor, reporting them, or conceding to their requests. Passive responses involved removing oneself from the situation by ignoring the harassment, blocking the aggressor, or deleting social media. The findings of this study can inform parents on how to educate their children and adolescents on the safe navigation of social media in the constantly evolving internet sphere.

When Language Moves What Matters: Effects of Linguistic Framing on Endorsement of Black Lives Matter Tenets

Lindsay Berkowitz (Dr. Kim Epting) Department of Psychology

The Black Lives Matter (BLM) movement holds a mission to fight white supremacy and stop systematic, racially-motivated violence targeted towards Black communities (Black Lives Matter, 2013). Although the majority of U.S. adults reported that they support BLM, it can be helpful to learn more about why some people do not support the cause and factors that might alter support (Horowitz, 2021). One consideration is linguistic framing, in which the specific words chosen and how they are combined can change a person's attitude or perception about the statement or idea (Bizer & Petty, 2005). More specifically, the valence of the words, or the positive or negative feelings that certain words or phrases may automatically evoke, can affect perceptions (Avineri & Waygood, 2013). This study measured frame valence and how it shifts in independent (words out of context) versus combinatorial contexts (statements on the BLM's website About page). Additionally, participants rated

how likely they were to support each statement. In part one, participants rated the individual words from the statements out of context to find the independent valences – positive, neutral, or negative. In part two, participants rated full statements (the words back in context) for valence as well as degree of support for the claim. Five-point Likert scales were used for both valence ratings (strongly negative to strongly positive) and support ratings (definitely not to definitely). Analysis confirmed that combinatorial valence strongly correlated to support ratings, and further descriptive analysis is underway. The results of this study will hopefully have a positive impact by adding to our understanding of framing as an important factor that can affect overall support.

Intellectual Humility, Misinformation Beliefs, and Vaccine Attitudes and Status

Amanda J. Bossert (Dr. Katrina Jongman-Sereno) Department of Psychology

The current research examines the role of openness to information - and misinformation - in vaccine attitudes and COVID-19 vaccine status. This project has real-world implications related to factors that may help us understand whether people receive vaccines. Openness to information was examined in two ways: 1) intellectual humility (IH), the extent to which people are open to information differing from their current beliefs, and 2) misinformation susceptibility, the extent to which people endorse false health beliefs, pseudoscience, and conspiracy theories. Past research shows that high levels of IH are related to engaging in investigative behaviors in the face of false information (Koetke et al., 2021), allowing high IH individuals to conduct research to create an educated opinion. Similarly, IH has been shown to be negatively correlated with misinformation susceptibility (Bowes & Tasimi, 2021) and positively correlated with positive vaccine attitudes (Huynh & Senger, 2021). The present research further examined these relations in the context of COVID-19 vaccine status (number of shots received). An online survey platform (MTurk) was used to recruit 194 participants (116 men, 77 women, M_{age} = 28.34 years; 82.9% White, 7.8% Black or African American, 2% Asian, .5% American Indian or Alaska Native, .5% Native Hawaiian or Other Pacific Islander) to complete a survey measuring IH, misinformation susceptibility, anti-vaccination attitudes, and COVID-19 vaccination status. Results showed that high-IH participants were more likely to endorse generic and vaccine conspiracy beliefs, but no more or less likely to endorse other misinformation beliefs. Endorsing positive vaccination attitudes was related to being more likely to be vaccinated against COVID-19 and having received more doses of the vaccine. Interestingly, endorsing pseudoscientific beliefs predicted a higher likelihood of being vaccinated against COVID-19; this was also associated with receiving more vaccine doses. More research is needed to clarify the role of pseudoscience in vaccine status, as well as the relationship between IH and conspiracy beliefs.

Law Students with Learning Disabilities and/or ADHD: Rationale for Requesting or Not Requesting Accommodations*

Gloria Cadet (Dr. Alexa Darby) Department of Psychology

The American Bar Association (ABA) has recognized the benefits of increasing diversity, including disability diversity, for the legal profession and those it serves. The organization encouraged law firms and bar associations to sign the pledge to affirm their commitment to increasing opportunities and support for lawyers with disabilities (ABA, 2009). The ABA's Disability Statistics Report (2011) found that 3.2% of the law school population requested accommodations for disabilities This number represents an increase over previous years but likely underreports the prevalence of disabilities because the stigma surrounding disability may discourage students from requesting accommodations (Guevara,

2019). In the law school system, professors do not know who receives accommodations, which are coordinated entirely by a testing coordinator. The purpose of this study was to explore perspectives on formal disclosure among law students with LD and/or ADHD at southern U.S. law school. The sample consisted of nine women and two men, from a single law school, six of whom were diagnosed with ADHD while attending law school. Each student participated in an hour-long semi-structured Zoom interview inquiring into demographic information and their rationale for formal disclosure or not. Zoom transcripts were then coded and examined for patterns across transcripts. Findings showed an almost even split between those who disclosed and requested accommodations and those who did not. Students who disclosed did so because they needed accommodation. Students' reasons for not disclosing included not needing assistance and not wanting to appear different from their peers. Similarly, more than half of the students in their law school residency chose not to disclose because they did not want to be seen as different and feared being judged by others. Future research needs to explore the on-the-job training law students receive in their programs and how to support disclosure and increase access to accommodations for law students who need them.

Chronic vs. Acute Stress impact on Stressed-Induced Grooming in Ants

Christina I. Carr (Dr. William Schreiber) Department of Psychology

The body responds to acute (temporary and brief) and chronic (prolonged) stressors differently: for example, immune defenses are enhanced when following acute stress but weakened during chronic stress. Self-grooming has been studied in vertebrates during periods of stress however less research has been conducted on insects which has led to less of an understanding of how insects perceive stress relative to vertebrates. In this study, I examined self-grooming behavior in harvester ants following exposure to acute and chronic stress. I hypothesized that ants exposed to acute stressors would groom more than ants exposed to chronic stressors, consistent with the response profile of immune system function following exposure to stressors. In this study 74 ants were randomly assigned to one of four groups; acute stress and exposure to vigorous shaking, acute stress without shaking, chronic stress (deprived of food, socially isolated for 24 hours) and exposure to vigorous shaking, and chronic stress without shaking. Mann Whitney U tests showed that animals that were exposed to an acute stressor engaged in a higher amount of self-grooming behavior compared with all other experimental groups. The result of the study suggests that ants respond differently under acute versus chronic stress conditions and it may be possible to examine the effects of different stressors on their learning and behavior.

Alibi Believability and Judicial Instructions

Grace Caluri & Jeppe Overgaard Jordoson (Dr. Meredith Allison) Department of Psychology

Jurors typically find judges' instructions difficult to understand (Pickel, 1995). Alibi instructions inform jurors that the onus is on the prosecution to prove the defendant's guilt beyond a reasonable doubt and the defendant does not have to prove an alibi claim (Connecticut Judicial Branch, 2019). The impact of alibi instructions on juror memory has not been studied. Participants from CloudResearch read a description of an arson incident and the resulting police investigation and trial. Half of these participants (n = 160) read judicial instructions on alibis and were assessed on how well they remembered them. Participants first answered an open response question about everything they could remember about the judge's instructions. We created operational definitions of accurate (scored as 1, e.g., "if I have reasonable doubt, choose not guilty"), partially accurate (scored as .5, e.g., "I may

have reasonable doubt"), and inaccurate answers (scored as 0, e.g., "without a reasonable doubt") for five accuracy variables: if you have reasonable doubt, then you must find the defendant not guilty; alibi defense as a rebuttal to the state; the state has to prove guilt beyond a reasonable doubt; it is up to you [the jury] to decide, considering all case facts; and the defendant does not have to prove the alibi claim. Two independent raters analyzed 26 participant answers. They agreed on 117/130 decisions (90% agreement) and resolved disagreements through discussion. One rater then analyzed all remaining answers. Preliminary findings suggest that accuracy was highest for "defendant does not have to prove the alibi claim," ($M = .5$, $SD = .38$), and lowest for "alibi defense as a rebuttal to the state," ($M = .22$, $SD = .25$). Participants also answered two multiple choice questions assessing their recognition memory. The first asked what the alibi defense is a rebuttal against (correct answer: the state's claim), and it resulted in high accuracy (96% correct). The second asked who must prove guilt beyond a reasonable doubt (correct answer: the state, 86% correct). Interestingly, men were more accurate than women on this question ($p < .01$). Implications and future directions will be discussed.

Yoga Flow Class Impacts on Test Anxiety in University Undergraduates

Olivia C. Eller (Dr. Matthew Gendle) Department of Psychology

This study investigated if participation in introductory yoga flow classes offered by a university campus recreation department could reduce test anxiety and general anxiety levels more broadly in first and second year university undergraduates. Anxiety is an unfortunately common component of the undergraduate student experience in the U.S (da Silva et al., 2009). Test anxiety, an increased state of emotionality and worry regarding examinations and schoolwork, particularly affects undergraduate student populations (Cassady & Johnson, 2002). Behavioral approaches to anxiety management, such as yoga classes, can be advantageous within higher educational settings and can play an important clinical role in managing anxiety symptomology in undergraduate populations without the potential drawbacks of pharmacological intervention (Anbarasu & Chandramohan, 2015). Yoga interventions can prevent the potential negative components of benzodiazepine-based therapy, such as problematic drug interactions, drowsiness, cognitive impairment, and states of dependency (Lader, 2014). This project attempts to contribute to the study of yoga as an economical, efficient, and accessible method of anxiety treatment for students in the U.S. In this study, participants completed six survey questionnaires measuring resilience and anxiety before taking their first or second yoga flow class and then again after completing five classes within a span of sixty days. In this presentation, data that tentatively supports a reduction in self-reported test anxiety following participation in introductory yoga classes will be discussed, recognizing that the study's small sample size precluded the use of inferential statistics. This study provides some preliminary evidence that yoga flow classes and similar interventions should be explored as potential alternatives to help students cope with the threat of test anxiety and stress.

Correlates and Predictors of Recidivism Among Adult Incarcerated Offenders

Victoria G. Getter (Dr. Anne-Marie Iselin) Department of Psychology

The purpose of this study is to investigate psychological predictors of recidivism among formerly incarcerated adult offenders. We examine offender's self-reported mental health concerns to test the Criminalization Hypothesis, which argues that people with mental illness become trapped in the legal system due to a lack of mental health resources in their community. Previous research has found that high levels of treatment amenability, social support, and self-regulation were negatively related to

criminal behaviors. Our research builds on this evidence by examining how mental health concerns, social support, and self-regulation predict recidivism as well as how openness to treatment is related to social support and self-regulation. We gathered data from 108 male and female formerly incarcerated adults (M_{age} = 39.29; 76.32% males) from four correctional facilities in North Carolina. We defined recidivism as any documented offense in North Carolina public criminal records that occurred after the individual was released from prison (up to 7 years). Of the 108 participants, 22 participants recidivated (20%), 42 participants did not recidivate (39%), and 44 participants were not released during the follow-up period (41%). Individuals with mental health concerns did not engage in significantly more recidivism offenses compared to individuals without mental health concerns [$F(1,62)=0.21$, $p=.65$]. Individuals with higher levels of openness to treatment scored higher on both social support ($r=.47$, $p<.001$) and self-regulation ($r=.19$, $p=.049$). Individuals who did not recidivate reported similar levels of social support as individuals who did recidivate [$F(1,62)=.39$, $p=.54$]. Lastly, individuals who did not recidivate reported similar levels of self-regulation as individuals who did recidivate [$F(1,62)=.83$, $p=.37$]. We discuss implications of our findings for working with incarcerated individuals before they are released from prison.

Exposure to Weight Loss Content on TikTok and Disordered Eating in Young Adults

Hannah Giessler (Dr. Ilyssa Salomon) Department of Psychology

"The sociocultural theory of body image states that external factors, including social media, set unrealistic body ideals and reinforce the overall importance of appearance (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). In Westernized cultures, these body standards tend to glorify thinness for women and muscular, toned bodies for men (Grogan, 2007). The pressure of attaining cultural body standards may contribute to the development of disordered eating behaviors to achieve the desired goal (Zimmer-Gembeck, Hawes, & Pariz, 2021). Existing research suggests that social media use is associated with negative body-related outcomes, including disordered eating (e.g., see Holland & Tiggemann, 2016, Rounsefell, et al., 2020 for reviews). TikTok is a newer social media platform that is popular among young adults and still being explored by researchers. TikTok differs from other popular platforms in that most of the content users see is curated by an algorithm. Recent research suggests that weight loss-related content is common on TikTok, which may contribute to the development of anti-fat attitudes in users. The current study explores the relationship between exposure to weight loss content on TikTok, anti-fat attitudes, and disordered eating behavior. It is hypothesized that anti-fat attitudes will mediate the association between exposure to weight loss content on TikTok and disordered eating behavior. Data collection is in progress and participants will consist of approximately 75-100 participants from the psychology Sona subject pool. Frequency of exposure to common forms of weight loss content on TikTok is being measured with a Likert-type scale (Minadeo & Pope, 2022). Anti-fat attitudes are being measured by the Anti-Fat Attitudes Survey, which captures dislike of fatness, fear of fat, and beliefs about willpower (Crandall, 1994). A portion of the Eating Disorder Examination Questionnaire is measuring the frequency of disordered eating behaviors in the last month (Fairburn & Beglin, 1994; 2008). Data will be analyzed using a mediation model in the PROCESS macro for SPSS, which uses bootstrapping for conditional path analysis. Initial findings and implications will be discussed.

