



Spring Undergraduate Research Forum

Welcome to SURF 2022

The 29th Annual Celebration of Achievements
in Undergraduate Research at Elon University

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 2022 has a total of 234 presentations. Forty-eight of these presentations are self-identified as projects related to the topics about diversity, equity, inclusion (DEI), and anti-racism. They are marked with an asterisk (*) in the presentation title. Each SURF abstract was reviewed by two Elon faculty members with disciplinary expertise.

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.

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.

Undergraduate Research Program Advisory Committee

Dr. Kevin Bourque

Dr. Barbara Miller Gaither

Prof. Joel Hollingsworth

Prof. Erin Hone

Dr. Tonmoy Islam

Dr. Ryan Kirk

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Dr. Kristina Meinking

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Prof. Bill Webb

Dr. Meredith Allison (Director)

Dr. Jen Hamel (Associate Director)

Dr. Qian Xu (Associate Director)

Undergraduate Research Student Association (URSA)

The Undergraduate Research Student Association is an organization on campus that acts as the student-run counterpart to Elon's Undergraduate Research Program. They help undergraduate students get involved with research as well as act as a cohort for upperclassmen already doing research. URSA is looking for new members as well as people to fill leadership positions next semester.

To contact URSA:

Please join us on PhoenixConnect.

Faith Glover, President of URSA: fglover@elon.edu



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.
- We would like to thank Julia Bleakney from the Writing Center for her poster workshops that helped students prepare for SURF.
- Many people from Event and Space Management and Teaching and Learning Technologies and Information Technology, particularly Robert Johnson, Alexa Lowey, and Sean Walker have provided all kinds of fantastic support to help with the setup of this event.
- Our program assistant, Tammy Womack, and the Powell 108 student workers, Rachel Mullenix, Hannah Allen, and Virginia Morrison have worked hard on the preparations for SURF Day.

Campus Map

To find the presentation locations, please [click this link](#) to access campus map.

PROGRAM LISTING BY SESSION AND TIME

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Koury Business Center 101 (LaRose Theatre): Biology	15
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Oral Presentation Session II (12:20pm – 2:00pm)	
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McKinnon Hall F: Economics & Accounting	17
Lakeside Meeting Room 212+213: English	17
Lakeside Meeting Room 214: Political Science & Policy Studies	18
Moseley 215: Sociology & Anthropology	18
Koury Business Center 101 (LaRose Theatre): Chemistry/Biochemistry	18
LaRose Student Commons 200: Exercise Science, Engineering, & Psychology	19
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Oral Presentation Session III (2:20pm – 4:00pm)	
McKinnon Hall D+E: Economics	20
McKinnon Hall F: Mathematics & Statistics	20
Lakeside Meeting Room 212+213: English & World Languages and Cultures	20
Lakeside Meeting Room 214: Public Health Studies	21
Moseley 215: Religious Studies & Philosophy	21
Koury Business Center 101 (LaRose Theatre): Chemistry & Physics/Engineering	21
LaRose Student Commons 200: Psychology	21
Schar Hall, Turner Theatre: Education & Wellness, Human Service Studies, & Center for Design Thinking	22
Center for the Arts, Yeager Recital Hall: Music & Performing Arts	22
SURF Reception (4:30pm – 5:30pm): Outside of Alumni Gym (Rain Location: Concourse inside Alumni Gym)	

ABSTRACTS BY DEPARTMENT/PROGRAM

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

#	Presentation Information	
1	Megan R. Farris Place-Based Inquiry: Five Essential Questions to Move Theory Towards Classroom Practice*	Dr. Scott Morrison
2	Mallory R. Poff What is an Efficient Solar-Panel Design to Power a Mobile Cooling Unit and Meet Agricultural Standards for Small Farms?	Dr. Sirena Hargrove-Leak
3	Hallie Milstein Jewish Identity and Wall Street: Challenging and Legitimizing Capitalist Systems	Dr. Geoffrey Claussen
4	Duru Tasman Phylogenetic Analysis of the dArc1 Domesticated Gene in <i>Drosophila</i>	Dr. Alfred Thomas Simkin & Dr. Mike Kingston
5	Maddie A. Anderson-LaPorte Benefits of Outdoor Recreation and Outdoor Education on Mental Health	Dr. Carol Smith
6	Samantha R. Dominguez "Wait...What is Engineering?": Elementary Teacher and Student Perspectives of STEM Education in Alamance County*	Dr. Sirena Hargrove-Leak
7	Matthias L. Ferring Size, Specialization, and Venture Capital Returns	Dr. Adam Aiken
8	Ryan Jacob Mancoll Moderate Intensity Exercise for Young Adult Cancer Survivors Experiencing Cancer-Related Cognitive Impairment	Dr. Aaron Piepmeier
9	Raelyn E. McGarry Are There Differences in Running Kinematics When Running After Childbirth?	Dr. Shefali Christopher
10	Kristina N. Gutierrez Families-in-Residence: An Analysis of the Experiences of Faculty and Families Living on College Campuses (For Elon Experiences)	Dr. Jennifer Eidum
11	Jahmai Sylvestre Socio-Economic Status, Gender, Race, and the Impact of COVID-19 on the Incidence of the Pediatric Inactivity Triad (PIT)*	Prof. Elizabeth Bailey
12	Miso Kim Korean American Parents' Support of Early Childhood Numeracy	Dr. Maureen Vandermaas-Peeler
13	Olivia Hoffer Teacher Perceptions of Grades: What do They Measure?	Prof. Margaret Chapman
14	Kaylynn Hiller Effects of Abortion Clinic Closures on Births and Abortions in Texas: A Focus on Teenage Outcomes	Dr. Rena Zito
15	Wylie K. Watlington Evidence of Long-Term Memory of Details for Fearful Events in Zebrafish	Dr. Eric Bauer
16	Chloe Yoon Educator Identity Development in Online Spaces: A Systematic Literature Review	Dr. Jeffrey Carpenter

17	Mikayla Medley Exploring Diversity, Equity, and Inclusion Practices and Content Within Sport Psychology*	Dr. Lauren Walker
18	Elizabeth Crouse Crisis Response for the Modern Organization: An Inclusive Approach to Crisis Communication*	Dr. Jennifer Eidum & Dr. Jessie L. Moore
19	Katey Alberto, Deanna DeMarco, Albert Meyer, Sarah Henderson, & Brandi Wiltshire Effects of Aging While Dual-Tasking on Force Characteristics and Performance During Five-Times Sit-to-Stand Task	Dr. Srikant Vallabhajosula
20	Sara Arora & Nicole Cason Meta-Analysis of Usage of the NEP, CNS, and EID to Predict Pro-Environmental Behaviors: Protocol for a Meta-Analysis	Dr. Aaron Sparks
21	Eva R. Engel Institutional Predictors of Completion Rate Among Colleges with Differing Percentages of First-Generation Students*	Dr. Crista Arangala
22	Kylee N. Hebert The Impact of Integrity Versus Competence-Based Corporate Social Responsibility Violations and Repair Strategies on the Perceived Authenticity of the NBA	Dr. Chris Nelson
23	Mackenzie K. Boyd Pilates for Breast Cancer Survivors Experiencing Cancer-Related Fatigue and Cancer-Related Cognitive Impairment	Dr. Aaron Piepmeier
24	Patrick A. Klesa Lack of Sex Differences in the Effect of Nicotine on Fear in Zebrafish	Dr. Eric Bauer
25	Carson O. Davis-Tinnell Cut, Copy, and Paste: The Examination of Gender Inequality Through the Lens of Punk Rock*	Dr. Sarah Glasco
26	Maeve S. McCaffrey Punk's Not Dead: Vivienne Westwood, Gender Equality, and the Staying Power of Punk Subculture	Dr. Sarah Glasco
27	Amy Moore, Presley Kimball, & Jacob Levenson An ODE Model of Yaws Elimination in Lihir Island, Papua New Guinea	Dr. Crista Arangala
28	Jeppe Overgaard Jordoson, Sophie Solan, & Grace Caluri Alibi Believability and Judicial Instructions: The Role of Inculpatory and Exculpatory Evidence	Dr. Meredith Allison
29	Samantha N. Perri, Oliver Tuisa, & Stacey Walton Effectiveness of Mixed Reality and Virtual Reality in Obstacle Clearance	Dr. Srikant Vallabhajosula, Dr. Pratheep Paranthaman, & Dr. Alys Giordano
30	Katarina M. Aulbach Yoga as a Spiritual Practice or a Good Workout? A Conceptual Evaluation about Who Practices Yoga, Perceptions of Accessibility, and Motivations for Practice*	Dr. Alexis Franzese