Efficacy of Security Updates: A Study of User Behaviors, Cognitive Burdens, and Behavioral Nudging in Young and Older Adults*

Paige Goldberg, Alejandro Mejia, & Brandon Fowlin (Dr. Amy Overman) Department of Psychology

A key element of cybersecurity is software updating to patch vulnerabilities, which depends upon timely compliance with update installations by the user, who must decide when and if to update (e.g., Rajivan, et al., 2020). This study investigates how to effectively nudge older and younger individuals to update their computer. Relatively little research has investigated the role of users' age, and how older adults may differ from younger adults in security-related software updating. Although aging is known to influence decision making generally (e.g., Lighthall, 2019), a gap exists in understanding age effects in security-related software updating behaviors. This study consisted of two experiments: 1) a survey via Qualtrics, and 2) an in-lab study that was conducted in Elon University's Psychology and Human Service Studies building. For Exp. 1, we provided a 20-minute survey to 127 participants (67 younger; 60 older) to gather information about their computer literacy and their decision-making behavior in response to different update messages. We randomly assigned two different versions of a survey, in which software update messages were presented in high and low cognitive load scenarios. One version presented threat-related updating messages and the other version presented coping-related updating messages. We also administered the Online Security Behaviors and Beliefs Questionnaire (OSBBQ), New General Self-Efficacy (NGSE) scale, and Technostress Scale to examine individuals' attitudes and experiences with cybersecurity. We found that older adults were less likely to dismiss all updates when coping information was provided than when threat information was provided. For Exp 2, we recruited participants through the community and from Elon's campus. Participants came to the lab and completed a computer task in which there were counterbalanced high and low cognitive load conditions (high = view picture; low = remember number string). Between those tasks they read messages about updating their computer and indicated when they would complete this update (i.e., now, 1 hour from now, 2 hours from now, etc.). Although Exp. 1 is complete, we are still in the process of collecting final data for Exp. 2 and will have analysis complete by the time of presentation.

Transprejudice and Gender Role Conflict: An Intersectional Approach*

Michaela R. Guerin (Dr. David Buck) Department of Psychology

Masculinity, as a social construct, comes with rigid roles that dictate masculine behavior, and which may create a sense of internal turmoil, known as gender role conflict (GRC; Norwalk et al., 2011), in some men. To reduce this tension, men may engage in hypermasculine behavior, such as the expression of gender or sexuality-based prejudices (Vandello & Bosson, 2013). Indeed, research indicates that adherence to traditional masculine gender roles is positively correlated with transprejudice among cisgender men (Greenberg & Gaia, 2019). This may be at least in part due to transgender and gender non-conforming individuals being perceived as threats to both traditional masculinity and male hegemony. However, individuals possess multiple social identities, and the gender roles and gender-based status benefits men experience differ across racial groups (Brassel et al., 2020). For example, status benefits afforded to men as a group have historically benefited White men more so than Black men, and perceived threats to male hegemony may have more of an impact on White men than on Black men. Thus, in this study we took an intersectional approach to examining the impact of masculinity threats on transprejudice. In the current study, we examined the three-way interaction between race, socioeconomic status (SES), and GRC predicting transprejudice. A sample of

220 heterosexual cisgender men over the age of 18, approximately equally Black and White, was collected through Amazon mTurk, an online recruiting platform. Participants completed a survey including measures of transprejudice (Clark & Hughto, 2020), GRC (Wester et al., 2012), and demographics, including income level. A regression analysis was run predicting transprejudice using participant race, income level, and gender role conflict and their 2- and 3-way interactions. The results indicated that for White but not Black men, GRC and income interacted to predict transprejudice, such that there was a positive relationship between GRC and transprejudice for White men who reported higher-income, but not for White men who reported lower-income. These findings build off previous research demonstrating racial and SES differences in how men respond to gender-based threats (Scaptura & Boyle, 2021) and highlight how complex social systems contribute to differences in prejudice.

Parental Beliefs About Motor Development and Practices to Support Infants in Indoor and Outdoor Environments

Hannah Higgins & Parker Fairfield (Dr. Sabrina Thurman) Department of Psychology

First-time parents make many decisions about how to set up home spaces for their infants. These decisions and behaviors are captured in the developmental niche framework, which describes how infant development is affected by the settings in which children live, and the caregiving practices to which they are exposed (Super & Harkness, 1986). Parenting practices such as placing babies in prone are positively related to advancements in infant motor development (Ammar et al., 2013; Pierce, 2000). However, little is known about how early home environments that shape motor development are affected by social factors such as parental education level and how parenting activities differ indoors versus outdoors. The current study aimed to examine how parental beliefs are influenced by their education level. Further, we examined how parenting practices might differ in varying areas of the home environment, and whether differing practices could shape infant motor development in unique ways. We recruited 261 first-time parents of infants aged 1-8 months who lived in the United States for an online survey. The survey included the Parental Beliefs about Motor Development and Infant Motor Habits Questionnaires (Atun-Einy et al., 2017), which assessed parents' beliefs about their roles in shaping their children's motor development, their daily practices with their children, and how they affected infants' motor progression. Results revealed that parents with no bachelor's degrees emphasized infant motor stimulation significantly more than parents with bachelor's or higher degrees. At a broad level, stimulating activities parents used with their infants differed by environment. Indoor stimulating activities focused predominantly on providing infants "tummy time" experiences, whereas outdoor play was more diverse, but predominantly focused on walks. These stimulating practices impacted infants' motor progression. For example, advancements in prone skill were partially correlated with having parents who placed their infants in prone ($p < .001$), and parents who practiced more stimulating activities, after controlling for age ($p < .05$). The results from this study suggest parental education level may impact parents' beliefs and practices surrounding motor development, which can impact how they utilize their home spaces, and how infants acquire motor skills within a developmental niche framework.

Telling Stories and Taking Pictures: How Children and Teachers Co-Facilitate Inquiry and Reflection Outdoors

Sophie I. Miller (Dr. Maureen Vandermass-Peeler) Department of Psychology

Sedentary lifestyles are becoming more common, childhood obesity rates are increasing, and children's desires to play outdoors are becoming obstructed by competing interests (Louv, 2008; Vilchis-Gil et al., 2015). Spending unstructured time outdoors is critical, as it is associated with children's social emotional skills, gross motor skills, and cognitive development (Dankiw et al., 2020). Play is crucial for development in early childhood, and outdoor play in particular lends itself to exploration, inquiry, and opportunities for physical stimulation. Inquiry is a cyclic process of observing, forming questions, finding answers, and reflecting. However, little research examines reflection in early childhood. This project addresses this gap by studying children's inquiry and reflection in an outdoor preschool. Ten children ages 3-6, already enrolled in the school's Afternoon Forest Adventures class, were observed twice a week interacting with each other and their teachers. What tools best facilitate the inquiry and reflection cycle, specifically in an outdoor environment in which children are encouraged to lead the class with their interests? During these visits, the researcher participated in the pedagogical documentation process, reporting experiences through audio-recording children's conversations, taking photographs, and creating portfolios (Rayna & Garnier, 2021). Similarly, children took photos and had the opportunity to reflect on them. When teachers and students are engaging in pedagogical documentation, it creates a medium of communication that makes the learning more tangible and easier to talk through with others (Macdonald & Hill, 2018). Detailed notes were taken alongside the photos, videos, and audio recordings by the researcher. Analysis is ongoing and is executed by compiling the data and coding for recurring themes. So far, it has been noticed that children use the camera as a tool to look at things they like, are not allowed to touch, and that they have lots of questions about. While reflecting on their pictures from previous days, conversation emerged regarding common themes within their photos as well as persistent questions relating to the content of their photos. Findings in this study are critical for advancing early childhood education because they illustrate effective learning strategies driven by child-led inquiry.

Assessing Efficacy and Strategies of Advisor Relationships with Doctoral Students with Learning Disabilities and/or Attention-Deficit/Hyperactivity Disorder

Maya E. Oledzka (Dr. Alexa Darby) Department of Psychology

The purpose of this study was to explore advisor/advisee relationships from the perspective of doctoral students with learning disabilities (LD) or attention-deficit/hyperactivity disorder (ADHD). Since the Americans with Disabilities Act became law in 1990, an increasing number of adults with disabilities, including ADHD and LD, have pursued higher education opportunities (Lombardi et al., 2018; Madaus et al., 2011). As a result, individuals with LD or ADHD are also advancing their academic careers through doctoral programs at higher rates than ever before (Zimdars, 2022). While some research exists on the importance of doctoral advisor/advisee relationships generally, few studies have focused on advisor support for doctoral students with LD or ADHD. Given the growing number of students with LD or ADHD entering graduate programs, it is crucial for institutions and departments to provide appropriate resources and support to foster a positive doctoral advising experience. Twenty doctoral students from different U.S. institutions with an average age of 28 years participated in this study. The fifteen female, five male, and one nonbinary participants included one Asian-American, one Middle Eastern, one Native American, one African American, and fifteen Caucasian doctoral students. Four first-year students, four second-years, two third-years, two fourth-years, and nine who were all but dissertation (ABD) participated, from fields ranging from clinical psychology to English took part. Three participants were diagnosed with LD and 18 with ADHD; 14 of the participants with ADHD take medication. The average age of diagnosis was 19 years. Each graduate student participated in an hour-long semi-structured Zoom interview inquiring about their disability and their relationship with

their advisor. Interviews were transcribed and analyzed for codes, categories, and themes. Preliminary data analysis shows that doctoral students received no support from their university's disability office for work on research projects or dissertations. Some participants reported having to switch advisors because their original advisor did not understand their LD or ADHD. Others formed a relationship with their advisor in which they discussed their LD or ADHD. Participants described supportive advisors as being flexible but also knowing when to set appropriate deadlines.

Parental Physical Discipline Effects on Somatic Symptoms Associated with Anxiety and Depression in Adolescents Across Three Countries*

Lauren F. Oppenheim (Dr. Anne-Marie Iselin) Department of Psychology

An increasing number of studies have found moderate positive relations of parental physical discipline with adolescent anxiety and depression symptoms. Adolescent anxiety and depression symptoms are also significantly related to somatic symptoms such as fatigue, nausea, and pain. Thus, it is plausible to hypothesize that parental physical discipline will be related to adolescent somatic symptoms. Furthermore, due to differences among parenting behaviors across cultures, the previous hypothesis can be expanded to examine the relation of parental physical discipline with adolescent somatic symptoms across cultures. We gathered data from 541 mother-child dyads from three countries and six subgroups (Italy: Rome and Naples, Colombia, United States: White, Black, Latinx). Participants were recruited through letters sent home from both private and public schools. Data was collected through surveys. Youth participants were approximately 12 years old (M=12.62, SD= 0.69), and 42% of the sample identified as female. All but one (i.e., Naples) of the correlations within subgroups were not significant. The relation of physical discipline with somatic symptoms among Napolitanos was negative and small to moderate in magnitude (r=-0.24), whereas the same relation among Romans was positive and small in magnitude (r=0.17). The correlations among Romans and Napolitanos were significantly different from each other (p=0.01). Future analyses will investigate how adolescent depression and anxiety symptoms alter the relation of physical discipline with adolescent somatic symptoms. We will discuss how findings from this study can inform treatment and prevention efforts for adolescents experiencing somatic symptoms indicative of anxiety and depression, so they are more sensitive to clients' racial and cultural backgrounds.

Mother & Infant Contributions to Maintaining Physical Closeness During Play: A Longitudinal Study of the First Two Years

Tiffany B. Pham (Dr. Sabrina Thurman) Department of Psychology

The acquisition of locomotor skills (e.g., crawling, walking) allows infants to make decisions regarding their own movement for the first time. Both infants and caregivers participate in the co-creation of relational space between them, deciding when to remain close to each other and when to explore. However, we know little about how proximity is maintained during infancy or how mothers encourage infants' movement behaviors during free-play. Here, we aim to understand whether mothers versus infants were responsible in maintaining physical closeness or creating distance between each other as infants acquire locomotor skills. We tracked 13 mother-infant dyads in 10-minute free-play sessions held in a laboratory space on a biweekly basis, beginning at crawl onset until infants had 2.5 months walking experience (from about 6-17 months). Sessions were recorded and video-coded. We tracked how often mothers and infants moved away or closer to each other, whether patterns of proximity-related behaviors were linked in time (e.g., when an infant moves away, does the mother

follow by moving closer?), and whether infants' displacement was encouraged by the mothers' ongoing behaviors (e.g., directive vocalizations, gestures, and/or body language). We examined changes in these behaviors over a 6-session transition from early to late crawling, and a 10-session transition from crawling to walking. Friedman tests revealed that mothers were more responsible for maintaining proximity to infants across the transition from early to late crawling ($p = 0.001$), and in the sessions just before walk onset, but this declined with walking experience ($p = 0.011$). In addition, mothers increasingly encouraged their infants to travel away from them as infants gained crawling experience ($p = 0.055$). During this time, infants often left mothers' attempts to come closer to them ($p = 0.001$), and mothers often joined their infants as infants traveled away from them ($p = 0.001$). This shifted during the transition to walking, when mothers increasingly encouraged their walking infants to come closer ($p = 0.001$). Learning to crawl and walk changes the ways mothers and infants co-create relational space. This research provides information about mother-infant relational bonds and could significantly impact developing interaction styles.

Longitudinal Impact of COVID-19 Related Factors on Depression and Anxiety

Abbey L. Rose (Dr. CJ Fleming) Department of Psychology

The COVID-19 pandemic has presented major stressors to the lives of people across the world. Scholars have found during the period of the pandemic that illness, isolation, financial stress, and uncertainty are all likely to increase mental distress due to these drastic changes in our daily lives. This study is an investigation of specific COVID-related factors and their longitudinal impact on adult depression and anxiety. A total of 598 adults comprised the initial sample for the study at round 1 in April through May of 2020. Three follow-up surveys were administered at the following timepoints: about a month after the first survey, March of 2021 (one year later), and finally in April 2022 (Fleming & Franzese COVID dataset). Depression was measured with the PHQ-9 survey and anxiety with the GAD-7 survey. COVID-related factors that were measured included household diagnosis/quarantine, hospitalization of self or loved one due to the virus, loss of a family member or friend due to COVID-19, and finally if the participant has had to self-quarantine away from others. To evaluate change over time for both depression and anxiety, we applied separate linear mixed effect models. Analysis of overall mental health symptoms for all participants over time showed a significant decrease in mean depression scores as well as anxiety scores from Time 1 to both Time 3 and 4. With regard to examination of mental health symptoms as related to COVID factors, neither change over time in anxiety or depression were found to be related to COVID exposure, COVID hospitalization, or COVID death. With regard to self-quarantine, the change in depression scores and anxiety scores over time were significantly different across groups (self-quarantine versus no self-quarantine). With regard to household quarantine, there was a trend in depression scores and anxiety scores changing differently from Time 3 to Time 4 between groups (household-quarantine versus no household quarantine). While the fallout of the pandemic continues, it is important to understand how these stressors and factors may or may not be affecting mental health to better understand where and how intervention is necessary.

Strategy Use in Infant Pull-to-Stand Behaviors: A Longitudinal Investigation

Rebecca A. Rose (Dr. Sabrina Thurman) Department of Psychology

For infants, pulling to stand (PTS) bridges the gap between crawling and walking and provides new opportunities for interaction. Prior literature suggests infants primarily PTS using 2-step strategies, two-leg, and half-kneel. The aim of this study was to investigate what additional strategies may be

used, and how strategy choice and speed change with varying skill levels, environmental conditions, and the infant's goals after PTS. We followed 13 infants (6f) in 10-minute free-play sessions held biweekly in laboratory space from 6-17 months of age. We tracked changes in PTS behaviors across a 2.5-month transition period from crawling to walking. For each time an infant exhibited a PTS, we video-coded the duration, rise strategies (e.g., kneeling to stand), hand use patterns (e.g., right hand pulled up first then left followed), and the infants' next behavior post-PTS (e.g., reaching for an object on the right). Results showed that infants used 2- and 3-step movements (e.g. sit to stand or sit to kneel to stand) 40.5% and 57% of all PTS respectively, and 4-step movements only 2.5% of the time. Wilcoxon tests revealed that 2-movement PTS were significantly faster than 3- and 4-movement PTS ($p= 0.001$ and 0.028, respectively), but 3- and 4-movement PTS were not significantly different from each other ($p=0.499$). Additionally, there was no significant difference in PTS speed between crawling and walking sessions ($p=.196$). Infants used specific hand behavior to prepare for their next behavior. Wilcoxon tests showed that infants were more likely to begin their PTS by pulling up with the same hand they used for their post-PTS behavior ($p=0.023$; e.g., infants began pulling up with the left hand and then once upright, also reached for a toy on the left side). The results of this study suggest that infants tend to use 3- and 4-step strategies to PTS that include a half-kneel rather than simultaneous two-legged strategies, as reported in prior literature. Additionally, by altering their strategies, infants under 17 months display motor planning and whole-body problem solving which has implications for cognitive development but has been minimally studied in children under 3 years old.

The Influence of Environmental Structure and Nature Connectedness on Preschoolers' Creativity and Social Cohesion During Outdoor Play

Juliet E. Stevenson (Dr. Maureen Vandermaas-Peeler) Department of Psychology

Developmental research indicates that outdoor play is essential for children's physical, cognitive and socioemotional development and ecopsychologists suggest that children's engagement in outdoor play is affected by their relationship with nature. Natural environments offer more affordances, environmental elements that children can incorporate into their play, which encourage creativity and social skills, than structured playgrounds (Larrea et al., 2019; McClain & Vandermaas-Peeler, 2016). The primary aim of the study was to determine how creativity and social cohesion differed during preschoolers' play in structured and unstructured environments. Influences of nature-connectedness on social cohesion and creativity were also examined. The kindergarten-prep children at the participating preschool had access to two outdoor environments: one structured playground area and one unstructured, more natural area. Seven five-year-old children were observed playing for five minutes with approximately three observations, taken on different days, per child in each environment. The environments were scored on the Affordance Scale (Kyttä, 2002) based on options for exploring, learning and development. Children's play was analyzed using the Play Observation Scale (POS; Rubin, 2001) and the proportion of time spent engaging in each type of play (solitary, group, exploratory, dramatic, etc.) were calculated. Social cohesion was calculated as the proportion of time each child engaged in group play or peer conversation. Children's creativity was assessed through dramatic play and in interviews using modified questions from the Divergent Thinking Skills Test (Susa & Benedict, 1994). Nature-connectedness was scored with the Nature Inclusive Measure (St. John & Macdonald, 2007). Researchers hypothesized that unstructured spaces would have more affordances and support higher levels of social cohesion and creativity than structured environments. Results indicated that unstructured environments supported higher social cohesion by affording group play, while structured playgrounds supported higher levels of creativity by affording dramatic play. Qualitative analyses indicated that creativity in both environments was highest when children were

using moldable materials (water, sand, etc.) and/or graspable objects (small toys, sticks, etc.). Nature-connectedness was not found to significantly influence social cohesion. However, children with higher nature-connectedness demonstrated more creativity during outdoor play. Implications of these and other findings for early childhood and outdoor education will be presented.

Preschoolers' Funds of Knowledge and Bridging Between Home and School

Sophia M. Templeton (Dr. Maureen Vandermaas-Peeler) Department of Psychology

Facilitating children's abilities to make connections between environments using funds of knowledge (FoK) and bridging has educational and social benefits. FoK is one's pool of cultural knowledge and values; bridging is a technique that supports across-context learning by establishing meaningful connections between known and new information (González et al., 2005; Moll et al., 1992; Vandermaas-Peeler et al., 2019). Few studies examine how parents and teachers co-facilitate children's learning by connecting their home and preschool environments and this study's aim was to fill this gap with two goals: 1) to investigate preschool teachers' and parents' beliefs and practices related to incorporating children's FoK into school environments; 2) to explore the use of bridging to facilitate knowledge transfer between home and school environments. Online surveys were distributed to 75 preschool parents and teachers in North Carolina and data were collected regarding their actions, knowledge, and attitudes toward FoK and bridging. Nineteen survey respondents also participated in 30-minute interviews exploring key topics in greater depth. Open-ended responses were coded using an iterative process, assigning individual codes and grouped into thematic categories. Results of survey and interview responses indicated that parents were less aware than teachers of how children's FoKs were incorporated into the school day. Both recognized active incorporations such as doing 'About Me' activities, but only teachers mentioned aspects of the physical environment such as books that allowed children to bridge between home and school. Both groups observed children making more connections with games and social activities than academics. These findings led to the production of a curriculum activity co-created with two preschool teachers using a design-based method that integrates both research and practitioner goals. Children took photos of the foods they eat at home and researchers turned them into an album children could view at school and home. Findings indicated children enjoyed creating bridges between home and school using the album and could display knowledge from and expand their FoKs in the process. This activity is one example of supporting FoK, bridging, and translating research findings into practice in early childhood classrooms.

Associative Learning in Harvester Ants

Benjamin Waggener (Dr. William Schreiber) Department of Psychology

The study of learning and memory is important in psychology (understanding how behaviors change from experience) and biology (understanding how animals adapt to new and changing environments), and it is important to examine learning and memory in both human and non-human animals. The purpose of this experiment was to produce a novel paradigm for studying associative learning in harvester ants using accessible materials and to measure the retention of learned associations. We examined associative learning using a paradigm in which ants were maintained on a sucrose-restricted diet and later exposed to a novel gel food source containing sucrose (food only condition), with some animals exposed to the gel treated with a plant stimulus (plant and food condition). To assess the retention of learned associations, ants were later individually tested using a stimulus discrimination task. Either 1 hour, 24 hours, or 48 hours following the end of exposure to the gel, we measured the

time each ant spent engaging with the paired stimulus and/or the novel stimulus/stimuli. Ants showed a preference for cilantro when paired with the gel after 24 hours ($p < 0.03$), but not after 1 hour or 48 hours ($ps > 0.05$). Ants in the plant and food condition spent more time exploring the plant stimuli than ants in the food only condition after 24 hours, but not after 1 or 48 hours, suggesting that learning might also be expressed through exploration of plants more generally rather than exploring the specific plant that was paired with food. Altogether, these findings suggest that this procedure can be used to demonstrate associative learning in harvester ants, and that the associative learning is retained after 24 hours. Our findings also suggest that associative learning in harvester ants can be more effective with cilantro compared with parsley, and that learning may not be expressed until after a period of consolidation that requires more than 1 hour.

Use Your Words: Impact of a Driver's Linguistic Framing on the Outcome of a Traffic Stop

Nicholas D. Willliams (Dr. Kim Epting) Department of Psychology

While a traffic stop is supposed to be completely objective, there is potential for biases to skew the outcome. Many authors have studied factors ranging from race, to age, to gender in order to see if a relation exists between these variables and the result of a traffic stop (Schafer et al., 2004; Smith & Petrocelli, 2001; Gaines, 2006; Dixon et al., 2008). It has been found that these variables, as well as many others, have an effect on the perceptions or outcomes of traffic stop events. One variable in need of more research in the context of a traffic stop is language,Äìmore specifically, what the officer or driver chooses to say. The way language is framed can have an effect on people's behavior (Banks et al., 1995, Landau et al., 2009). Previous research on this topic has found that an officer's language changes depending on who they have pulled over (Voigt et al., 2017), but driver phrasing choices have not been considered. This led to the development of our main research question: How does framing of driver dialogue in a traffic stop affect the outcome of the stop (e.g. getting a warning instead of a ticket)? Specifically, the driver's language was manipulated in three ways. In this 2x2x3 mixed design, the independent variables were: respect framing (respectful or disrespectful), agreement framing (agree or disagree), and goal framing (gain a positive result, avoid a negative result, or neutral). The language used in the experiment was first assessed through a manipulation check with a convenience sample ($N = 90$) crowdsourced via social media. In the experiment, 288 mTurk workers from the United States answered questions based on a hypothetical traffic stop scenario. Significant main effects were found for respect framing as well as goal framing, but not for agreement framing. Respectful language produced predictions of less severe outcomes, while language attempting to avoid a ticket produced predictions of more severe outcomes. There were no interaction effects among the 3 framing variables. These results show that even small nuances in driver phrasing can impact the severity of the outcome for that driver.

Public Health Studies

"Ask Us, Hear Us, Believe Us": Exploring Quality of Care, Racism and Outcomes During Childbirth Experiences of Black American Mothers*

Victoria I. Colbeck (Dr. Yanica Faustin) Department of Public Health Studies

Poor quality of maternity care is associated with adverse maternal health outcomes. Historically marginalized populations disproportionately experience adverse maternal health outcomes such as maternal mortality and morbidity. The purpose of this study is to investigate and explore the quality of

care, outcomes and experiences for Black birthing persons during their pregnancy/labor/delivery, in the United States from 2018-2023. An online survey was used to collect data on the quality of care and racism experiences of participants. The survey included quantitative and qualitative questions. Three frameworks informed the design of the data collection tool in order to take into account the historical and multidimensional manifestations of racism in maternity care. First, a racial equity framework, titled R4P, involves five domains: remove, repair, remediate, restructure and provide. R4P guided the qualitative questions about race and health equity. Second, the Institute of Medicine's six aims for improving quality of care include: (1) Safe, (2) Effective, (3) Patient-centered, (4) Timely, (5) Efficient, and (6) Equitable care. These aims informed the quantitative questions about perceived quality of care. Third are the theorized domains of SACRED birth: (1) Safety & Accountability, (2) Autonomy, (3) Communication & Information Exchange, (4) Racism, (5) Empathy & Humanity, (6) Dignity in Blackness & Holistic Care, and (7) Kinship. The SACRED birth domains guided the development of additional quantitative questions. Data collection is ongoing. The quantitative analysis consists of calculating descriptive statistics including the prevalence of adverse maternal health outcomes. The qualitative analysis for this study is informed by the Sort and Sift, Think and Shift method and involves (1) reading (2) writing memos and annotating (3) re-reading (4) topic monitoring (5) developing themes. Preliminary findings suggest that there are varying experiences (positive and negative) in regards to both outcomes and quality of care for Black birthing persons in the U.S. The aim of this research is to learn more about the experiences of Black birthing persons with particular attention towards positive birthing experiences and those who experience maternal morbidity. The goal is to better serve this population and make progress towards eliminating racial disparities in maternal mortality and morbidity.

Through the Lens of Latinx/Hispanic Women: Reproductive and Maternal Experiences in the Piedmont-Triad Area*

Karen Guadalupe Cruz-Ruiz (Prof. Amanda Tapler) Department of Public Health Studies

Hispanic cultural norms have been found to impact women's relationships, reproductive experiences, and healthcare decisions. In 2020, the Latinx/Hispanic community had the second-largest number of births in the United States and the third-largest number of births by race in North Carolina. Despite this knowledge, limited studies have specifically focused on the reproductive and maternal health experiences and decision-making of Latinx/Hispanic women with regards to pregnancy, birth practices, labor and delivery, postpartum, and motherhood. This, coupled with the lack of preparation and slow implementation of systemic changes for the growing Latinx/Hispanic community further prevents positive reproductive and maternal experiences for Latinx/Hispanic women. This qualitative, community-engaged research study provided an opportunity for young Latinx/Hispanic women to voice their reproductive and maternal experiences and how this intersects with their beliefs, culture, and perceptions. Participants were recruited through purposive snowball sampling. Open-ended, semi-structured interviews were conducted with 14 Latinx/Hispanic women, aged 18-45, who gave birth between 2015 and 2022 and who reside in the Piedmont-Triad of North Carolina. The research team used an iterative analytic technique that involved: coding and recoding, categorizing emergent patterns, and then aggregating patterns to develop thematic statements. Five prominent themes emerged: (1) individual, interpersonal, and structural factors that influenced their decision-making; (2) the importance of support; (3) the impact of perceptions and experiences of motherhood; (4) their birthing experiences within the U.S. healthcare system; and (5) their experiences with postpartum depression. Almost all participants described receiving either relational, financial, physical, or verbal support from a partner or family member. More than a third of participants reported engaging in cultural or

traditional practices associated with birthing or motherhood. More than half of participants reported experiencing difficulty with medical providers, including but not limited to providers not being comforting enough, providers showing a lack of urgency, and providers displaying a lack of cultural relatability and understanding. Healthcare providers and maternal care institutions should intentionally engage in learning about and understanding the experiences of Latinx/Hispanic women in order to provide quality, equitable, and culturally humble care.

Boroughs Matter: Examining Maternal Morbidity by Racial Neighborhood Composition in NYC*

Shauna K. Galvin (Dr. Yanica Faustin) Department of Public Health Studies & (Dr. Deshira Wallace) UNC Gillings School of Global Public Health

Maternal morbidity has risen in the U.S. in recent years, yet there has been a lack of examination of the intersection of race and ethnicity and maternal morbidity outcomes, within the Latinx community. This research explores the relationship between race/ethnicity, borough of residence, and maternal morbidity. We aimed to answer the following two research questions: 1) What is the prevalence of maternal morbidities by race/ethnicity for birthing persons in NYC from 2008 - 2016? and 2) How does the prevalence of maternal morbidities by race/ethnicity for birthing persons in NYC differ by borough? It is vital to further dissect the boroughs in NYC in order to deepen our understanding of the documentation of maternal health inequities overall. Place of residence should not impact your maternal health outcomes, and thus the consideration of borough of residence and race/ethnicity is important. Furthermore, it is critical to understand the structural factors influencing inequities in maternal health across racial and ethnic groups. We utilized a birth record dataset consisting of 900,434 births to investigate maternal morbidity inequities by race/ethnicity and by borough, with particular attention to the intersection of racial category and Latinx ethnicity. Overall, the outcomes indicate that there are maternal morbidity inequities by race/ethnicity and by borough, indicating a need for tailored interventions that consider the lived experiences of the Latinx community to combat maternal morbidity in these populations.