31	Alex J. Hebert II Development of a Hands-On Statics Project for Large Student Enrollments	Dr. Sirena Hargrove-Leak
32	Abigail J. Weaver Political Communications Analysis of the Two Final Costa Rican Presidential Candidates during the Months of January and March 2022	Dr. Vanessa Bravo
33	Chad Urquhart Why is Acetyl CoA a Better Choice for Condensation Reactions than an Ester Analogue in the Citrate Cycle? Contributions by Resonance and Inductive Effects toward Alpha Carbon Acidity	Dr. Joel Karty
34	Josefina R. Malone Digital Storytelling: A Tool for Intercultural and Transformational Learning in Public Health	Prof. Amanda Tapler
35	Paloma C. Dettloff The Thermophone Loudspeaker	Dr. Richard Blackmon
36	Logan T. Roberts Disney Parks and Their Controlled Themed Environments as an Example of a New Type of Erving Goffman's Total Institution	Dr. Alexis Franzese
37	Claudia A. Penny Understanding Evolution at the mtDNA Sequence Level in Hybrid Tree Lizards	Dr. Greg Haenel
38	Kaitlyn L. Vigeant Origin of Selective Terms from Mental Illness and the Mental Health Movement	Dr. Kathy Lyday
39	Alexandra H. Lahetta Investigating Transthyretin Aggregates Link to Oxidative Damage of HDL Cholesterol Carriers	Dr. Kathryn Matera
40	Caleb Dunham How Does Using Generated Data Impact Bias on Machine Learning?*	Dr. Scott Spurlock
41	Ashley M. Tatum Race Representation in American Literature Classrooms*	Prof. Allison Bryan
42	Emily Kibler The Effects of Pilates and White Noise on Attention in College Students with ADHD	Dr. Aaron T. Piepmeier
43	Madeleine R. Spence A Balancing Act: Mediating Internal and External Conditions to Create a Holistic Repatterning Approach for Dancers	Prof. Lauren Kearns
44	Andie R. Weinberg How is the Enolase Enzyme Capable of Deprotonating 2-Phosphoglycerate in the Glycolysis Pathway? Contributions by Resonance and Inductive Effects	Dr. Joel Karty
45	Sara J. Moretti The Courts Through an Intersectional Lens: A Look at Experiences, Attitudes, and Roles*	Dr. Elisha Savchak-Trogdon
46	Harry Masker, Stratton Bacogeorge, & William Tunis Methods for Characterizing Near Surface Defects on SiC Wafers	Dr. Scott Wolter & Dr. Anthony Rizzuto
47	Blythe L. Hehmeyer Self-Compassion, Perceived Organizational Support, and Psychological Responses to Sport Injury in Collegiate Student-Athletes	Dr. Christopher Leupold

48	Alex K. Nemfakos Understanding How Those in Scientific Fields Create Ethical Determinations about Human Genetic Editing	Dr. Rissa Trachman
49	Kristina Woodis Investigating the Link Between the Gut Microbiome and Epilepsy in Zebrafish	Dr. Jennifer Uno
50	Jordan O. Young A Critical Analysis of Intersectional Racial Representation in Children's Live-Action Television*	Dr. Naeemah Clark
51	Nsikak U. Udoh Integrating Diversity, Equity, and Inclusion into Exercise Science: A Case Study of Neuromotor Control and Biomechanics*	Dr. Matthew Wittstein
52	Josephine M. McNeil & Anna Chase Sheinberg Impacts of pH on Decomposition of Aqueous Carbonic Acid	Dr. Anthony Rizzuto
53	Kimberly J. Creel Utilizing Machine Learning Methods to Solve Rubik's Cube	Dr. Jeff Clark
54	Hannah E. Brown How COVID has Affected Women-Identifying Stage Managers Across the United States*	Prof. David McGraw
55	Sarina S. Jackowski Products of Peroxidase-Catalyzed Oxidation of Estrogens	Dr. Kathryn Matera
56	Madison K. George Materials Analysis and Energy Return of Pole Vault Spikes	Dr. Scott Wolter & Dr. Shefali Christopher
57	Alana C. Campbell Exploration of Faculty-Student Partnerships in an Exercise Psychology Course*	Dr. Eric Hall
58	Shannon E. Treacy Mathematical Modeling of Dengue Fever Focusing on the Mosquito Life Cycle and Preventative Measures	Dr. Karen Yokley

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

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

#	Presentation Information	
1	Samantha R. Dominguez, Shalexzandra A. Dunkley, Timothy P. Verlander, & Emma F. Walker	Dr. William Puer Optimization of Denitrifying Bioreactor Configuration for Reduction of Nitrate in Retention Ponds
2	Meredith G. Adair	Dr. E. Stephen Byrd Compassion Fatigue in Pre-Service Special Educators
3	John R. Ruggiero & Alexandra H. Lahetta	Dr. Kirstie Doehler Analyzing Data on Confederate Symbols to Stimulate DEI Discussions in the Statistics Classroom*
4	Victoria R. Cataldo	Dr. Daniel M. Haygood Beauty Beyond Borders: How American Cosmetic Brands Use Cultural Ideals of Beauty to Develop Social Media Posts Targeted to the US and Singapore
5	Alizée Ballarin	Dr. Linda Niedziela Impacts of Crassocephalum Crepidioides on the Learning and Memory of Younger Zebrafish (Danio rerio)
6	Erica J. Patterson	Dr. Heidi Hollingsworth Mental Health Training and Practices of Elementary and Middle School Teachers
7	Madison K. George, Mallory R. Poff, Alexa D. Roveri, & D. Haydn Stucker	Dr. Jonathan Su & Dr. Bethany Brinkman Constructed Floating Wetlands for Extreme Temperature Conditions
8	Xiomara Y. Garcia	Dr. Lisa Buchanan An Examination of Dual-Language Immersion Practices & Programs In North Carolina and Texas*
9	Caroline E. Seelman	Dr. Caroline Ketcham & Dr. Eric Hall Sports Positions Yielding the Highest Concussion Rates Among Elon Club and Varsity Athletes: An Analysis of Elon University's ImpACT Data from 2009-2021
10	Claire T. McGrath	Dr. Jennifer Dabrowski Sustainable Medicine: Investigating Green Solvents in Conversion of Sugars
11	Ryan G. Monkman, Madison K. Tarkenton, Olivia A. DiGiovanni, & Demaya U. Starkes	Dr. Amy A. Overman Neural Representations of Memory in Older and Younger Adults
12	Colleen Egan, Alex Hebert, Orlanzel Washington, & Jimmy Warren	Dr. Jonathan Su & Prof. Matthew Banks Helicoil Detection Within an Aluminum Core
13	Arianna M. Wolgin	Dr. Cynthia Fair A Qualitative Study of the Biopsychosocial Needs Among North American Families with Adopted Children Living with Perinatally-Acquired HIV

14	Victoria E. Gorman Surfactant-Modified Method for Analysis of Explosives Through Fluorescence Quenching	Dr. Karl D. Sienerth
15	Michaela R. VanDerVelden It's Not All Black and White: The Portrayals of Black and White Mass Shooters Before and After the 2020 Black Lives Matter Movement*	Dr. Daniel M. Haygood
16	Jordan A. Wels Simulating Gaseous Clouds in Galaxies Harboring Active Intermediate Mass Black Holes	Dr. Chris Richardson
17	Kellyn Trowse Examining Habituation in Harvester Ants	Dr. William Schreiber
18	Alexa Goldberg Gender, Math Anxiety, & Math Performance: Connected or Not?	Prof. Erin Hone
19	Ons Yasmeen Bouali Investigating the Role of PPARs in Primary Biliary Cholangitis-Related Cellular Stress	Dr. Tonya Laakko Train
20	Emily P. Holland Bringing Together an Elon University Writing Center Alumni Network	Dr. Jessie L. Moore
21	Marli Siciliano Relationship Functioning During the COVID-19 Pandemic: Examining Marital Satisfaction and Verbal Aggression	Dr. CJ Fleming
22	Erin E. Ierace Exploring Nonlinear Quenching Behavior in Determination of Explosives Through Fluorescence	Dr. Karl D. Sienerth
23	Megan E. Hutchinson Stereotypes and Perceptions of Humanitarian Workers	Dr. Thomas Arcaro
24	Caleb Ogunmola Digging Deeper into the Science Behind Skill Position Football Cleats	Dr. Jonathan Su
25	Abbey L. Rose, Kerry L. Barba, & Marli Siciliano Intimate Relationship Changes During the COVID-19 Pandemic	Dr. CJ Fleming
26	Chad J. Urquhart Tick-Tock: No Time for TikTok: An Examination of Procrastination and Mental Health in Undergraduate Students- Correlational Study	Dr. Eric Hall
27	Madeleine Dauenhauer Children of the Disappeared: Film Portrayals of Intergenerational Trauma in Post-Dictatorship Argentina	Dr. Federico Pous
28	James W. Allen, Catherine M. Capodanno Biogeochemical Gases Emitted from Juncus Effusus in Artificial Wetlands	Dr. Jonathan Su
29	Pierce C. Johnson Impression Updating: The Role of Change Detection and Recollection in Associative Memory for Face-Adjective Pairs	Dr. Amy A. Overman