Centering the Margins: Applying Public Health Critical Race Praxis in Exploring Black Adolescent and Young Adult Fatherhood*

Kiara M. Hunter (Dr. Stephanie Baker) Department of Public Health Studies

Dr. Chandra Ford and Dr. Collins Airhihenbuwa developed Public Health Critical Race Praxis (PHCRP) as a pathway for researchers in public health to move beyond documenting disparities towards developing and evaluating interventions that challenge the systemic causes of inequities. While data on the prevalence and barriers to Black fatherhood is available, little research has investigated how age, gender, and experiences with racism impact fatherhood. Therefore, this project aims to share the lived experience of Black adolescent and young adult (AYA) fathers and work to understand how PHCRP might inform intervention development for Black AYA fathers. Researchers worked in partnership with a community advisory board to implement this qualitative study. A snowball recruitment strategy was used to recruit 11 young fathers, ages 15 to 24, who self-identified as Black or African American. A deductive analysis of recorded interviews led to the mapping of illustrative quotations that amplified the voices and experiences of young Black fathers. PHCRP and Community Based Participatory Research influenced the creation of a research community advisory board, were used to contextualize the preliminary literature review, and informed the development of a

semi-structured interview guide. Deducted themes, guided by the PHCRP framework, are as follows: (1) Voice, (2) Structural Determinism, (3) Social Location and Support, and (4) Everyday Discrimination. This study found that even in the presence of systemic and interpersonal barriers, young Black fathers desire involvement in their children's lives and are determined and motivated to grow and develop themselves for and with their children. Upon the project's completion recommendations will be provided on how health programs and initiatives can meet the needs and create supports identified by and for young Black fathers.

Making Sense of Medical Gaslighting: A Qualitative Study of the Experiences of BIPOC Women with Health Care Professionals in the United States*

Simone Llanos-Taminez (Dr. Cynthia Fair) Department of Public Health Studies

BIPOC women are more likely to experience adverse health outcomes than their white counterparts. Medical gaslighting may play a role in health disparities. Medical gaslighting is a microaggression characterized by healthcare providers downplaying a patient's concerns or symptomology. This project investigated how BIPOC identity impacts an individual's experiences with medical gaslighting using qualitative data methods through an online survey with open-ended questions. Seventy-nine BIPOC cisgender women (18 to 35 years) completed the survey (43.6% Black/African American, 23.1% Hispanic/Latinx, 20.5% Asian/Pacific Islander, 5.1% Native American/Alaskan Native/Hawaiian Native, and 5.1% 'Other'). Questions centered on experiences within the medical system as well as impact of medical gaslighting. Sixty percent of respondents had a bachelor's degree, and 72% of the medical providers with whom respondents had a negative experience presented as White. Data were analyzed using the Sort and Sift, Think and Shift model that allows for diving into the data and then stepping back to get a better view of the emergent themes. Results indicated that medical gaslighting presented itself in forms of dismissal and judgment. One participant stated that, "[I] went to the OBGYN felt extremely judged for having unprotected sex." Another participant stated that, "[I] had HPV and was very concerned about its potential to become cervical cancer. [The] doctor just told [me] to let it happen and didn't care about [my] concerns." Experiences had a lasting emotional and behavioral toll on the respondents as they reported feeling small, alone, anxious, and silenced, as well as avoiding doctors after their medical gaslighting trauma. Findings suggest that medical gaslighting adversely affects healthcare access as many women reported they no longer sought medical attention and did not feel comfortable openly communicating with healthcare providers. This has both policy and practice implications, as it demonstrates the need for a push to be made in BIPOC representation in healthcare spaces both in provider preparation and the provider population.

The Impact of Film on Understanding the Black Maternal Health Crisis*

Catherine E. Oliver (Dr. Stephanie Baker) Department of Public Health Studies

The United States is the only developed country where maternal morbidity and mortality rates have been increasing between 1990 and 2015. Moreover, Black birthing people have nearly four times higher risk of maternal morbidity and mortality in comparison to white birthing people. This disparity is a result of many factors, including systemic racism and implicit bias in the obstetric healthcare system. *Reclaiming Power: The Black Maternal Health Crisis* is a documentary dance film inspired by and based on a qualitative research project. It collected the birthing experiences of 30 Black women who gave birth either in their own homes or in a birthing center. The documentary dance film shares the stories of the participants of the parent study through spoken word and dance. This current research

study aims to examine survey participants' existing knowledge of Black maternal health and determine the impact of educational and informational films on their knowledge and understanding of the Black maternal health crisis. This current study collected survey responses prior to and after participants viewed this documentary dance film. Before viewing the film, 316 survey participants defined their familiarity and perceptions of the birthing experiences of Black individuals in various settings, such as in hospitals, birthing centers, and at home. The survey participants were also queried about their feelings toward the Black maternal health crisis and were asked to identify what factors may contribute to the poor outcomes seen in the pregnancy and childbirth of Black birthing people. Following the viewing of the documentary dance film, 304 survey participants completed another survey, which measured how their knowledge and understanding of the topics illustrated prior to the film had been affected. Preliminary findings and data analysis of these surveys indicate that survey participants had a more positive perception of both home and birthing center births after viewing the film. Furthermore, survey participants more frequently identified racism as a factor contributing to negative birth experiences after viewing the film. The findings of this study provide insight into how the arts of film and dance may be utilized to educate audiences about important topics in public health.

Social Determinants of Health for Type II Diabetes in Texas Hispanic/Latino Community

Hannah I. Pleasants (Dr. Cynthia Fair) Department of Public Health Studies, (Dr. Kari North) UNC Department of Epidemiology, (Dr. Heather Highland) UNC Department of Epidemiology, (Dr. Miryoung Lee) UT School of Public Health, & (Peter Yang) UNC Department of Epidemiology

Hispanic/Latino populations face a disproportionately high prevalence of type II diabetes (T2D) in the United States yet remain overlooked in biomedical research. Though genetics contribute to this disparity, the role of social determinants of health (SDoH) in this relationship requires further study. This longitudinal study investigated the link between SDoH and prevalent T2D in a homogenous Mexican American population (n=3955) on the Texas-Mexico border. Using logistic regression models with demographic and health behavior covariates, we evaluated how education, occupation, and income were associated with T2D prevalence in this socially vulnerable community. SDoH were measured through a score that quantified socioeconomic adversity by accumulating factors of education, occupation, and income, and T2D was diagnosed through fasting (>10 hours) blood samples. Our findings suggest that, after adjusting for body mass index (BMI), age, sex, smoking habits and drinking habits, insurance type, and generation status, education was the only contributing social determinant of health that was examined in this community. Individuals of this population with education less than high school had odds of T2D 2.08 times higher than those with higher educational attainment. This finding aligns with previous research among other minority communities and provides insight into the consistency of the impact of education across various types of populations, including underserved sub-populations. Our results indicate a need for educational interventions for T2D within these sub-populations.

Reproductive Justice, Photovoice, and the Scholarship of Teaching and Learning

Morgan E. Rende & Alex K. Campbell (Dr. Yanica F. Faustin) Department of Public Health Studies & (Dr. Kristin Z. Black) East Carolina University, Department of Health Education and Promotion

On June 24, 2022, the United States Supreme Court voted on Dobbs v. Jackson Women’s Health Organization (2022) favoring the overturn of the landmark supreme court cases Roe v. Wade (1973) and Planned Parenthood v. Casey (1992), which had protected the constitutional right to abortion in the

United States for nearly fifty years. This decision has the potential to impact reproductive health for every individual of reproductive age. This research aims to understand and address the perceptions of college-aged students with regard to the Dobbs decision and its potential impacts on their reproductive health. The photovoice method was used to gather qualitative data through two separate photovoice sessions, which were recorded and transcribed. Photovoice is a participatory research method that allows individuals participating in a study to use photography to express answers to posed questions. Each session focused on one of two prompts: How are college-aged students establishing their own viewpoints or stance on reproductive health? What feelings and decisions are involved in that? and What are your main fears/hopes when it comes to navigating your reproductive health post-Dobbs? Two focus groups consisting of 8 and 10 undergraduate students, respectively, enrolled in a course titled Reproductive Justice (PHS 3701) at Elon University took part in the photovoice sessions. The participants answered the research prompts through photographs that depicted their feelings, viewpoints, and stances. Group discussion was utilized to analyze the individual photos. Following this, participants decided on one photo that most encapsulated the group's answers and discussion. The selected photo was analyzed using the SHOWED method; a process that allows for further group discussion of the chosen photo in relation to the prompt. Preliminary findings suggest that the Dobbs decision has significantly impacted the stances, viewpoints, and feelings of college-aged students regarding reproductive health and reproductive justice. Findings from this study indicate that this supreme court decision has stimulated fear and worry amongst many, especially those of reproductive age. Participants in both groups went on to discuss potential action and advocacy that could take place in light of the new reproductive health landscape they need to navigate.

Religious Studies

Queer Depictions of Jesus on TikTok*

Virginia Grace Beall (Dr. Lynn Huber) Department of Religious Studies

Popular depictions of Jesus, especially in the United States, have often been used to sanction heteronormative standards for Christian behavior (e.g. Warner Sallman's Head of Christ). While Jesus has been tied with homophobia in some contexts, he also has been "queered" in ways that challenge normative understandings of gender and sex. In this study, I ask: How do content creators on TikTok use parody and camp to create queer images of Jesus that wrestle with homophobic narratives common to some interpretations of the Christian Bible? This research adds to academic conversations about the role of Christianity in authorizing sexuality and sheds light on the struggle over claiming Jesus as a moral authority. Furthermore, it takes on a different perspective by analyzing cultural artifacts coming from TikTok—a video-based social media platform that is a relatively new outlet for expressing thoughts and opinions. I use the sensibility of camp to analyze the videos, as well as Melissa M. Wilcox's concept of serious parody: a cultural protest that comically imitates an oppressive subject while claiming the subject in a more positive framework. The videos in my research provide an example of serious parody by parodying the oppressive Jesus put forth by some cultural institutions, using queer visual and vocal cues (e.g. feminized gestures, higher cadence voices, queer-coded clothing). For example, the TikTok creator Jegaysus wears a pastel, rainbow stole, clearly challenging assumptions about Jesus's masculinity. This research shows that these content creators parody Jesus by queering him because of a desire to humor the audience and challenge homophobic forms of Christianity, while adding to academic conversations about how queer individuals contribute to religious discourse and reclaim the figure of Jesus. Through their scripts, they reclaim Jesus as open, welcoming, and slightly sassy.

Experiencing the Guru Through His Weapons: Shashtar Darshan in Contemporary Indian Sikh Worship*

Darsev Kaur (Dr. Amy L. Allocco) Department of Religious Studies

This research seeks to understand the significance of the daily practice of Shashtar Darshan at Takhat Sri Keshgarh Sahib (TSKS), during which there is a procession of eighteen *shashtar* (weapons) that are honored for their connection to the Sikh *gurus* (spiritual or religious leaders) and other significant figures within the tradition. Drawing on 41 semi-structured interviews and five weeks of participant observation at TSKS in North India, I argue that the daily presentation and narrative exegesis of these symbolically charged weapons strategically communicates a collective history that connects Sikhs to their religious identity and community, propagates dominant Sikh discourses, and evokes an affective response from audience members. TSKS is a historically significant Sikh *gurudwara* (temple) that ranks as one of five *takhats* (thrones), or seats of power, from which authoritative pronouncements concerning Sikh belief and practice are traditionally delivered. It is where, in 1699, Guru Gobind Singh installed the *Guru Granth* (Sikh scripture) and the *Guru Panth* (presence of the guru in the assembly of his followers) as the eternal figures of authority for Sikhs and initiated thousands into the tradition (Singh 2013). Shashtar Darshan allows an eager audience of about 75 Sikhs, consisting mostly of pilgrims and tourists, to engage with these weapons more directly in a congregational setting. The daily ritual deploys the material relics to deliberately reinforce the teachings of the *guru* and remind onlookers of Sikhism's militant past.

The Hidden Potential of the Tumtum as a Path to Liberatory Trans Judaism*

Faith E. Minor (Dr. Geoffrey Claussen) Department of Religious Studies

One ancient midrashic interpretation of the biblical characters Abraham and Sarah identifies them both with the gender tumtum and then sees God as differentiating them into a man and a woman. My project considers the significance and use of the gender tumtum – a phrase often understood as referring to a person who is considered "hidden" or "covered," and uncategorizable as man or woman – both in and of itself and when applied specifically to the characters often viewed as the founders of Judaism. Tumtum is one of at least six different genders present in the literature produced by Rabbinic Jews during the first millennium of the Common Era, genders which have been studied increasingly by those interested in the intersections of transness and Judaism or Jewish identity. The existence of non-binary gender categories here may be understood as pointing towards the potential for greater acceptance, as Rabbi Elliot Kukla has argued. Alternatively, they may encourage the creation and codification of a more restrictive system of law around gender through defining divergence of body and social role, as Dr. Max Strassfeld has argued. This project explores how the work of the ancient Rabbis which destabilized assumed progressions of gender and sex can be used by trans Jewish people to create a liberatory trans Judaism. The project seeks to contribute to interdisciplinary trans studies and Jewish studies through the analysis of relevant premodern texts, contemporary scholarly works, and contemporary writing that interprets trans modes of existence in Jewish text and tradition. I argue that the gender tumtum may radically expand what Jewish personhood can be, particularly in the context of its application to Abraham and Sarah, the figures who originate Jewish identity and may be considered to epitomize it. I suggest that the depiction of the tumtum as "covered" or hidden implies a type of significant or even undefinable potential, rather than an existing and definite truth that must be revealed. Recontextualizing ancient texts in this way can provide a model for a liberatory trans Judaism in our time.