30	Reiley K. Overend Investigation of the Preparation and Structural Properties of Vanadium-Amoxicillin Complexes	Dr. Jennifer Dabrowski
31	Madison M. Meehan Missing from the Conversation: A Case Study of Elementary Grading Practices	Prof. Erin Hone
32	Abigail H. Thomson A Preliminary Study on Psychological Well-Being, Concussion Symptoms, and Menstrual Symptoms in Correlation with Hormonal Birth Control Use	Dr. Caroline Ketcham & Dr. Eric Hall
33	Benjamin J. Waggener Associative Learning in Ants	Dr. William Schreiber
34	Olivia M. Powers The Pro-Inflammatory Effect of Lipopolysaccharide on mTOR	Dr. Yuko Miyamoto
35	Stephanie L. Neu Celebrity Influence in Book-to-Film Adaptations for Commercial Book Publishing	Dr. Jessie L. Moore
36	Tori Duenkel Drug Diffusion Through Swellable Polymers	Dr. Jonathan Su
37	Corinne Orgettas The Impact of the COVID-19 Pandemic on College Student Mental Health and College Counseling Practices: The Perspective of College Counselors	Dr. Eric Hall
38	Makayla Oby Investigation of Synergistic Combinations of Chemotherapy Drugs for the Treatment of Oral Cancer	Dr. Victoria Moore
39	Olivia G. Lovell Examining the Impacts of a Mentoring Program on Female Sport Management Students' Career Advancement*	Dr. Shaina Dabbs
40	Christopher D'Inzeo Investigating the BCL-2 Family of Proteins in Pancreatic Cancer to Overcome Chemotherapy Resistance	Dr. Victoria Moore
41	Courtney Abruzzo & Sophia Demelo Be Your Selfie: A Qualitative Content Analysis Exploring How Young Adults Evaluate Their Instagram Profiles	Dr. Ilyssa Salomon
42	Grace K. Holmes Prolonged Sleep Duration May be Associated with Increased Adiposity in College Students	Dr. Simon Higgins
43	Zoë Rein Finding Representative Candidate Sets in Double-Interval Societies	Dr. Kristen Mazur
44	Aidan D. Burnside, Ashleigh N. Azan, Carleigh M. Wood, & Declan Elie Design and Research of Customized Cervical Brace for Recovery	Dr. Jonathan Su & Dr. Crystal Ramsey
45	Jenna Sudol Exploring the Impact of Social Media and Exercise Motivations on the Relationship Between Physical Activity and Body Dissatisfaction	Dr. Ilyssa Salomon

46	Michael A. Mesrobian Objective and Subjective Memory Assessment Tools for Concussion Baseline Testing	Dr. Caroline Ketcham & Dr. Eric Hall
47	Liora Wittle Internal Melanin and Oxidative Stress: An Investigation of Lizard Livers	Dr. Victoria Moore
48	Kerry L. Barba The Roles of Religious Beliefs and Coping Mechanisms on Beliefs Surrounding the COVID-19 Pandemic	Dr. CJ Fleming
49	Joe Urban Evaluating the Pro-Inflammatory Effect of LPS on Focal Adhesion Kinase (FAK) Phosphorylation	Dr. Yuko Miyamoto
50	Timothy R. Gies Middle Level Engagement in Central North Carolina Classroom	Dr. Cara Lucia
51	Zachary M. Ohmann Evaluating the Effect of Lipopolysaccharide on PKC and Its Downstream Targets of FAK and mTORC2	Dr. Yuko Miyamoto
52	Hannah Kimberlee Fox Dominating the Digital Domain: A Quantitative Response to Ensure Fiscal Success and Brand Awareness	Dr. Jessie L. Moore
53	Alexandra K. Stoll The Impact of Dietary and Exercise Habits on the Extent of Frailty in Adult Survivors of Childhood Cancer	Dr. Takudzwa Madzima
54	Christina I. Carr Evidence for Stress-Induced Grooming in Ants	Dr. William Schreiber
55	Samantha E. Eastman Investigating Vanadium–Tetracycline Complexes: Synthesis and Structural Analysis	Dr. Jennifer Dabrowski
56	Daniel O. Conley Like a Rolling Stone: The Glorification of Drug Use in American Popular Music	Dr. Todd Coleman
57	Aiden Tierney, Andrew Weitz, Casey Obaytek, & Stephen Haley Concrete Water Filtration	Dr. Jonathan Su

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

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

McKinnon Hall D+E (Moderator: Dr. Brandon Sheridan)		
10:00am	Maria J. Mendoza Impact of Abortion Clinic Closures on Evictions	Dr. Steven Bednar
10:20am	Cole Haecker Women's Family Planning Access and its Impact on Income Generating Activity in Southwest Kenya: An Individual Level Analysis	Dr. Casey Dirienzo
10:40am	Olivia Leggett The Effect of the Gender Pay Gap on Economic Growth	Dr. Brandon Sheridan
11:00am	Morgan J. Kearns Accumulating Consequences of Sexual Violence: Age of First Experience on Human Capital	Dr. Casey DiRienzo
11:20am	Madison Duchesneau Measuring the Effect a Woman's Age at First Birth Has on Income	Dr. Casey DiRienzo
McKinnon Hall F (Moderator: Dr. Mark Kurt)		
10:00am	Kimheng Larch An Analysis on the Relationship Between Alcohol Consumption and Labor Market Outcomes	Dr. Mark Kurt
10:20am	Benjamin T. O'Connor An Analysis of the Relationship Between Right-to-work Laws and Reduced-Price Lunch Participation	Dr. Mark Kurt
10:40am	Jack Heretz The Impacts of Mental Illness on Employment Status	Dr. Mark Kurt
11:00am	Moritz Lederer ESG Practices and Company Debt Structure in the Chemical Industry	Dr. Scott Hayward
Lakeside Meeting Room 212+213 (Moderator: Dr. Michael Carignan)		
10:00am	Jordan Ennis The Economics of Ethnicity: A Case Study of the Maasai and Batwa Peoples	Dr. Waseem Bin-Kasim
10:20am	Grace A. Middleton Post-World War II Immigration Policies and Experiences of Muslim Women in Italy*	Dr. Andrea A. Sinn
10:40am	Anna Van Jura Rise of Nationalism in Italy and Germany: Lega Nord and Alternative für Deutschland	Dr. Safia Swimelar
11:00am	Grace K. Costa "Well Behaved Women Seldom Make History:" Examining Militancy versus Constitutionalism in British Suffrage, 1880-1930*	Dr. Yidi Wu
11:20am	Shannon R. Rogers Art for the Industrial Working Class: Ruskin's Educational Experiment	Dr. Michael Carignan

Lakeside Meeting Room 214 (Moderator: Dr. Jessica Carew)	
10:00am	Kara L. Friske Dr. Joel Shelton Gender Mainstreaming and Policy Framing: An Analysis of Spanish Labor Market Policy in the European Semester
10:20am	Taylor H. Rudtner Dr. Joel Shelton The Messaging of Italy's Lega Nord: Regional Difference in Political Attitudes Towards Migrants
10:40am	Malia J. Takei Dr. Jessica Carew The Effects of Stereotyping on Racial Disparities in Judicial System Outcomes and Public Policy Development*
11:00am	Sophie Gerth Dr. Carrie Eaves Allow Me to Introduce Myself: Analysis of Senatorial Announcement Videos in the 2020 Election
11:20am	Clara J. Learned Dr. Jessica Carew Presentation, the Media, and Perception: The Impact of Female Stereotypes on the Presidential Candidacies of Clinton, Fiorina, Warren, and Klobuchar
Moseley 215 (Moderator: Dr. Sophie Adamson)	
10:00am	Aniyah S. Adams Dr. Olivia Choplin "Une histoire tue est une histoire tuée": Unsilencing Haitian History in Marie-Célie Agnant's works (This presentation will be in French.)
10:20am	Arianna M. Wolgin Dr. Sophie Adamson The Sociocultural Revelations of HIV Narratives in France: <i>On n'est pas sérieux quand on a 17 ans</i> (1996) by Barbara Samson and <i>J'ai 20 ans et le VIH: Ma vie presque comme les autres</i> (2020) by Lucie Hovhannessian (This presentation will be in French.)
10:40am	Molly A. Armstrong Dr. Sophie Adamson Roots and Rootlessness: Sense(s) of Self in the Autobiographical Novels <i>Ru</i> by Kim Thuy and <i>Garçon manqué</i> by Nina Bouraoui (This presentation will be in French.)
11:00am	Ari Yaron Dr. Sophie Adamson Cinematic and Literary Representations of Jewish-Muslim Relations in France: <i>La Haine</i> (1995) by Matthew Kassovitz and <i>Avant la Haine</i> (2015) by Thierry Cohen (This presentation will be in French.)
11:20am	Madison H. Eaton Dr. Juan Leal-Ugalde 500 Years: An Analysis of Past Violence Against Indigenous People and Contemporary Environmental Issues in Guatemala* (This presentation will be in Spanish.)