Material Memories: Narratives of the Israeli/Palestinian Conflict*

Maddy Starr (Dr. Amy Allocco) Department of Religious Studies

Since the establishment of the State of Israel and the catastrophe of the Nakba, which entailed the mass displacement of hundreds of thousands of Palestinians in 1948, the Israeli/Palestinian conflict has dominated global headlines and shaped foreign policy throughout the Middle East and North Africa. The state of constant tension and mutual distrust that has characterized Israel/Palestine since 1948 has also resulted in structural violence and resistance to occupation. Both Israelis and Palestinians tend to perceive themselves as victims of violence and the other as perpetrators of the conflict, thus mutually enforcing an "us versus them" atmosphere. While the conflict gains significant traction on the world stage during periods of heightened physical violence and war, less attention has been paid to how Israelis and Palestinians experience the conflict on an everyday basis. Likewise, there has been little attention paid to the material memories and realities of the conflict, including how recurring interactions with objects and images allow Israelis and Palestinians to remember narratives of the near and distant past and inspire mutual distrust, structural violence, and resistance. During five weeks of ethnographic research in Jerusalem, I explored how memory informs the pervasive tension, structural violence, and resistance of ordinary Israelis and Palestinians. My project asked: How do ordinary Israelis and Palestinians narrativize their experiences of the conflict, and how do everyday objects embody these narratives? Drawing on more than thirty interviews and hundreds of hours of participant-observation, I suggest that divergent memories of brutal conflict, structural violence, and dehumanization shape the perceptions of Israelis and Palestinians and fuel everyday tension and mutual distrust. I also argue that individuals in Israel/Palestine employ objects and images to evoke memories of the near and distant past that both perpetuate and resist prevailing violence.

Contemporary Egyptian Nationalism Through an Ethnographic Lens*

Natalie Triche (Dr. Brian Pennington) Department of Religious Studies

From 2011-2013 Egypt saw massive protest movements that first sought to and then successfully toppled the regime of Hosni Mubarak. The protests led to elections that named Mohamed Morsi of the Muslim Brotherhood's Freedom and Justice Party to the presidency (the first ever democratically elected president of Egypt). After only one year, Morsi was ousted in a military coup led by Abdel Fattah Said al-Sisi, the military general who took office as president in 2013, where he remains today. Over the past decade, al-Sisi's regime has consolidated power, aided by his regime's facilitation of a singular national identity via tools of secularism, like establishing the supremacy of national identity over others, especially religious affiliation. Egypt's constitution names the nation as an Islamic country, yet Sisi foregrounds secularity in his governance. Over the course of two years, I pursued the question, what is the particular nature of Egyptian secularity and what are its implications for Egyptian identity? In a post-Arab Spring society, considering how identity is managed differently in public and private spheres is important because doing so reveals the way authoritarianism is negotiated in everyday life in Egypt. This project employed ethnographic fieldwork methods of data collection over the course of eight weeks in Cairo and interprets that data through the analytical frameworks of religious studies and global studies. Bringing the findings of preeminent scholars of secularism Saba Mahmood and Talal Asad together with the research I conducted leads me to argue that there are two central ways Egyptians frame their identity in primary ways in their everyday life. The first is *beledi*, or local, nationalism that takes a vernacular form and emphasizes love for Egyptian culture. The second is state-sanctioned nationalism. In this formation of national identity, pride for Sisi's regime is

prominent. These two distinct forms of Egyptian nationalist expression that emerged in the course of my interviews reflect patterns in the negotiation of identity in authoritarian, post-Arab Spring Egypt.

Sociology & Anthropology

Impact of Internet Resource Integration on Immigrant-Owned Microenterprises' Profits in Greensboro, N.C.*

John Luke Farah (Dr. Mussa Idris) Department of Sociology & Anthropology

This research explores immigrant-owned microenterprises supported by the North Carolina African Services Coalition (NCASC) in Greensboro, N.C. It focuses on the impact of the implementation of online resources on immigrant and refugee-owned microenterprises. This study investigated the effectiveness of developing an online presence for the increase of microenterprise market reach and profits. The ultimate goal was to explore whether other similar microenterprise programs nationwide should develop curricula in online resources integration in addition to credit-history building and microenterprise-loan training. The research methodology in this study included fieldwork observations with the business loan manager at the NCASC, review of written profiles of the micro entrepreneurs, one-on-one business and media consultations with micro entrepreneurs and a final semi-structured interview with six micro entrepreneurs to determine the effectiveness of the online resources and the likelihood that they will continue to use them. The study started in July of 2022 and will continue until May of 2023, and the sample included 6 micro entrepreneurs, 4 male and 2 female (including from the Democratic Republic of the Congo, Syria, Sudan, South Sudan, Ethiopia and Eritrea), in a variety of micro businesses, including grocery services, hair braiding services, transportation services and food services. The main findings of this study indicate that each micro entrepreneur needed specific types of online and offline resources to best facilitate their online market presence. These online resources include social-media marketing strategies, advertisements, online business-card tools, Square business software, social media presence (e.g. on Facebook and Instagram), translation of online materials and graphic design support. Preliminary conclusions of this study reflect that the implementation of online resources into microenterprises can be effective at increasing market reach and profitability. This study suggests that microenterprise programs should include training for refugees to develop an online media presence as part of its training curriculum to benefit their clients and their programs.

Perceptions of Crime from 1994 to 2022: A Content Analysis of Partisan Newspapers and a Survey of US Attitudes*

Maggie E. Noble (Dr. Raj Ghoshal) Department of Sociology & Anthropology

In the 1990s, tough on crime policies became a popular means to combat rising crime rates. Following the peak in crime rates in the 90s, crime had been steadily declining until recent years. After the murder of George Floyd, protests called for defunding the police, police reform, and prompted media attention to highlight police brutality. This research seeks to understand how views on crime prevention have shifted from 1994 to 2022 and current US perceptions of crime. I employed two methodologies to shed light on these questions: content analysis and a survey. First, I analyzed articles from the *Washington Times* and the *Washington Post* to see how crime prevention bills are presented in the media. Data was collected by searching for articles focused on different crime bills, such as the 1994 crime bill and the First Step Act. Second, the survey portion of this study was sent to a representative sample using Luc.Id. Two hundred forty-three responses were collected to analyze US

attitudes on preventing crime and the seriousness of different types of crimes. Data from both methodologies are essential for understanding how different approaches to preventing crime are viewed. These results have implications for understanding what types of crime-reducing policies would be supported by the US population. I found no major shifts in the way each newspaper viewed crime reduction policies, as each newspaper tended to mirror its political party's views. From the survey, I found that while people gravitate toward the label of tough on crime, when given specific policy options, most people favor a mix of some tough on crime approaches and some soft approaches. This research adds to existing literature focused on attitudes toward crime prevention policies by analyzing policies and attitudes following massive protests calling for reform.

Liberation Through the Land: Exploring Queerness in Appalachian Agriculture*

Samantha J. Schwamberger (Dr. Robert Perdue) Department of Sociology & Anthropology

The back-to-the-land movement of the late 1960s and 1970s pushed back against industrial agriculture through organic and sustainable farming methods which defied traditional capitalist ideas and centered ecological consciousness. Moreover, many of the traditional gender roles found in the conventional agricultural setting were upended on these farms and homesteads. Responsibilities deemed either feminine or masculine began to break down as more women began to identify as farmers and transgress traditional gender norms. Studies examining how gender operates in sustainable agriculture have proven illuminating, but much less attention has been paid to how sexuality and queerness operate in these spaces (Hoffelmeyer, 2019; Leslie 2017, 2019; Wypler, 2019). This research sheds light on this overlooked topic by examining the experiences of queer farmers in Appalachia, helping to better understand the nexus of sexuality and sustainable agriculture. Specifically, I ask: how do queer people in Appalachia make meaning and forge their identities by practicing sustainable farming techniques in a new back-to-the-land movement? In the summer of 2022, I conducted 8 weeks of ethnographic fieldwork among queer farmers in Appalachia through interviews, participant observation, and immersion in culture to understand the intersection of queer identities and farming. Interviews were transcribed and coded using in vivo grounded methodology of Saldaña (2009) and Corbin & Strauss (2008). Through interviews and participant observation with fifteen queer farmers in Appalachia, I find that farming offers queer people the opportunity to defy limitations to their sexual identity, to create inclusive and secure food systems, and to challenge meteronormative queer stereotypes that suggest queer people can only be open and happy in urban settings. I also find that isolation and a general lack of community are the biggest challenges threatening the viability of farming for queer individuals in the region. Results of this project shed light on the queering of American agriculture in the Appalachian context, as well as the general direction of this new back-to-the-land movement.

Predicting Attitudes Towards the Defund The Police Movement vs. Police Budget Reallocation Reform: An Exploratory Study

Jessica N. Skelley (Dr. Rena Zito) Department of Sociology & Anthropology

The #DefundThePolice hashtag surged on Twitter following the police killing of George Floyd in the summer of 2020. Police reform movements peaked shortly thereafter, and the hashtag has remained a part of the cultural dialogue ever since. As a social media hashtag, "Defund the Police" represents a variety of perspectives on police reforms and police abolition. There is little agreement about its meaning, though it is typically invoked in calls for reallocating police funds, increasing implicit bias

training, and improving data collection. This study explores the individual-level predictors of attitudes towards the Defund the Police Movement and the police budget reallocation reforms it embodies. Specifically, this study uses survey data from a nationally representative sample of 379 U.S. adults to address whether the terminology of "Defund the Police" reduces support among those who otherwise endorse the reforms sought by the movement. Specific budget reforms include the reallocation of funds to social services, mental health resources, and substance abuse treatment. Results from OLS regression models provide support for my hypotheses, including: (1) significantly more support for police budget reallocation than the DTP movement, (2) less-favorable perceptions of police are associated with greater support for both reallocation and the DTP movement, though the effects are stronger for reallocation, (3) concern about crime moderates the effect of perceptions of police on attitudes towards police budget reallocation such that greater concern about crime exacerbates the effect of less-favorable police perceptions, and (4) there is a large Black-White racial gap in attitudes towards the DTP movement but not towards police budget reallocation. With regards to the fourth finding, I find that this effect is driven primarily by racialized experiences with negative police encounters and less favorable attitudes towards police among Black respondents. This study provides insight into the ongoing police legitimacy crisis, and it suggests that accomplishing meaningful reform will require a shift in messaging rather than a shift in attitudes.

Assessing a Theoretical Model About Motivations for Change Within College Student Memoirs

Brad R. Weiss (Dr. Alexis Franzese) Department of Sociology & Anthropology

The transition to college can expose young adults to opportunities to evaluate and alter their sense of identity. Beyond developmental processes, how and why do some students make the decision to change themselves during their college years? A theory put forth by Kiecolt (1994) proposes that the decision for self-change occurs through four stages; the impetus to change, conditioning factors, a critical event, and finally appraisal. The impetus to change begins with stressors that ultimately lead to reduced self-efficacy, esteem, or authenticity which may cause psychological distress. Should several conditioning factors be present that allow change to occur, a turning point or critical event in one's life can lead to appraisal and serve as the final motivation to pursue change. We evaluate this framework through a qualitative approach encompassing content analysis of four memoirs of college students about their transitions to campus life and college experiences. The selected memoirs (They Said This Would be Fun, Educated, Don't Follow Me I'm Lost, and Confessions of an Ivy League Fratboy) were published after 1995, were not independently published, and focused on a student's experiences. Utilizing the constant comparative method for data analysis (Glaser, 1978; Glaser & Strauss, 1967) we identify relevant themes for change and assess the four components of Kiecolt's model. Results indicate support for Kiecolt's model, with many examples of the powerful role of reductions in self-efficacy, self-esteem, or authenticity in leading to change. We observed that self-awareness about the reductions in those domains was not merely fueled by social comparison as suggested in the model, but actually required social comparison. Similarly, a belief that identity change is possible was found to be a requisite for making said change, rather than optional as suggested by the model. Finally, the model is more cyclical than it appears, with people able to re-engage with the process of change after having gone through it. These findings offer important insights about the influence of the environments that students find themselves in, or especially ones they self-select, as the backdrop for their college years and the transformation that may occur during this period of development.

The Aesthetics of French Pastries: A Cultural and Historical Account of Pâtisserie in Paris

Katherine E. Wunderlich (Dr. Leyla Savloff) Department of Sociology & Anthropology & (Dr. Nina Namaste) Department of World Languages & Culture

French cuisine is considered the backbone of Western culinary standards and techniques, and pastries are symbolic of tradition and identity, especially when analyzed within the context of France, more specifically Paris. Pastries' history and aesthetics provide insight into what is considered authentically French, like *pain au chocolat* or *madeleines*, but pâtisserie specifically is rarely investigated as a vessel of history and culture or a representation of tradition and national identity. When the pastries are removed from their cultural contexts in France, they are forced to adjust in accordance with their new environment. To better understand the effects of globalization and larger influences between pâtisserie and its cultural contexts, I conducted an ethnographic study by collecting participant observatory data from pâtisseries in Paris and in New York City. I also conducted semi-structured interviews with French pastry chefs in Paris and in the United States to understand their rationale when creating the French pastries. Although French pastries appear seemingly unchanged within the context of pâtisseries in Paris, they have undergone symbolic reconstruction to align with the desires of consumers, which differ by location. In Paris, customers prefer pastries devised to mimic tradition, while in New York City, consumers prefer new, innovative forms of French pastry. Although presentation differs between the two locations, French pastry chefs in New York City and in Paris both operate under the expectation and intention to keep their respective businesses open to the public. Overall, I conclude that the cultural forces at play in Paris and in New York City that affect the creation of French pastries revolve around differing values, but the underlying attitudes of French pastry chefs remain the same.