Koury Business Center 101 (LaRose Theatre) (Moderator: Dr. David Vandermast)		
10:00am	C. Ashlyn Crain Mitigating CO2 Emissions through Carbon Sequestration: Four Strategies for Storing Carbon in Forests	Dr. David Vandermast
10:20am	Lindley Longstreet Multidecadal Changes in Cation Concentrations in the Wood of Trees from Elon University Forest	Dr. David Vandermast & Dr. Justin Clar
10:40am	Kathryn Paturzo Impacts of Religious Beliefs and Levels of Practice on Heart Rate Variability	Dr. Robert Vick
11:00am	Sarah L. Peake Investigating the Role of sTNF and tmTNF in Triple Negative Breast Cancer Cells	Dr. Tonya Laakko Train
11:20am	Rebecca L. Carranza Examining The Potential for Evolutionary Divergence by Describing Treehopper Host Plant Use and Mating Signals	Dr. Jen Hamel
LaRose Student Commons 200 (Moderator: Dr. Svetlana Nepocatych)		
10:00am	Talya E. Geller & Gabrielle N. Clancy A Community Needs Assessment Used to Develop a Workplace Nutrition and Physical Activity Education Program	Prof. Elizabeth Bailey & Dr. Svetlana Nepocatych
10:20am	Gabrielle N. Clancy & Talya E. Geller The Impact of a Workplace Physical Activity and Nutrition Education Program (HealthEYou) on Behavioral Change	Dr. Svetlana Nepocatych & Prof. Elizabeth Bailey
10:40am	Hailey E. Jurgens & Sara A Higgins Tart Cherry Juice and Whey Protein Reduce the Perception of Muscle Injury Recovery in College Age Females	Dr. Svetlana Nepocatych
11:00am	Hannah G. King Yoga and Fatigue in Breast Cancer Survivors: An Online Feasibility Study	Dr. Aaron T. Piepmeier
11:20am	Lillian C. Niehaus The Effects of Yoga on Perceived Anxiety, Depression and Salivary Cortisol Levels in Prepartum Women Aged 18-30	Dr. Takudzwa Madzima
Schar Hall, Turner Theatre (Moderator: Dr. Harlen Makemson)		
10:00am	Catherine E. Dalrymple Three Little Words: Law and Order, Videostyle Analysis, and Dog Whistle Racism in Richard Nixon's 1968 Campaign*	Dr. Harlen Makemson
10:20am	Isabel B. Allain Communicating Depression in India and China: An International Comparison of Mental Health Frames in English-language News Sources	Dr. Kenn Gaither

10:40am	Christian W. Harrison Campaigning on Twitter: A Content Analysis of the 2020 Georgia U.S. Senate Candidates' Twitter Feeds	Dr. Jane O'Boyle
11:00am	Lindsay Gelman Persuasion Strategies in the 2020 Campaign Discourse on Facebook: A Content Analysis of Donald J. Trump's and Joe Biden's Presidential Campaign Ads	Dr. Qian Xu
11:20am	Katherine J. Grant Social Network Analysis of Christian Identity Hate Groups	Dr. Megan Squire

Koenigsberger Learning Center 127 (Moderator: Dr. Cassie Kircher)

10:00am	Ben Waggener Liberty in a Pandemic	1 st Place
10:00am	Lilly Santiago Jefferson, the U.S., and Vaccination Sentiments Then and Now	2 nd Place
10:00am	Ethan Porter The Founding Fathers Believed in Vaccines and 42 Percent of Republicans Can't Believe It	3 rd Place

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

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

McKinnon Hall D+ E (Moderator: Dr. Katy Rouse)		
12:20pm	Bridget Foehl The Predictive Ability of Cognitive and Non-Cognitive Skills at Kindergarten Entry on Fifth Grade Achievement	Dr. Katy Rouse
12:40pm	Isabella K. Hindley The Effect of Secondary School Teacher Expectations on Student Enrollment in Post-Secondary Education - A Gender-Specific Analysis	Dr. Katy Rouse
1:00pm	Kara L. Friske The Gender Difference in Test Scores and Teacher Grades in ECLS-K:2011: The Role of Noncognitive Skills	Dr. Katy Rouse
1:20pm	Kyle F. Hensler The Effects of Farmland Preservation on Residential Property Value in Hunterdon County, New Jersey	Dr. Brooks Depro & Dr. Ryan Kirk
1:40pm	Jack O. Libby Investigating Environmental Outcome Convergence in North Carolina	Dr. Brooks Depro
McKinnon Hall F (Moderator: Dr. Susan Anderson)		
12:20pm	William Davies Productivity in the National Basketball Association: The Effects of Rest Time and Age in the Regular Season on Postseason Productivity	Dr. Douglas Redington
12:40pm	Campbell W. Shepard An Analysis on the Relationship Between Legalized Gambling and Crime Rates	Dr. Douglas Redington
1:00pm	Dana L. Miller The Use of Paycheck Protection Program Loans for Small Businesses in Central North Carolina	Dr. Susan Anderson
Lakeside Meeting Room 212+213 (Moderator: Dr. Jennifer Eidum)		
12:20pm	Elizabeth Crouse More than an English Education: A Case Study of the English as a Second Language Program's Crisis Response to the COVID-19 Pandemic at Alamance Community College*	Dr. Jennifer Eidum
12:40pm	Skylar Flechsig Breaking the Binary: Heteronormativity, Authorship and Bisexual Invisibility in Literature*	Dr. Kevin Bourque
1:00pm	Lucas D. Leveillee Exploring English Pronoun Usage and Contemporary Usage of They, Them, and Their as Epicene Pronouns*	Dr. Kathy Lyday
1:20pm	Gillian Kick Rewriting Injustice in Alamance County: Fostering Youth Agency and Community Engagement Through Social Justice Writing* (A Leadership Prize Project)	Dr. Heather Lindenman

1:40pm	Lily E. Harkes Democratic Backsliding in Hungary and the United States: The Role of Political Elite Strategic Narratives	Dr. Safia Swimelar
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Lakeside Meeting Room 214 (Moderator: Dr. Kaye Usry)

12:20pm	Isabella DeLaGarza Juicio y Castigo: The Impact of the 2001 Argentine Financial Crisis on the National Justice and Reconciliation Agenda	Dr. Jason Kirk
12:40pm	Catherine Stallsmith Repatriation Culture Today-Refugees, States and International Actors in Myanmar's Rohingya Refugee Crisis	Dr. Jason Kirk
1:00pm	Tasia Theoharis The Securitization of Outer Space: How Presidential Narratives Explain Outer Space Security	Dr. Sean Giovanello
1:20pm	Talia N. Gallo Portraits of Extreme Wealth in Partisan Cable News Media	Dr. Kaye Usry
1:40pm	Skyler Matuska Child Protective Services as Political Socialization: Investigating the Political Consequences of an Early Life Experience with Government*	Dr. Kaye Usry

Moseley 215 (Moderator: Dr. Rissa Trachman)

12:20pm	Hannah E. Boone Fear for the Future: Youth Climate Activism	Dr. Leyla Savloff
12:40pm	Emily A. Katz Childhood Expectations and Decisions for Family Completion	Dr. Alexis Franzese
1:00pm	Melissa R. Sturtz Sexual Orientation Identity and Authenticity Development Through Young Adulthood*	Dr. Alexis Franzese
1:20pm	Megan N. Casner The New Normal: The Effects of the Covid-19 Pandemic on United States and New Zealand College Students	Dr. Rissa Trachman
1:40pm	Andrea G. Sheetz Policy vs Contextual Factors: Minimizing Geographic Mental Health Disparities*	Dr. Robert Perdue

Koury Business Center 101 (LaRose Theatre) (Moderator: Dr. Justin Clar)

12:20pm	Yvonne M. Ritsema Transformation of CeO ₂ Nanoparticles in Surface Coatings: Potential Hazards of Inhalation During Application	Dr. Justin Clar
12:40pm	Anna Chase Sheinberg Kinetic Investigations of the Decomposition of Aqueous Carbonic Acid	Dr. Anthony M. Rizzuto
1:00pm	Anna C. Altmann Investigating the Trace Metal Content of Cigarette Butts in Environmental Systems	Dr. Justin Clar