Sport Management

Enhancing Fan Engagement and Retention by Implementing the Metaverse: A Case Study of Charlotte Hornets

Brett M. Bailey & Maxwell A. Casey (Dr. Young Do Kim & Dr. Tony Weaver) Department of Sport Management

With the continuous advancements in digital technology, the National Basketball Association's (NBA) Charlotte Hornets strive to be on the front edge of technology and incorporate the metaverse into their current fan engagement strategies. The metaverse, a platform for virtual, augmented, or mixed reality via the internet and mobile technology, optimizes fan experiences by providing convenient viewing options, interaction opportunities, and gamification elements. Leading the way into the metaverse may allow the Charlotte Hornets to attract new fan bases, thereby gaining new revenue streams. Despite the growing trend and pressure toward the adoption of the metaverse, this novel fan engagement technology has just begun to take a first step into the sport business. In other words, it becomes challenging for the Charlotte Hornets to design and produce sport metaverse experiences without knowing their target audience's wants and needs. This current market phenomenon leads to the following research question: How can the Charlotte Hornets create new levels of fan engagement to maximize the economic benefit by harnessing the metaverse? Therefore, the purpose of this study is to investigate the current metaverse market situation and technologies in the context of professional sport organizations and propose evidence-based fan engagement strategies for the NBA's Charlotte Hornets. This study relies on secondary data and the existing literature in the

metaverse to address the research question. Our findings suggest that the Charlotte Hornets should utilize three avenues of fan engagement through the metaverse platforms. First, a metaverse convention where they can provide education on the benefits and functions of the metaverse. Next, player centralized promotions where current and former players of the Charlotte Hornets will promote the new land in the metaverse to explore on different platforms. Lastly, a virtual walkthrough would allow fans to experience a walkthrough of the virtual Spectrum Center without having to leave the comfort of their home. These unique strategies will allow the Charlotte Hornets not only to build a brand image as a forward-thinking sport organization but also offer technologically enhanced experiences in ways the fans never could before.

College Students Consumption and Interactivity with Digital Action Sports Content

Michael Brown (Dr. David Bockino) Department of Sport Management

Professional action sports athletes, casual participants, and affiliated companies have long been involved in the production and consumption of action sports digital media content. However, in a marketplace saturated with options, the nature of digital content consumption is always evolving. This research sets out to understand one aspect of this evolution: how college-aged individuals consume and interact with action sports digital media. Guided by the theoretical foundation of uses and gratification theory (Khan, 2017; Ruggiero, 2009), qualitative data was collected through two focus groups (Whiteside & Hardin, 2011) consisting of 10 participants each. One focus group consisted of individuals who identify as heavy action sports content consumers and the other focus group consisted of individuals who are casual consumers of action sports content. Participants of each focus group were shown three short form action sports videos from three different sports, companies, and level of brand presence. Questions were asked to both groups that centered around brand favorability, advertising effectiveness, sentiment, and interactivity. Three key themes emerged that illustrated the groups engagement and consumption of the content. (1) Their overall general and sport specific motivations from content were driven by the ease of their phone which serves as a conglomerate of sources that allows the students access to quick, diverse, and up-to-date information. (2) Impressions of the videos shown, from a sport perspective, illustrated that the students prefer to see sports used in advertisements that are not extremely mainstream because it catches their attention quickly and maintains that engagement throughout the advertisement. (3) Impressions of the videos shown, from a production and marketing perspective, highlight that the use of athletes' stories, music, and a high production value helps the audience see the advertisement more as a video and less as an advertisement, which generates engagements and word-of-mouth advertising. From an academic perspective, these conclusions will contribute to our understanding of an evolving media landscape and uses and gratifications theory. From a professional perspective, this data will help companies understand how to effectively reach their target audiences and better utilize action sports market in their strategic marketing plans.

Exploring Efficiency and Profitability in the College Football Win Totals Market: A Heuristic-Based Analysis

Bennett Lynch (Dr. Alex Traugutt) Department of Sport Management

Sports betting markets have become a focal point for academic research to explore questions related to market efficiency and human behavior. To date, most sports betting research has focused on individual game outcomes, concluding that markets are generally efficient, with few opportunities for profitable

returns. In contrast, season win totals markets, where bettors wager on whether a designated team will win more or fewer games in a season than the posted total line, have exhibited consistent inefficiencies and avenues for profitable returns. More specifically, heuristic-based strategies yielded above-average returns in various professional sports (e.g., Woodland & Woodland, 2015). Heuristics are mental shortcuts individuals utilize to simplify their decision-making, often leading to judgmental errors. In particular, the representativeness heuristic has been cited as the basis for biased decision-making, leading bettors to overestimate the impact of past performances on future outcomes. Sentiment bias has also been cited as a source of inefficiency, as bettors tend to exhibit a preference for historically successful teams. The purpose of this study was to examine the efficiency and profitability of the season win totals market in college football using a heuristic-based analysis. To date, previous research has focused largely on professional sports. The dataset spans ten seasons (2012 – 2022, excluding the 2020 season) and includes 581 lines. The first step in the process was to conduct a weak-form test of market efficiency using a logistic regression model from the perspective of the under bettor. Results indicated that the market was inefficient such that the probability of winning an under bet increased as the win total increased. Five betting strategies were then derived based on the model outcomes and errors in judgment that result from the use of heuristics. Tests of efficiency analyzed whether average returns were greater than average bookmaker commissions, while tests of profitability examined whether returns were greater than zero. Results from the various betting rules indicated that the market is inefficient, with several strategies providing profitable returns. Detailed results will be presented for each strategy, providing valuable insights into the dynamics of this market and the impact of heuristics on financial decision-making.

An Audit of the NCAA Landscape Using Athletic Department Sport Offerings*

Jack Rardon (Dr. David Bockino) Department of Sport Management

Key moments in college athletic history—including Title IX, Covid-19, and the changes regarding name, image, and likeness rights for athletes—have had a large impact on the makeup of athletic departments. This research continues the work of previous scholars (Anderson, 2004; Cooper, 2011; Swanson, 2020; Williams, 2021) who have examined how and why athletic departments determine what sports to support and which to cut. For example, Williams (2021) looked at the 352 programs cut that cited Covid-19 as the primary reason, and Swanson (2020) investigated the swift actions that were taken by athletic departments immediately following the cancellation of the 2020 March Madness Tournament. This topic is important because it can contribute evidence to help predict future changes made to athletic departments that are facing new financial challenges with the everchanging NCAA landscape. The core of this study is a comprehensive audit on the athletic department makeup of all 363 Division 1 programs. This includes Power Five schools such as Ohio State, Alabama, and Clemson, Group of Five schools such as Boise State and Miami University, FCS schools such as Elon and Wofford, and non-football schools such as Marquette and Gonzaga. The audit was organized by the schools' primary Division 1 conference and broke down which sports were offered for men and women ranging from basketball to rodeo. This data will then be analyzed and organized visually in order to uncover trends by which certain sports are kept or cut. Additionally, samples of athletic department communication have been gathered to examine, and then further predict, athletic department changes based on the justifications given by those in charge. Together, these two strands of research will lead to conclusions on how to best predict what the future landscape of Division 1 athletics looks like as it faces new financial challenges with the changing environment.

A Modern Evolutionary Impact of NIL: Player, Performance, & Profit

Douglas Ulrich & Zillion Moe (Dr. Khirey Walker) Department of Sport Management

In our American society, few industries are as complex yet seemingly transcendent as college athletics. Beguiling and accessible in equal measure, the sporting events held by higher academic institutions nationwide have hosted long-standing traditions, captivating feats of athletic prowess, and an unmatched passion for the game. Since the inception of the largest governing body in college sports, the NCAA, student-athletes were unable to profit off their talent while coaches, athletic directors, and schools did. The result of the NCAA v. Alston (2021) case allowed for states to expand on the decision and pass laws allowing players to earn money on their name, image, and likeness (NIL) (Oyez, 2023). The purpose of this study is to examine student-athlete NIL deals, the implementation of state NIL legislature, and the various strategies implemented by NCAA member institutions to provide opportunities within their athletic department. For example in July 2021, the state of North Carolina became one of the first states to introduce a NIL executive order focused on protecting student-athletes and deferring policies regarding facilities and official marks to each individual institution. Recently, Elon University's athletic department launched "Forever Phoenix", which is an NIL network partnership with Opendorse. Through this partnership, Elon student-athletes would be able to seek out and accept name, image, and likeness prospects from a variety of local, regional, and national organizations. This study is qualitative in nature and information pertaining to specific NIL details will be collected from a variety of resources, including but not limited to: On3, Opendorse, the NIL Network, Business of College Sports, and the NIL Source. Once data has been collected, details will be coded by a two-person coding team, and a content analysis will be executed in order to explore patterns regarding NIL legislation and student-athlete deals from state-to-state.

From "Statcast" to the "Pitch Clock Era": Solving Baseball Analytics Challenges Using Quantitative Data and Traditional Baseball Knowledge

Evan Wu, Nick Ullian, Will Carroll, Teddy Freeman, & Jackie Jovanovic (Dr. Mark Cryan) Department of Sports Management & (Dr. Ryne Vankrevelen) Department of Mathematics & Statistics

This presentation will be centered on the work of the Elon Baseball Analytics Case Competition Team, jointly supported by the School of Communications and College of Arts & Sciences. The case was developed by former Society for American Baseball Research Board President Vince Gennaro. Teams were asked to measure the "impact of incorrect ball-strike calls" and analyze "the ways in which these calls might have affected the final score and outcome of selected games." The idea of "robot umps" and an automated strike zone has grown increasingly popular lately, and this research takes a look at what impact that may have had on two specific games. Using a predictive model and an expectancy matrix, we attempted to individually evaluate the costliness of each incorrect call. We found that the great majority of the most impactful calls were made when a batter had two strikes, where the call was the difference between whether or not the current batter was out. When accounting for the differences between run expectancies for the correct call (versus that of the one on the field), both games would have had a different winner, which demonstrates the weight that incorrect ball/strike calls can have on runs and game outcomes. This research project includes identifying and defining the research question being asked, defining relevant terms, and deciding what data is appropriate and what assumptions must be made. The goal is producing a solution that isn't necessarily the "right" answer, but is a logical, data-based solution. Student researchers employed traditional baseball knowledge, statistical

programming, and utilized currently available analytics metrics, both historical and predictive. The case competition provided the students a platform to showcase their skills in front of judges that included major league team employees.

Strategic Communications

The Next Gen Sponsors of NASCAR: How Brands Use IMC on Twitter While Sponsoring a Full Car Wrap of a NASCAR Cup Series Car

Brett M. Bailey (Dr. Daniel Haygood) Department of Strategic Communications

This study examines the brands that sponsor full car wraps on 2022 NASCAR Cup Series cars and how they use Twitter to leverage their sponsorship(s). IMC in sports is more important than ever to use all available channels to reach potential customers. This study was a quantitative analysis that examined the main Twitter accounts of brands that sponsor four NASCAR Cup Series Playoff drivers. Specifically, it looked at their Twitter activity during the week leading up to the race. The tweets that were analyzed spanned the entire 2022 season from February 14th to November 7th. They were analyzed for the type of content they contained, such as types of graphics, mentions of the sponsorship, sources of tweets, and the timing of the tweets. The research found several key findings. They included the following: Most brands (70%) were very active on Twitter, while others (30%) did not use the platform frequently. A majority of the tweets mentioning a brand's sponsorship (66.5%) were posted during the week leading up to the race, and certain sponsors (36.7%) also tweeted during the race. Brands posted their graphics of the sponsored cars and retweeted posts containing videos and pictures taken of the car by others. Brands with car sponsorship packages that included two to eight, 15, or 16 races interacted more on Twitter than packages including 1, 10, 13, or 14 races. Some brands put more effort into their relationships with the cars and drivers they sponsor, while others barely mentioned the sponsorships at all on their main Twitter accounts. Certain brands, such as Mobil 1 and Hunt Brothers Pizza, didn't mention their motorsports sponsorships on their main Twitter accounts. Instead, they had separate Twitter accounts solely dedicated to tweeting about these sponsorships. In addition to posting standard static tweets, Busch Light and Mahindra Tractors used other formats to promote their sponsorships. These included long-form videos and trivia/giveaways. Ultimately the research demonstrated two extremes when it comes to how brands used Twitter to promote their sponsorships of 2022 NASCAR Cup Series cars. They either used Twitter extensively or not at all.

Sex Sells: A Content Analysis of Changes in Cosmopolitan's Sex-Related Headlines Over 40 Years*

Anna C. Cave (Dr. Jane O'Boyle) Department of Strategic Communications

Women's magazine articles feature sexual advice as a major content element. This qualitative content analysis examines whether *Cosmopolitan* magazine has changed the way it frames sex by analyzing the sexual focus of cover headlines through the promotion of female or male pleasure. Multiple research studies have been conducted that offer insight into the subject matter discussed in the current study. Prior studies show that sexual advice in women's magazines is purposeful and attractive to the audience and will likely be prevalent in media for years to come, proving the importance of studying such a topic. The headlines on the covers of *Cosmopolitan* in 1979, 1999, and 2019 were used to track changes over time. This study will focus directly on how the headlines themselves frame sex for the intended audience of women, and how that framing has changed over time. For this study, inclusive

sex is defined as sex described without set gender roles, or heterosexual sex that simultaneously emphasizes both female and male pleasure. There was a shift toward male pleasure on the covers of the 1999 issues before moving away from the male focus in 2019. The adjustments over time in sexual focus on the cover headlines of *Cosmopolitan* aligned with significant social and cultural movements during the prescribed period. *Cosmo*'s headlines about sex align appropriately with cultural women's movements. Observing the changes in this vanguard women's magazine that has a print audience of 10.2 million (*Cosmopolitan Media Kit,* 2022) and is still read by new generations of young women is important because women's magazines have been proven to influence their audience when it comes to the societal construction of what it means to be a woman (Durham, 1996).

What Does it Mean to Look Healthy? Body Diversity in Women's Fitness Advertising

Grace E. Hallowell (Dr. Barbara Miller Gaither) Department of Strategic Communications

This study will examine how women's fitness brands portray their health and appearance over the past two decades, specifically before and after the body positive movement. The body positive movement originated on Instagram in 2012 to celebrate and honor bodies of all shapes and sizes. Specifically, this research will explore the advertising of women's fitness clothing brands in magazines to examine if/how the brand's advertising has changed, including the language used to describe women's health and appearance, as well as changes in the look of models or clothing. While research suggests that the language used to describe women's bodies and women's fitness has changed extensively since the body positive movement began, previous research from 2014 has also found that women's fitness advertising does prioritize thinness and weight loss. Therefore, this research will explore if/how brands are responding to changes in society relative to body positivity, in both their words and visuals. Additionally, this study will explore the way women's fitness advertising promotes weight loss and slimness. This research will contribute to the field by examining more modern phenomena, and by seeing how much brands and observed social changes correlate. This study uses a content analysis to examine advertisements in women's fitness magazines from the late 1990s to the early 2000s, and to the current time, from the late 2010s to the present day. The advertisements will be examined for the words used in them, such as healthy, thin, and slim, and the associated images of the models, their body size and type of clothing they are wearing, such as midriff-baring tops or full coverage clothing.