1:20pm	Melissa B. Denish Investigating the Molecular Basis of Tay-Sachs Disease	Dr. Kathryn Matera & Dr. Tonya Laakko Train
1:40pm	Carolyn E. Vaughan NUT Carcinoma: Investigating Drug Synergy and the Production of Drug Resistance	Dr. Victoria Moore

LaRose Student Commons 200 (Moderator: Dr. Mathew Gendle)

12:20pm	Andrew G. Miller Examining Gender Differences of Athletes on Coaching Behavior in Collegiate Distance Running	Dr. Lauren Walker
12:40pm	Madison K. George Comparison Between Men and Women's Foot Force Distribution During a Pole Vault Approach	Dr. Scott Wolter & Dr. Shefali Christopher
1:00pm	Jillian M. Chrise Caffeine and Anxiety on a College Campus During the COVID-19 Pandemic	Dr. Mathew Gendle
1:20pm	Bailey C. McCollum The Moderating Effect of Mindset and Patient Interaction on Burnout in Healthcare Professionals	Dr. Erika Lopina

Schar Hall, Turner Theatre (Moderator: Dr. Daniel M. Haygood)

12:20pm	Matisse A. Gilmore Living in the Background: Analyzing the Representation of Marginalized Identities in Predominantly White TV Shows*	Dr. Daniel M. Haygood
12:40pm	Leila A. Jackson Black, Biracial or Other? An Analysis of Tweets concerning Meghan Markle's Race after the Airing of the 2021 TV Special, <i>Oprah with Meghan and Harry</i> *	Dr. Daniel M. Haygood
1:00pm	Cierra Johnson The StrongBlackWoman: Gendered Racism & The Hidden Costs of Strength*	Prof. Nicole Triche
1:20pm	Elizabeth V. Bigham The Art of Being Seen: How Independent Comics' Representation of Gender and Sexuality Can Inform Film*	Prof. Sowjanya Kudva
1:40 pm	Hannah E. Otos Dismantling the White Savior in Film: An Analysis of White Ignorance, Privilege, and Guilt in Films About Undocumented Immigration and a Creation of a Short Film on the Subject*	Prof. Youssef Osman

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

McKinnon Hall D+E (Moderator: Dr. Steve DeLoach)		
2:20pm	Liam O'Connor An Analysis on the Relationship Between Public Library Innovation and Social Capital	Dr. Steve DeLoach
2:40pm	Aniyah S. Adams The Success of Soap-Making: How Entrepreneurial Training in Ugandan Refugees Impacts Their Outcomes in Village Savings and Loan Associations	Dr. Steve DeLoach
3:00pm	Malia J. Takei The Relationship Between the 2008 Recession and Birth Rates in the United States	Dr. Steve DeLoach
3:20pm	Charles N. Purrington Measuring the Economic Value of Walkability	Dr. Tonmoy Islam

McKinnon Hall F (Moderator: Dr. Hwayeon Ryu)		
2:20pm	Sam B. Bacon Comparisons of Different Q-Q Plot Models on Viewer's Assessment of Normality	Dr. Laura Taylor
2:40pm	Sarah Austin Association Between Fire-Related Particulate Matter Exposure and Childhood Asthma in Peru: A Burden of Disease Assessment	Dr. Mark Weaver
3:00pm	Christopher Boyette & Sarah Ruth Nicholls Using a Network Model to Control the Spread of an Infectious Disease on a College Campus with Contact Tracing	Dr. Hwayeon Ryu, Dr. John Gemmer, & Dr. Kaitlin Hill
3:20pm	Danielle DaSilva, Minato Hiraoka, & Malindi Whyte Modeling Disease Intervention Strategies on a Dynamic Small-world Network	Dr. Hwayeon Ryu, Dr. John Gemmer & Dr. Kaitlin Hill
3:40pm	Amy Moore Confronting Gerrymandering: Building the Foundation of a Research Program for Automating Fair Political Districting	Dr. Todd Lee & Dr. Crista Arangala

Lakeside Meeting Room 212+213 (Moderator: Dr. Scott Proudfit)		
2:20pm	John Lee Rudolph Shock and Awe: An Analysis of Anti-War Theatre in the 21st Century	Dr. Scott Proudfit
2:40pm	Grace M. Magness How Historical Tragedy Can be Presented Appropriately During Walking Tours*	Dr. Scott Proudfit
3:00pm	Haley D. Acosta Public, Private, Personal: Essays on Finding an American Identity*	Prof. Tita Ramirez
3:20pm	Ella Kay Gatermann Herzog's <i>Stroszek</i> and Luis Trenker's <i>Der verlorene Sohn</i> in the Context of Heimat Films (This presentation will be in German.)	Dr. Scott Windham & Dr. Lina Kuhn

Lakeside Meeting Room 214 (Moderator: Dr. Cynthia Fair)	
2:20pm	Faith S. Glover Dr. Cynthia Fair "I Feel Like We're Approaching a Cliff": Perspectives on Health Care Transition among Parents of Internationally Adopted Children with HIV
2:40pm	Toni Parker Dr. Cynthia Fair Patient-Provider Decision Making and Risk-Perception of Antidepressants in Pregnancy
3:00pm	Deena E. Elrefai Dr. Stephanie Baker "To Us, We're Different, to Them, We're the Same": Dimensions of Diversity and Health in the Latinx Communities*
3:20pm	Madeline K. Attianese Prof. Amanda Tapler The Value of Authenticity in Comprehensive Sex Education: Understanding the Role Authenticity Plays in the Wise Guys Educators Delivery of the Curriculum

Moseley 215 (Moderator: Dr. Ann Cahill)	
2:20pm	JoyceLyn Bentley Dr. Ariela Marcus-Sells Mythmaking and the NOI: Writing Their Own Story*
2:40pm	Emily P. Wilbourne Dr. Pamela Winfield & Dr. Casey Avaunt Negotiating Religion, Tradition, and Modernity in Post-19th Century Korean Seungmu Dance
3:00pm	Molly Morrison Dr. Lynn Huber Apprehending the Goddess: Cybele's Transition to Romanhood*
3:20pm	Nicholas Hom Dr. Amy Allocco Gods, Gurus, and Ghouls: Jain and Hindu Devotion in Medieval Tamil Literature
3:40pm	Sydney D. Rogers Dr. Ann Cahill Merleau-Ponty, Flesh, and Skin: One and the Same? A Phenomenological Approach*

Koury Business Center 101 (LaRose Theatre) (Moderator: Dr. Karl D. Sienarth)	
2:20pm	Lauren O. Butler Dr. Karl D. Sienarth & Dr. Anthony Rizzuto Investigating the Efficacy of a Rhodium-Centered Complex as a Catalyst for the Electrochemical Reduction of Carbon Dioxide
2:40pm	Hayley S. Clos Dr. Daniel Wright Assessing the Effects of Climate Change on the Release of Metals into Agricultural Products
3:00pm	Emma F. Walker Dr. Sirena Hargrove-Leak Universal Design: Integrating Empathy, Ethics, and Human-Centered Design Approaches in an Elon Engineering Course to Define Student Learning Goals

LaRose Student Commons 200 (Moderator: Dr. Anne-Marie Iselin)	
2:20pm	Madelyn A. Mahoney Prof. Margaret Chapman External Influences on Non-Binary Resilience: Protective Factors of Living and Thriving in One's Gender Identity at Elon*

2:40pm	Eukela Little Strong, Black, and Self-Compassionate: Exploring the Correlates and Self-Care Behavior of Collegiate Black American Women*	Dr. Buffie Longmire-Avital
3:00pm	Hannah N. Allen Cross-Cultural Relations of Positive Parenting with Child Emotion Regulation, Self-Efficacy Beliefs about Emotion Regulation, and Prosocial Behaviors	Dr. Anne-Marie Iselin
3:20pm	Maya C. Pergine Attention Please: The Effects of Linguistic Framing Variables on Donation Behavior Towards Nonprofit Organizations	Dr. Kim Epting
3:40pm	Molly Armstrong Body Image Disorders in Relation to Perfectionism	Dr. Bilal Ghandour

Schar Hall, Turner Theatre (Moderator: Dr. Vanessa Drew-Branch)

2:20pm	Jacob C. Hyle Access is Not Enough: Supporting People from Diverse Backgrounds, Cultures, and Identities in Outdoor Experiential Education*	Dr. Scott Morrison
2:40pm	Katie P. Grinnell The Effect of Outdoor Educational Programming on Resilience in a Global Pandemic	Dr. Vanessa Drew-Branch
3:00pm	Soniyah Robinson Redesigning Higher Education for Equity and Social Justice*	Dr. Danielle Lake
3:20pm	Avery Davis Motivational Factors that Support Female Interest in Introductory Earth Science Labs*	Dr. Kelsey S. Bitting, Dr. Katherine Ryker, & Dr. Rachel Teasdale
3:40pm	Lucy Callicott Examining Elementary Educators' Awareness and Perceptions of Trauma-Informed Teaching Approaches	Dr. Katherine Baker