Starbucks France: Analyzing Communications and Coffee Culture through the Circuit of Culture

Anelisa L. Holder (Dr. Kenn Gaither) Department of Strategic Communications

A country roughly the size of Texas, France can boast that its citizens consume two times more coffee a year than the international average. Although France has a strong coffee and cafe culture, international chains, such as Starbucks, have struggled to find a foothold in the country. Starbucks has relatively few locations in France compared to other European countries, and evidence suggests the French have not embraced the global coffee behemoth. The purpose of this research is to examine Starbucks' branding and communications in France as well as French customers' perceptions of Starbucks. The topic is important to the field of public relations (PR) because as the world is becoming increasingly connected and globalized, it is critical for PR practitioners to effectively navigate other cultures. Multinational companies (MNCs) must consider their communications and marketing to attract customers in countries different from the host nation. Because consumers worldwide often have preexisting perceptions of large brands, MNCs must be aware of their reputation and that of their

country of origin before opening in new locations. To understand French consumers' opinions of Starbucks, participant observation was conducted at Starbucks locations in France, in addition to interviews with French Starbucks customers and non-customers. To analyze how Starbucks France communicates with its publics, a content analysis of its website was conducted. Findings from the three methods are discussed through the lens of the circuit of culture, a theoretical framework created by Stuart Hall and other academicians from Open University in Britain who suggest meaning is a cultural practice woven through five "moments." The circuit of culture provides a robust analytic framework to view Starbucks in a cultural context and inform communications strategies for MNCs in general. Findings from this study suggest that Starbucks France is not consistently following effective public relations practices but has still found a meaningful place in French coffee culture.

A Period Piece: Analyzing How Portrayals of Menstruation in Films Have Evolved from the 1960s to the 2020s*

Nadine M. Jose (Dr. Jane O'Boyle) Department of Strategic Communications

This study examines how portrayals of menstruation in film have shifted from the 1960s to the 2020s. While attitudes, technologies, practices, and laws on menstruation have shifted tremendously over time, research has yet to examine whether films have shifted in their perspective. Thus, this study interrogates how both the presence and absence of menstruating girls and women in films reinforce antiquated and misguided norms regarding how people ought to menstruate. In order to investigate how depictions and attitudes on menstruation have evolved, this study employed a qualitative content analysis on four films: James Clavell's 1967 film To Sir, With Love, Brian De Palma's 1976 Carrie, Howard Zieff's 1991 My Girl, and Domee Shi's 2022 Turning Red. The films were selected as they spanned over sixty years and incorporated different genres. The films were watched and coded using attributes developed by the student researcher. Some attributes coded were: whether disgust was expressed physically (retching, gagging, screams); whether disgust was expressed verbally; whether menstruation were alluded to but not directly addressed; whether the word "normal" was used in describing menstruation; whether shame, mockery or teasing was expressed from peers or adults to the character. Results show that portrayals of menstruation maintained a sense of shame and secrecy that manifested predominantly through coded language and teasing or condemning. All observed films used euphemisms and avoided the words "menstruation" and "period". Coded language in tandem with the exploitative nature that the films depicted reinforced that menstruation must be something to be ashamed of and conceal. Another common facet of these films were peers, and even adults shaming or mocking the characters for menstruating. Multiple films had scenes centered around peers and adults being outwardly judgemental, belittling, and malicious in their dealings with the main character. Other themes included an association with menstruation as supernatural, further supporting the necessity of being secretive and a target to be mocked. Overall, the patterns and characteristics noted in these films depict both how far cinema has come in abandoning certain outdated ideas about menstruation, as well as the progress still left to normalize a rudimentary experience like menstruation.

Social Setback: A Study of Social Media's Role in College Students' Well-Being During COVID-19

Olivia A. Nevin (Dr. Daniel M. Haygood) Department of Strategic Communications

This study investigates the impact of social media usage during COVID on current college seniors through the lens of the uses and gratification theory. Uses and gratification theory includes five needs

of consumers: cognitive needs, social integrative needs, tension-free needs, affective needs, and personal integrative needs. Recent uses and gratification literature does not include significant analysis of how specific social media applications fulfill certain needs under this theoretical framework, particularly in regards to college students. Previous research on social media usage amid quarantine revealed some addictive and destructive behaviors related to social media usage, especially when one believed to have lost their locus of control (Brailovskaia & Margraf, 2021). The goal of this research was to better understand how students used social media to fulfill one or more of the five core needs during the pandemic and how their social media usage has changed since 2020, if at all. Multiple focus groups consisting of 10 college seniors were conducted to gather students' reactions to their quarantine experience. Results demonstrate that students used TikTok and Instagram to learn about current events and stay connected to loved ones, therefore fulfilling both cognitive and social integrative needs. Snapchat fulfilled social integrative needs as well through users' ability to "vlog" their days in quarantine. Students fulfilled tension-free needs through "mindlessly scrolling" on TikTok to escape the stress that came with living through isolation. Additionally, results showed that social media habits have changed dramatically since 2020, with many students actively trying to use social media less than they did during isolation. This is primarily due to an increased awareness of excessive social media use during the pandemic. Overall, the research reinforced the idea of social media being a productive resource for students during quarantine, but also a mentally damaging tool if overused.

A Comparative Analysis of World War II Propaganda Posters

Erin C. Shugar (Dr. Kenn Gaither) Department of Strategic Communications

While propaganda is often discussed in the context of the World Wars, it was used long before the 20th century, and its prevalence shows no signs of stopping. The World Wars changed the previously neutral dynamic perceptions of propaganda, which undeniably influences public opinion, to far more sinister connotations. Definitions of propaganda are fluid, changing with context and culture. Still, there is a widespread scholarly agreement that propaganda relates to persuasion and communication. Regardless of how propaganda is used, it has continually proven effective in communicating to the masses, making it a crucial area for scholarly research. This study is a comparative analysis of propaganda posters created during the Second World War, from 1939–1945. Although many nations participated in the war, this research examines posters by The United States, United Kingdom, Germany, and Italy. Through qualitative and quantitative content analysis, this research addresses the following questions: What narratives are embedded in the propaganda posters made by America, Great Britain, Germany, and Italy during World War II? How do design elements such as color, text, font, and symbols contribute to the meanings of WWII propaganda? What narratives are consistent throughout propaganda made by countries in the same alliance? Which are different? What are the situational factors that affect the prevalence and strategy of propaganda posters? Answering these questions contributes to research both about World War II propaganda but also about persuasive and effective communications in the modern day. Early results indicate that propaganda posters are more alike than dissimilar and employ many of the same features.

Street Drugs Merging: An Exploratory Content Analysis on the Framing of Ketamine Treatment for Depression and Traditional Antidepressants within Major U.S. News Outlets

Jake A. Twer (Dr. Daniel M. Haygood) Department of Strategic Communications

This study examines the framing of ketamine treatment for depression as well as the coverage of traditional antidepressants such as Prozac or Zoloft within a selection of U.S. media. Ketamine was originally used as an anesthetic in the Vietnam War, evolving to usage as a recreational street drug known as Special K. Recently, it has been found to have antidepressant properties. Mainly used in low doses as an intramuscular injection or IV, ketamine treatment causes rapid effects. Patients are monitored in the room of a clinic for several hours as they experience hallucinations, dissociation, and euphoric feelings. Hundreds of clinics across the U.S. are administering these ketamine treatments, even though ketamine is not FDA approved. With nearly 50 million Americans experiencing mental health issues and over half of them not receiving care, finding an effective form of treatment is vital. No previous scholarship has been published in academic sources exploring the framing of both ketamine treatment and traditional antidepressants within U.S. news outlets. Relying on a quantitative content analysis, the researcher manually coded 64 articles from The New York Times, The Washington Post, The New York Post, and CNN. Several themes emerged on topic areas such as tone, doctor references, patient quotes, and side effects. The research found that ketamine treatment articles were framed more optimistically, and traditional antidepressants were framed more negatively. For example, articles noted that ketamine treatment causes a rapid and robust effect within hours, meaning patients do not need to wait 6-8 weeks with traditional antidepressants. Further, coverage highlighted recent studies on traditional antidepressants which found that they were not necessarily more impactful than a placebo; other trials emphasized the frequent side effects that patients experience. These articles about treatments often failed to include sufficient primary background information, such as side effects. This exclusion affected how the information was presented to readers and perhaps how it may influence consumer choices. News sources should include all important background information on forms of treatment so consumers can find the most effective treatment, which can then be complemented with psychotherapy.

World Languages and Cultures

A Man's World: An Examination of Self-Image and Worldview in Lucia Etxebarria's *Amor, Curiosidad, Prozac, y Dudas**
(This presentation is in Spanish.)

Lily C. Blake (Dr. Mayte de Lama) Department of World Languages & Cultures

Amor, Curiosidad, Prozac, y Dudas (2001) by Lucia Etxebarria follows the Gaena sisters as they explore their identity through their life experiences in 21st century Madrid. Cristina, Rosa, and Ana are each different, but their feminine identity is what unites them in a world dominated by patriarchy. During their entire lives, the Gaena sisters struggle with their romantic relationships, gender roles, abandonment issues, religion, and sex, which is shown through the narration of different stories by each sister. By applying Simone De Beauvoir's concept of "The Other," we discover that while the sisters question, critique, and denounce the patriarchal expectations that society lays out for them, they are unable to break the system that they fight against. Through three distinct discourses, the sisters tell their stories, spanning from childhood to adulthood, about how the presence of the patriarchy affects the female experience and how living in a paternalistic society changes the way each of them perceives not only their own self, but also the world around them.

It is We Who Cannot Understand: *Aluap* and the Military Dictatorship in Argentina (1976-1983)*
(This presentation is in Spanish.)

Stephen Bloch-Schulman (Prof. April Post) Department of World Languages & Cultures

Released in 1997, *Aluap* is a short film mainly set in 1976, the beginning of the Process of National Reorganization, the Argentine dictatorship. In an early scene, its titular character, Paula, draws her name on a piece of paper and holds it up to the mirror, proclaiming: "Look, Mom, my name is Aluap in the mirror." Together with the film's epigraph—a quotation from the Alice books of Lewis Carroll—we see three important elements early in the film: 1. the importance of Paula for the film, 2. the connection the film is making to Lewis Carroll's Alice books, which are both referenced in the epigraph and in the language Paula uses (one of Carroll's books is *Through the Looking Glass and What Alice Found There*, the looking-glass being another name for a mirror), and 3. the main metaphorical thread that runs through the film, specifically, the understanding of the backwardness of life under a dictatorship. Through these three, we are given to assume that Paula, a young girl in a world in which the rules have become backwards, is a stand-in for Alice in her similar circumstances. This would lead to a deep insight: in life under dictatorship, like in Alice's adventures, the gap between what one habitually expects and what occurs in the new circumstances is so great that it is impossible to know anything. This epistemological insight is, indeed, the central lesson from *Aluap*. But in a strange way. After showing ways the events of the film are, in subtle ways that are likely to go unnoticed, themselves impossible, I will argue that the backwardness of life under dictatorship is manifested in the film in a way that itself is backwards. it is not the case that we, the viewers, watch Paula struggle to understand anything because her life has become so unpredictable. It is rather we, the viewers, who cannot understand, as we watch the film. It is *we* that are experiencing the unnerving effects of being unable to know, and it is we that gain a direct experience of epistemological impossibility under dictatorship.

An Evaluation of Student Health as a Result of Academic Environment at École Diagonale in Paris, France

Julia N. DuVal (Dr. Ketevan Kupatadze) Department of World Languages & Cultures

This project is an interdisciplinary case study that examines the effect of academic environment on student well-being, thereby combining educational research with a cross cultural analysis. The subject of this study is Ecole Diagonale, a private high school with a specialized schedule, pedagogy and curriculum in Paris, France. The importance of education in modern society cannot be disputed. That said, it is crucial to examine the implications of spending so much time invested in academics and analyze how culture impacts the relationship respective societies have with education. While it is natural to feel anxiety surrounding academics, this does not excuse the mental health crisis affecting adolescents globally. That said, Ecole Diagonale serves as an interesting model for middle and secondary school. The main component of their specialized approach accommodates a flexible schedule with classes ending by 1pm, thereby allowing students to live "multiple lives" by providing an opportunity for them to explore their passions outside of school. Data was collected via student interviews, classroom observations, and surveys filled out by students. The results of this study suggest that a flexible educational model is most beneficial for the mental well-being of students, and supports the development of other passions, leading to healthier lives in the long run. In sum, this study aims to analyze how mental and physical health is impacted by traditional and specialized educational models.

Traditions and Transgressions in and through French: Confidences à Allah (2008) by Saphia Azzeddine and La petite dernière (2009) by Fatima Daas*
(This presentation is in French.)

Julia N. DuVal (Dr. Sophie Adamson) Department of World Languages & Cultures

This project is a literary analysis of two novels by franco-maghrebian authors whose narrators painstakingly question their intersectional identities as they transgress the expectations of their traditional Muslim families. In *Confidences à Allah* (2008) by Saphia Azzeddine, 16-year-old Jbara "confides" in Allah about topics that include rejection, isolation, oppression, and prostitution. From a small village in the mountains of Morocco, Jbara expresses humor, sorrow, shame, rage, and, ultimately, signs of inner peace through subversive journal entries addressed directly to Allah. In Fatima Daas' autobiographical novel, *La petite dernière* (2009), the narrator identifies herself as "Fatima," a franco-algerian lesbian "sinner" who struggles to come to terms with her identity as she navigates adolescence from a suburb of Paris. In passages that are reminiscent of Jbara's writing, Fatima addresses portions of her journal to Allah from whom she seeks forgiveness and understanding. An in-depth analysis of both novels via a process of close reading reveals similarities and disparities in the narrators' language around identity, faith, culture, and sexuality, demonstrating their struggles in rejecting tradition in favor of their authentic selves. Fatima admits that she writes stories "to avoid living her own," but we see that her journal entries help foster a stronger sense of self and relation to Islam despite her self-deemed transgressions. Language is not only a tool but a gauge of her personal evolution. Jbara, too, professes to Allah in the last paragraph that her "love" for him has "enabled" her to "love herself" which has allowed her, more generally, to love. In sum, this project demonstrates how writing for both narrators serves as both a buoy and an indication of resilience, subsequently strengthening their faith and sense of self. This research will be presented in French.