Center for the Arts, Yeager Recital Hall (Moderator: Prof. Jen Guy Metcalf)

2:20pm	Katie Jo Fulks The Politics of Dancing: A Study of Ballet as a Political Tool	Prof. Jen Guy Metcalf
2:40pm	Alyssa M. Meritt Classical Gatekeeping: Racial Barriers to Success in American Opera*	Dr. Polly Cornelius
3:00pm	Kaylee N. Therieau Preparing Future Musicians: Lesson Plans and Resources that Incorporate Music Theory into Middle and High School Ensemble Classrooms	Dr. Allison Wente
3:20pm	Cassidy M. Perry Creating an Optimal Performer: A Body Composition and Performance Analysis	Prof. Renay Aumiller & Dr. Takudzwa Madzima
3:40pm	Brianna M. Boucher Intersectional Discrimination in Stage Management*	Prof. David McGraw

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Abstracts by Department/Program

Accounting

The Use of Paycheck Protection Program Loans for Small Businesses in Central North Carolina

Dana L. Miller (Dr. Susan Anderson) Department of Accounting

The coronavirus (COVID-19) forced U.S. businesses to shut down for an extended period of time, significantly impacting the economy. As a result, the CARES Act was passed on March 27, 2020 and aimed to provide support to small businesses by changing the tax laws and providing loans, specifically through the Paycheck Protection Program (PPP). Since the enactment of the PPP, scholars have been examining data regarding its effects on business survival and employment with mixed results. This study focuses on small businesses in central North Carolina to determine how COVID-19 affected their ability to operate and pay monthly expenses during the early months of the pandemic, as well as how the PPP loans were distributed and used throughout the region. It also analyzes the impact of a business's relationship with its bank to determine if pre-existing relationships affected a business's ability to obtain a PPP loan. Pre-existing relationships include anything more complex than having a bank account, such as borrowing from the bank prior to the PPP or having a relationship with a specific banker or loan officer. The preliminary results of the analyses based on a survey completed by 49 small business owners in central North Carolina revealed that: 1) some business owners had growing concerns about the survival of their business when COVID-19 first began; 2) a majority of survey participants applied for and received at least one PPP loan; and 3) while there were many factors taken into account when applying for and receiving loans, pre-existing relationships with banks were not a significant factor in one's ability to receive a loan. These results, specifically those involving a business's relationship with a bank, differ from prior research.

Biology

Impacts of *Crassocephalum crepidioides* on the Learning and Memory of Younger Zebrafish (*Danio rerio*)

Alizée Ballarin (Dr. Linda Niedziela) Department of Biology

The plant *Crassocephalum crepidioides*, commonly known as redflower ragleaf, has been traditionally used for medicinal purposes to boost immune function in African culture. *C. crepidioides* also contains alkaloids that possess acetylcholinesterase inhibiting properties. Many neurodegenerative disorders cause a decline in acetylcholine, a compound involved in neuron connection and memory function. Acetylcholinesterase is an enzyme that regulates acetylcholine levels in the body. Removal of the regulator will induce an influx of acetylcholine which could ameliorate cognition for individuals with neurodegenerative disorders. Older zebrafish experience cognitive impairments, making them great models for studying neurodegenerative effects. A previous study conducted in our laboratory investigated the impacts of *C. crepidioides* on the learning and memory of older zebrafish and found that high concentrations of the extract did not affect learning but significantly increased memory. This research seeks to connect the enzyme-inhibiting properties of the plant to its role in cognitive function in younger zebrafish. Young fish have sufficient levels of acetylcholine, and it has been hypothesized

that increasing acetylcholine levels will not impact the learning and memory of the fish. Young fish were exposed to 1000 ppm of extract in their tank water for one week. Preceding training, zebrafish were placed in the T-maze to observe which arm they initially swam towards. Then once a day for three days, they were trained to swim towards the opposite arm using negative reinforcement. After 24 hours, the learning capacity of the fish was evaluated by observing if they swam towards the correct arm without use of reinforcement. Memory was tested every 48 hours until they no longer chose the correct arm. Results suggest that fish treated with 1000 pm extract exposure had no significant difference in both learning ($n = 5$, $p = 1.0$) and memory ($n = 5$, $p = 0.803$) when compared to the control group. While this extract might have benefitted older zebrafish, the results suggest that younger fish did not cognitively benefit from an increase in acetylcholine.

Investigating the Role of PPARs in Primary Biliary Cholangitis-Related Cellular Stress

Ons Yasmeeen Bouali (Dr. Tonya Laakko Train) Department of Biology

Primary Biliary Cholangitis (PBC) is a progressive autoimmune disease that can ultimately lead to liver failure. Recent clinical trials have shown that the activation of a class of molecules called PPARs may hold promise for PBC treatment. There are three PPAR subtypes (alpha, beta/delta, and gamma) with various functions, including regulating liver lipid metabolism and reducing inflammation and autoimmunity. However, the effects of PPARs on PBC at the molecular level, in human bile duct cells, have yet to be characterized *in vitro*. In this study, H-69 human cholangiocytes (a model of PBC bile duct cells) were successfully cultured in DMEM-based media and fortified with a variety of specific additives. H-69 cells have not been widely investigated, making their culture and analysis significant. H-69 lysate (a protein-rich cell extract) is currently being analyzed for PPAR expression by western blot. In addition, a bicinchoninic acid assay was performed to determine protein concentrations; it was calculated that the lysate contained 1674 $\mu\text{g/mL}$ of total protein. This work will help confirm the presence of all three PPAR types in H69 human cholangiocytes, revealing their potential role in regulating PBC-related cellular stress while also determining whether immortalized human cholangiocytes express all PPAR subtypes *in vitro*. These results establish a basis to investigate how agonists and antagonists can be used to modulate the levels of PPARs in H69 cells and affect PBC-like cellular stress, as measured by apoptosis and mitochondrial stress.

Examining The Potential for Evolutionary Divergence by Describing Treehopper Host Plant Use and Mating Signals

Rebecca L. Carranza (Dr. Jen Hamel) Department of Biology

Behavioral mechanisms which can play a role in speciation are of central interest in evolution and ecology research. Plant-feeding insects are a highly diverse group of animals and often serve as models for the study of speciation. Many plant-feeding insect species locate and acquire mates by producing substrate-borne vibrational signals. They do so on particular plant species (i.e. host plant species), on which they live, mate, and lay eggs. Plant-feeding insects sometimes change their host plant species, and such "host plant shifts" can result in reproductive barriers. The properties of vibrational mating signals can change as one consequence of a host plant shift and may contribute to reproductive barriers. Keeled treehoppers (*Entylia carinata*) are plant-feeding insects that produce vibrational mating signals prior to copulation. In a midwestern population where keeled treehoppers use multiple different host plants, their vibrational signals have recently been shown to differ according to host plant species. Host plant use and mating signal parameters have not been described for North Carolina Piedmont populations of keeled treehoppers. Here, we describe host plant use from early and late

summer surveys at a field site (Penny's Bend Nature Preserve) near Durham, NC. We quantitatively describe the male mating signals of *E. carinata*, which contain four distinct components. Our findings show that *E. carinata* consistently use one host plant, *Cirsium altissimum*, throughout the early and late summer (month vs. nymph presence: $\chi^2 = 2.05$, $P = 0.15$; month vs. adult presence: $\chi^2 = 0.03$, $P = 0.85$). In addition to using *C. altissimum* throughout the season, *Entylia* also occupy another host plant species, *Erechtites hieraciifolius*, during the late summer. We found no differences in signal parameters between insects that developed on the two host plant species (linear mixed models, all NS). However, peak frequency differed for signals recorded from early and late-summer males on *Cirsium* (lmm: $F_{1,10} = 8.32$, $P = 0.01$). Consequently, we suggest that future research should assess the effects of developmental nutrition and plant phenology on male signal parameters and female preferences.

Mitigating CO2 Emissions through Carbon Sequestration: Four Strategies for Storing Carbon in Forests

C. Ashlyn Crain (Dr. David Vandermast) Department of Biology

Accurately quantifying carbon sequestration, the process whereby CO₂ is removed from the atmosphere, in forests can provide insights into mitigation strategies of human-induced climate change. This study analyzes the carbon budgets of four CO₂-reducing scenarios: 1) Urban Forests: urban tree planting projects, 2) Timberlands: afforested and organized tree plantings, 3) Reforestation: natural successional forest regrowth, and 4) Old Growth Forests: continuous and mature forests. Above ground biomass estimates of forests in the Piedmont region of North Carolina and synthesized from literature were standardized and converted into expected carbon storage values to allow for direct comparisons of carbon sequestration among scenarios. The reforested study site was found to sequester 72.6 Mg C/ha and the old-growth forest to sequester 59.7 Mg C/ha, both values greater than the carbon sequestered in planted forests. Factors such as tree density, geographic range, stand age, and tree species were also considered within the analyses. The data support that preservation of reforested and old-growth forests are the most valuable methods of sequestering carbon, over the planting of new trees in urban or timberland stands. This study allows for the direct comparison of the benefits of utilizing forests in the mitigation of greenhouse gas effects on climate change.

Investigating the Molecular Basis of Tay-Sachs Disease

Melissa B. Denish (Dr. Kathryn Matera) Department of Chemistry and (Dr. Tonya Laakko Train) Department of Biology

Tay-Sachs disease (TSD) is a rare but fatal disorder that disproportionately affects the Ashkenazi Jewish population and results in progressive neurodegeneration. Patients with TSD have lower levels of an enzyme, hexosaminidase-A (Hex-A), which causes a neuronal lipid (GM2) to accumulate in brain cells. There currently is no cure for TSD, and the molecular basis of this disease is not fully understood. A human neuroblastoma cell culture model was employed to investigate TSD by using RNA interference to reduce Hex-A levels and then comparing these cells to cell cultures without RNA interference treatment. Relative Hex-A protein levels were determined by western blot analysis using GAPDH as a total protein control, and preliminary experiments indicate that the TSD model had a 65% reduction in the level of Hex-A expression as compared to non-treated cells. GM2 cell-based ELISA, resorcinol quantification, and thin-layer chromatography of extracted gangliosides from cell cultures are being used to both quantify and identify the ganglioside components in the TSD cell culture model. This analysis will determine whether the Hex-A enzymatic decrease in cells treated by

RNA interference also results in increased GM2 accumulation. Establishing such a cell model for TSD will allow for further investigation of therapeutic methods to treat the disease.

Lack of Sex Differences in the Effect of Nicotine on Fear in Zebrafish

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

Fear is a complex behavioral state that has equally complex neurological bases which can be influenced by drugs and chemicals. Due to the similarities between zebrafish and human brain anatomy, we were able to use Zebrafish (*Danio rerio*) to investigate chemical influence on fear behavior. Studies have shown that zebrafish experience fear when the environment around them is altered, such as by the addition of a novel object. The aim of this study was to track the influence of nicotine and its withdrawal on their fear behaviors, with a specific focus on how those effects may differ between the sexes. The two-week experimental protocol began with an initial un-treated novel-object experience, followed by one week of nicotine exposure, and one week nicotine-free. Fish were tested in the experimental tank at the end of each week. Fish behavior was recorded 5 minutes before and 15 minutes after introduction of the novel object. Fish behavior was tracked using Ethovision software. Fear was assessed by using two specific behavioral patterns: time at the bottom in the first minute in the tank and avoidance of the tank-side where the novel object is revealed in the first minute following the reveal. Immediately following nicotine exposure, males and females showed equal anxiety 1 minute after being placed into the test tank ($p=0.235$, $N=21$) and one minute after the novel object was revealed ($p=0.499$, $N=23$). After one week of nicotine withdrawal, males and females showed an equal amount of fear, both when immediately placed into the tank ($p=0.142$, $N=14$) and after the novel object was revealed ($p=0.433$, $N=14$). The results show that male and female zebrafish respond to fear similarly in the presence of nicotine and its withdrawal. The next step in the experimental process is to increase the sample size as well as compare this data to the data that was produced from untreated fish that underwent the same protocol in order to gain a clearer understanding of the effect of chemicals on the difference in fear response between male and female zebrafish.

Multidecadal Changes in Cation Concentrations in the Wood of Trees from Elon University Forest

Lindley Longstreet (Dr. David Vandermast & Dr. Justin Clar) Department of Biology

Changes in atmospheric chemistry, in particular the acidification of rainwater in recent decades, have the potential to decrease the concentration of particular nutrient components in soils. One key component in soils are cations. Acid rain will reduce the availability of these cations in soils, making them less available to plants. Changes such as this have been documented in Europe, and closer to Elon, the Great Smoky Mountains National Park. The wood of trees in Elon University Forest (EUF) should contain a record of the change in cation availability of its soils. In this study, we use increment cores collected in 2015 from a variety of tree species in EUF to examine changes in cations such as iron (Fe^{2+}), magnesium (Mg^{2+}), and calcium (Ca^{2+}). Concentrations were examined using an inductively coupled plasma mass spectrometer (ICP-MS). We found that changes in wood cation concentrations (mg/g) were variable by species. When we grouped trees phylogenetically, we found that in the wood of gymnosperms both Ca^{2+} and Mg^{2+} concentrations declined over time (90 years ago to present), but not significantly. However, there was a significant increase in Fe^{2+} from 0.05 to 0.15 mg/g ($R^2=.648$). For angiosperm species, all changes were significant: Ca^{2+} decreased ($R^2=.555$), while both Mg^{2+} and Fe^{2+} increased (R^2 of .807 and .899, respectively). The results of our study do not follow our expectations with regard to the effect that acid rain should have on soil

cation concentrations. Uptake and translocation of cations in trees is more complicated than a simple linear relationship between soil concentration and wood concentration. Implications of our results will be discussed in detail.

Evaluating the Effect of Lipopolysaccharide on PKC and its Downstream Targets of FAK and mTORC2

Zachary M. Ohmann (Dr. Yuko Miyamoto) Department of Biology

Cancer utilizes the immune response to increase cell proliferation by responding to cytokines and growth factors produced by other cells in the tumor microenvironment. Understanding how the microenvironment affects tumors is important when designing cancer treatments. Lipopolysaccharide (LPS) is a molecule found on Gram-negative bacteria and it has been shown to produce an inflammatory response *in vitro*. Protein kinase C delta (PKC δ) plays a role in cell proliferation by affecting specific intracellular pathways. These pathways include focal adhesion kinase (FAK) and mTORC2. FAK is involved in regulating cell migration, while mTORC2 is involved in a variety of cellular processes including cell proliferation and cytoskeleton rearrangement. PKC δ acts downstream of mTORC2 and upstream of FAK by phosphorylating serine and threonine on these proteins. This allows the mTORC2 and FAK signal transduction pathways to continue. This study investigates the way hyperinflammation caused by LPS affects PKC δ activity in a cell culture model. LPS increased cell proliferation at a concentration of 5 $\mu\text{g}/\text{mL}$ with significance at $P < 0.001$. LPS has not been shown to affect PKC δ . This research can be used to further evaluate anti-inflammatory effects of cytokines on tumor cells.

Impacts of Religious Beliefs and Levels of Practice on Heart Rate Variability

Kathryn Paturzo (Dr. Robert Vick) Department of Biology

Heart rate variability (HRV) is the variation between consecutive heartbeats over time. An increase in HRV correlates with better overall cardiac health. Lifestyle choices and biological factors can affect HRV. Research has examined the effects of chanting, reading holy texts, and praying on HRV. However, there has been little research on how the levels of religious association affect HRV. The purpose of this study is to determine whether there is a correlation between levels of religious beliefs and practice and HRV. Inter- and intra-religious beliefs and levels of practice were rated on a scale from 1-5. HRV measurements were generated utilizing a lead I electrocardiogram (EKG). LabChart software was used to measure R-R wave intervals. EKGs with nine time-domain measurements of HRV were performed on 67 participants. T-tests and Bonferroni analyses were performed on the data to determine significance. Data were analyzed from participants identifying as members of 4 different religious identities: atheist, Catholic, non-denominational Christian, and Jewish. There is a significant difference ($p=0.03$, $n=10$) in SDRR (std dev of R-R time) of Catholics with different levels of practice, but not atheists ($p=0.5$, $n=15$), Christians ($p=0.6$, $n=17$), or Jews ($p=0.7$, $n=11$). Similarly, there is a significant difference ($p=0.006$, $n=15$) in SDRR of atheists with different levels of beliefs, but not Catholics ($p=0.4$, $n=10$), Christians ($p=0.7$, $n=17$), or Jews ($p=0.2$, $n=11$). Inter-religious data analysis results to follow. Although the data support significant differences between religious traditions, the cause of these differences remains unknown.