Nuestra gente: The Negative Implications of Anti-Immigrant Policy on The Well-Being of Latinxs in Alamance County, North Carolina*
(This presentation is in Spanish.)

Tyra Duque (Dr. Juan Leal-Ugalde) Department of World Languages & Cultures

Federal institutions such as Immigration Customs Enforcement (ICE) and local entities such as the police department tend to induce negative reactions and target Latinx individuals. My research will focus on the effects anti-immigrant policies have on the well-being of Latinx people in Alamance County, North Carolina. In specific, I ask how policies –whether local and/or federal– and the xenophobic sentiment of politicians affect the mental health of Latinx individuals in Alamance County. North Carolina has been a destination for many Latinx immigrants to fill the demand for meat and agricultural jobs. This growth of Latinx individuals was seen in Alamance County from 1990 to 2005, which prompted political reactions (Hill, 2010). In my presentation, I will look into policies such as the 287(g) program, first put in place in response to the increasing number of undocumented immigrants. 287(g) is a federal partnership between ICE and the local Sheriff's Department that offers a financial incentive to detain undocumented individuals. In 2012, the United States Department of Justice released a report that found the Sheriff encouraged the arresting of "Mexicans," making Latinx individuals 4 to 10 times more likely to be stopped compared to White drivers (Bruno, 2012). I will focus on the well-being of Latinxs directly targeted (undocumented individuals) and indirectly affected (US-born citizens) by this policy. To conduct my analysis, I will refer to the current literature from Lorraine Salas, which supports that undocumented individuals experience heightened anxiety due to

the fear of deportation. This anxiety is also present in first-generation Latinx US citizens, who may fear separation from relatives (2013). I will also conduct a series of 10-15 interviews with Latinx people who have resided in Alamance County for over five years. I will do so to present the localized situation of these individuals, as there is little to no research on the topic. My objective is to propose an assessment of anti-immigrant policies and further understand how they target the wellness of Latinx individuals in Alamance County.

Identity in Julia: An Examination of the Obstacles That the Protagonist Overcame to Find Her Identity
(This presentation is in Spanish.)

Elizabeth C. Kohler (Dr. Mayte de Lama) Department of World Languages & Cultures

Through an analysis of the coming-of-age novel “Julia”, by Ana Maria Moix, this research examines how external influences and the challenges women face throughout their lives impact identity formation. One’s identity is a reflection of who they are and how they fit in the world and is defined through their values, world views, passions, and unique characteristics. The process of finding one’s identity is not a clear path. It is important to recognize the experiences that may challenge the course of development and how the strength to overcome such challenges is an essential component to identity formation. Throughout history women have been marginalized and limited in their choices and the novel “Julia” provides an example of how the protagonist overcame these societal and familial barriers. By analyzing the work of psychologists and other scholars I was able to draw conclusions about generalizable experiences found when examining identity and used this research to support my findings about the novel Julia. Substantial research exists which supports that the formation of identity, especially in women, is strongly impacted by influences such as maternal relationships, abuse and neglect, and societal norms which often prevent young women from making their own choices about what they do, believe, and who they want to be. Abuse and neglect at a young age reinforces feelings of inferiority and helplessness, sometimes leading to a lack of motivation to change their situation and mental illness. Overall, the research shows that not having support, freedom to make their own choices, and confidence in oneself is detrimental to the formation of identity and further explains how women, like Julia, must overcome obstacles and make their own choices to realize their full potential.

Humor and the Creative Arts in France: Stand-up Comedy as a Lens into the Global Pandemic
(This presentation is in French.)

Ivy Montague (Dr. Sophie Adamson & Dr. Olivia Choplin) Department of World Languages & Cultures

This presentation is dedicated to examining the lived experiences of the French during the COVID-19 pandemic, and will focus on the analysis of spoken texts of stand-up comedy acts that were performed in French for live audiences between 2020-2022. Art has long been a means by which people have processed and documented societal events, and it can act as a time capsule for historical moments. Knowing the cultural weight the French give to the arts -- both visual and performing – it is particularly interesting and important to conduct research regarding the changes that the pandemic and mandated quarantines have imposed on French artistic expression. Although stand-up does not have the same long-standing history in France as it does in the United States or the United Kingdom, it constitutes a growing form of artistic expression that comments on and questions French society. An analysis of stand-up acts about COVID provides a way of gauging French attitudes during the global

pandemic and sheds light on how humor reflects personal and cultural experiences. By looking at a variety of clips from January 2020 to December 2022, readily accessible through YouTube and Netflix, one can gauge shared experiences through the comedians' topics, language, tone, and audience reactions. The research includes textual analysis of written transcriptions and close readings of French news articles that were published throughout the French government's three mandatory quarantines as well as transcriptions of first-hand interviews of French citizens in the creative-arts. This project is important in that it contributes to our overall understanding of how the French experienced the pandemic, and this presentation will reveal the unique role of stand-up humor in offering a lens into society.

Impacts of Satirical Television on Political Perspectives in France and in the U.S.

Caroline Powers (Dr. Sophie Adamson) Department of World Languages & Cultures

Comedy is an essential part of all cultures in both creating and diffusing tension around socio-political topics. In our modern world, comedy has manifested itself into a form of political commentary. This research looks at France's nightly satirical puppet show, *Les Guignols de l'Info* (1988-2018), and published studies of its impact on national French elections. Subsequently, it makes and examines parallels to *Saturday Night Live* and its possible impact on contemporary American politics. It compares and contrasts the two shows, and it examines data that suggests there may be a direct correlation between satirical television, political leanings, and voter behavior. In addition to reviewing existing research on the two shows, these findings were drawn out through a series of relevant interviews and surveys that asked how people felt their political bias may be impacted. The research shows that despite viewers being aware of ideological leanings in these shows, they continue to watch weekly for entertainment purposes, and are therefore exposed to the ideas within them. This information draws attention to the impact of televised late-night humor on political leanings and decisions, suggesting that these types of shows possess the ability to reaffirm people's political beliefs.

Healthcare in Spain Versus The United States

Georgia Ritter (Dr. Ketevan Kupatadze) Department of World Languages & Cultures

Countries around the world have different customs, beliefs, and practices that make their culture unique. With various cultures, it is inevitable that countries will often take different approaches to social issues, I will be specifically focusing on healthcare and its implications in both the United States and Spain. It is no doubt that healthcare in the United States is extremely expensive, but in other countries, such as Spain, this is not the case. The most obvious difference between Spanish healthcare and United States healthcare stems from the cost difference. On average, an American citizen will spend around 12,900 USD per year whereas in Spain, most citizens pay no cost for public healthcare or around 2,800 USD for private healthcare options per year. This grave difference of thousands of dollars can be attributed to the mindset and political climate surrounding healthcare in these countries. These fundamental differences have arisen partially due to the question of whether healthcare should be considered a basic human right, or a privileged service that must be paid for. As it may be apparent, the United States and Spain do not share a common answer to this question. The answer to this question may be somewhat personal, however it is more widely debated in countries such as the United States when compared to Spain and other European Union countries. Using personal experiences, political debates and policies, along with the opinions of citizens from both nations, I will investigate

the differences between Spanish and American healthcare to answer the above question; is healthcare a basic human right, or a privileged service?

Feminine Systems of Support in Un Largo Silencio
(This presentation is in Spanish.)

Elissa M. Rizzo (Dr. Mayte de Lama) Department of World Languages & Cultures

The 2007 novel Un Largo Silencio, by Angeles Caso, presents four systems of female companionship and mutual support while comparing the post-war world of the Vega family to the community they used to know. The Spanish Civil War, which spanned from 1936 to 1939, was a unique experience for women, many of whom grieved men who they lost to the war, which is exemplified by the fictional Vega family in the novel. In order to rebuild their sense of community and find strength to persevere, the women create systems of support, including the relationship between the matriarch and the rest of her family, a relationship between two sisters, a sisterhood shared by two female friends, and lastly, an intergenerational support system. An exploration of these four support systems exhibited in the novel reveals how females in post-war Spain used systems of mutual support to rebuild their communities. To answer this question, literature detailing the female experience in post-war Spain and theories of feminism and female relationships proved to be useful. These themes, female companionship and support, have been underrepresented in Spanish literature following decades of subordination of women in politics and social environments. Un Largo Silencio serves to better define such intimate relationships, in addition to revealing the importance of this unique feature of the post-war female experience. These relationships provide a source of strength for the women following the war and a method to rebuild the community that they long for. Therefore, not only is Un Largo Silencio a truly feminist work, in accurately depicting female companionship, but it is also a testament to the importance of such relationships for women as a source of strength and method of community rebuilding.

The Socio-Political Force of Soccer: The Impact of the FLN Soccer Team on National Unity and Independence in Algeria

Guillermo Vizuete (Dr. Sophie Adamson) Department of World Languages & Cultures

From 1958 to 1962, during the Algerian Revolution, the Front de Libération Nationale (FLN) harnessed the unique politized “football culture” of Algeria with “Le Onze de l'Indépendance,” the first Algerian national soccer team. They mesmerized crowds as they played around 80 games across Europe, Asia, and Africa. “Le Onze de l'Indépendance” and its importance is widely unknown. Whereas historians worldwide have written about the significance of the Algerian War of Independence from France (1954-1962) in forging an Algerian national identity, little has been published about the pivotal role of soccer, in particular, or about the “Onze de l'Indépendance” which helped foster a unified Algerian identity. In addition, there is little documentation available in English about the roughly eighty matches that were played across Eurasia and Africa by a team made up of Algerian players, some of whom had been recruited from the French national team. Few historians have written about the fact that the *“*Onze de l'Indépendance” mesmerized crowds with their unique playing style and, as a result, brought wider attention to Algeria’s cause. This project aims to uncover the importance of soccer on the Algerian Anti-colonialist movement and that, for four years, “The Eleven of Independence” constructed and celebrated a new Algerian national identity which, research suggests, helped the country gain its independence. The work draws from peer-reviewed articles

related to soccer in Algeria and the Algerian Revolution, as well as interviews with former players that were conducted and published in French. It offers a unique perspective that has been overlooked on the Algerian Revolution and anti-colonialist movements. More generally, it provides insights into the connection between sports and the formation of national identities. While the use of soccer as a national unifier was less successful after the Revolution, and soccer alone is not enough to create and unify a national identity, this research suggests that soccer is a powerful political and social force that can tear down or help build up social systems and national identities.

Belonging in the Banlieue: A Linguistic Analysis of Self-Expression and Community from the Periphery of French Society
(This presentation is in French.)

Stephanie Wagner (Dr. Sophie Adamson) Department of World Languages & Cultures

This project examines the themes of community and belonging in two French novels by young franco-maghrebian authors, Faïza Guène and Saphia Azzeddine. Both *Kiffe Kiffe Demain* (2004) by Guène and *Mon père est femme de ménage* (2009) by Azzeddine offer personal narratives that read like intimate journals written by adolescent protagonists who share their familial and cultural struggles from the periphery of French society. Doria, the 15-year-old narrator of *Kiffe Kiffe Demain*, is the French-born daughter of first-generation immigrant parents from Morocco. Abandoned by her father at a young age, she and her mother live in a highrise apartment in the outskirts of Paris. Doria is disconnected from school, disillusioned about her future, and embarrassed about her mother's job as a housecleaner. Paul, who narrates *Mon père est femme de ménage,* is a 16-year-old boy whose French-born parents are uneducated and an embarrassment throughout his teen years. His mother is physically disabled and unable to care for him the way he would have wanted, and his father works the day and night shifts as a "cleaning lady," as we learn from the title of the novel. Although their contexts are vastly different, both narrators seek refuge from their realities. The adolescents are often harshly critical of their family members, friends, teachers, counselors, and neighbors, but through their rants and fantasies the reader can see Doria and Paul processing their experiences and trying to find their place. Despite having to tackle obstacles such as poverty, discrimination, and sexism the narrators learn to have hope for their futures. In particular, this project calls attention to their use of slang, an informal writing style that reflects everyday speech patterns including contractions and colloquial expressions, as well as evidence of code-switching, the practice of shifting from one linguistic code (a language, dialect, or speaking style) to another, depending on the social context or setting they are writing about. The linguistic analysis of their written expression reveals two narrators whose eventual self-acceptance and sense of belonging can be traced through the words they choose to express themselves and speak about the world around them.

The Aesthetics of French Pastries: A Cultural and Historical Account of Pâtisserie in Paris

Katherine E. Wunderlich (Dr. Leyla Savloff) Department of Sociology & Anthropology & (Dr. Nina Namaste) Department of World Languages & Culture

French cuisine is considered the backbone of Western culinary standards and techniques, and pastries are symbolic of tradition and identity, especially when analyzed within the context of France, more specifically Paris. Pastries' history and aesthetics provide insight into what is considered authentically French, like *pain au chocolat* or *madeleines*, but pâtisserie specifically is rarely investigated as a vessel of history and culture or a representation of tradition and national identity. When the pastries are

removed from their cultural contexts in France, they are forced to adjust in accordance with their new environment. To better understand the effects of globalization and larger influences between pâtisserie and its cultural contexts, I conducted an ethnographic study by collecting participant observatory data from pâtisseries in Paris and in New York City. I also conducted semi-structured interviews with French pastry chefs in Paris and in the United States to understand their rationale when creating the French pastries. Although French pastries appear seemingly unchanged within the context of pâtisseries in Paris, they have undergone symbolic reconstruction to align with the desires of consumers, which differ by location. In Paris, customers prefer pastries devised to mimic tradition, while in New York City, consumers prefer new, innovative forms of French pastry. Although presentation differs between the two locations, French pastry chefs in New York City and in Paris both operate under the expectation and intention to keep their respective businesses open to the public. Overall, I conclude that the cultural forces at play in Paris and in New York City that affect the creation of French pastries revolve around differing values, but the underlying attitudes of French pastry chefs remain the same.