Investigating the Role of sTNF and tmTNF in Triple Negative Breast Cancer Cells

Sarah Peake (Dr. Tonya Laakko Train) Department of Biology

Triple-negative breast cancer (TNBC) has a survival rate of 77%, the lowest rate among all breast cancer subtypes. This subtype is more challenging to treat than other types of breast cancer because it lacks three cell receptors that are used for most targeted chemotherapies; therefore, there is a need to explore alternative treatment options. In TNBC, selective inhibition of TNF- α could provide a new approach to targeted therapy. The TNF- α pathway is a signaling pathway in cancer cells that mediates processes including inflammation and cell death. There are two forms of TNF- α , soluble (sTNF) and transmembrane (tmTNF) form, and there is little research examining the role of each form individually in TNBC cells. This project aims to determine the role of tmTNF and sTNF in TNBC cells (Hs578t) by selective inhibition using two inhibitors, TAPI-1 and Infliximab, and measuring cell death using flow cytometry. Treatment with sTNF and tmTNF inhibitor, Infliximab, resulted in an average increase in viable cell populations after the after 48 hours. Treatment with sTNF inhibitor, TAPI-1, resulted in an average decrease in viable cell populations. These preliminary results suggest that sTNF may have protective effects on the Hs578t cell population while tmTNF might have a suppressive effect on the Hs578t cell population.

Understanding Evolution at the mtDNA Sequence Level in Hybrid Tree Lizards

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

While mitochondrial DNA (mtDNA) has long been thought to be under strong balancing selection, recent work has shown that some genes may experience directional selection. This research addresses the pressures of 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*. As a result, hybrid mitochondria are in a dysfunctional state with disrupted ATP production. Comparing the codons of mtDNA genes from each species allows us to investigate the role of natural selection on hybrid mtDNA for better ATP production and how natural selection may also change the hybrid mtDNA to better interact with a different nuclear DNA background. We have the complete mtDNA sequence for 2 individuals of each species and 2 hybrids. We have characterized 7,168 base pairs for changes in the mtDNA sequence and have identified most of the mutations in the protein coding genes when compared to a third, outgroup species (*Urosaurus nigricaudus*). To see which mtDNA genes may be under stronger selection than others, we are comparing the proportion of amino acid replacements against the total gene length for each of the 9 mtDNA coding regions. Furthermore, we have calculated the genetic distance between each mtDNA gene from each lizard to see how far the species have diverged from the outgroup in terms of amino acid replacements. ATPase6 had a much higher genetic distance than any other gene and ATPase8 had more amino acid replacements than other genes. This research is important because as species are forced to change habitats due to climate change, there will be more interspecies interactions and an increased number of hybrid species. With our natural experimental model, we can understand the genetics of these interactions and help better predict what will happen as climate change continues to alter animals' natural habitats.

The Pro-Inflammatory Effect of Lipopolysaccharide on mTOR

Olivia M. Powers (Dr. Yuko Miyamoto) Department of Biology

Cancer cells have been found to use the natural immune response to recruit immune cells which then lead to the production of pro-inflammatory molecules and growth factors, and ultimately aid cancer cells in continuing to grow and proliferate. This project focused on mTOR, a downstream protein

kinase of the IL-37 signaling pathway which plays a role in cell proliferation and survival. Lung carcinoma cells (A549) were incubated with lipopolysaccharide (LPS) to mimic conditions that are a result of a cancerous environment where pro-inflammatory cytokines are present. Expression of mTOR and phosphorylated mTOR proteins after treatment with LPS were measured using western blot analysis to better understand the activation of the cell signaling pathway. Preliminary results show that LPS does not induce the activation and phosphorylation of mTOR, as minimal difference could be seen between the two treatments. Future experiments will investigate other downstream proteins from the mTOR signal pathway caused by LPS.

Phylogenetic Analysis of the dArc1 Domesticated Gene in *Drosophila*

Duru Tasman (Dr. Alfred Thomas Simkin & Dr. Mike Kingston) Department of Biology

Retrotransposable elements (retrotransposons) are mobile DNA elements that can relocate within a chromosome or migrate to a different chromosome in the genome through reverse transcription. Molecular domestication occurs when a relocation provides an evolutionary benefit and improves a critical biological process. The Arc gene in *Drosophila melanogaster* is a domesticated retrotransposon that aids in regulating neuro-motor signaling. This protein, also called Arc, exists in several *Drosophila* species; but the gene appears not to be fully domesticated in every one of them, providing a unique opportunity to observe transposable element domestication directly. We obtained the most updated sequenced *Drosophila* genomes from public genome libraries, such as UCSC genome library and FlyBase, and analyzed the data using Python programming language in conjunction with alignment tools. We aligned different dArc1 gene versions' open DNA reading frames and their protein sequences from 13 other *Drosophila* species by utilizing different Python functions and programs. *Drosophila sechellia* and *Drosophila simulans* are notably similar to *D. melanogaster* due to their comparable mutation rates per gene per generation. Our research into the evolutionary history of the dArc1 gene in the *Drosophila* genus will potentially yield important insights into the retrotransposon molecular domestication process in other evolutionary lineages. We hope that our phylogenetic analysis will lead to a general model that describes retrotransposon domestication within the tree of life.

Evaluating the Pro-Inflammatory Effect of LPS on Focal Adhesion Kinase (FAK) Phosphorylation

Joe Urban (Dr. Yuko Miyamoto) Department of Biology

Inflammation has been shown to exacerbate cancer. This research focuses on the focal adhesion kinase (FAK), a protein found in virtually all mammalian cells, and how it is affected when cells are treated with a pro-inflammatory molecule, lipopolysaccharide (LPS). FAK is involved in cell growth and motility by catalyzing the cytoskeletal organization of cells. The protein becomes phosphorylated in inflammatory conditions and previously when tyrosine at amino acid position 397 (Y397) becomes phosphorylated, FAK is activated and catalyzes cell-surface reorganization that optimizes cell growth and motility. Studies have also indicated that LPS, a glycolipid produced by most Gram-negative bacteria, stimulates cancer cells to metastasize. Y397FAK phosphorylation levels with and without LPS treatment in A549 lung carcinoma cells were measured utilizing western blotting. It was hypothesized that LPS treatment would increase FAK phosphorylation due to its pro-inflammatory properties. Preliminary results of amounts of phosphorylated FAK with and without LPS treatment were measured and showed no differences between the treatment and control groups, indicating that LPS had no effect on Y397FAK phosphorylation.

Evidence of Long-Term Memory of Details for Fearful Events in Zebrafish

Wylie K. Watlington (Dr. Eric Bauer) Department of Biology

Fearful and stressful responses occur in all animals and understanding its neurological basis is therefore of general interest. Zebrafish (*Danio rerio*) are small fish that show consistent fear/stress responses, making them an ideal model for neurobiological studies of stress and fear. In this project, behavioral responses were stimulated using the novel object test, in which zebrafish are exposed to an unfamiliar object. This exposure elicits a fear response measurable by well-researched behavioral parameters, such as time spent in the bottom of the tank and time spent on the opposite side from the novel object. While the novel object is known to cause fear in zebrafish, it is unknown whether they can remember and avoid the object in subsequent trials by remaining on the side opposite the object. These fish were tracked with the software Ethovision for 5 minutes before object reveal and 15 minutes after over a 2-week period. At the beginning, the fish were exposed to the novel object on one side of the tank. They then were exposed at 1-week intervals to assess their memory. This consisted of observing whether the fish remembered the tank was a fearful place, and whether they remembered the novel object side. It was determined that zebrafish avoid the tank side where the novel object is first presented, showing they do remember the novel object and its associated fear (2nd experience: $N=37/p<0.0001$, 3rd experience: $N=32/p<0.0001$). Though the fish avoided the side of the novel object, there was no significant difference between time spent in the bottom of the tank between the first and subsequent trials (2nd experience: $N=63/p=0.915$, 3rd experience: $N=72/p=0.7786$). This shows the fish are not exhibiting fear of the experimental tank overall, but that they remember and predict where the fear-eliciting novel object was placed. These results set a precedent for further research using zebrafish models. Future directions of this project include determining whether e-cigarette chemicals (such as nicotine and cinnamaldehyde) alter fear responses and memory, eventually generalizing these findings to human health.

Investigating the Link Between the Gut Microbiome and Epilepsy in Zebrafish

Kristina M. Woodis (Dr. Jennifer Uno) Department of Biology

Epilepsy is the fourth most common neurological disorder affecting over 50 million people worldwide. Recent research indicates that modulation of the gut microbiome can alter the course of the disease in animal models as well as in humans. The gut microbiome is an ecosystem of fungi, viruses, and bacteria that is influenced by an individual's genetics, diet, and lifestyle. The impact that the gut-brain axis may have on epilepsy is not well understood. Dietary modifications are often used as treatment options for epileptic patients that are unresponsive to other anticonvulsant therapies. In fact, current research indicates that ketogenic diets are associated with a decrease in microbial diversity and diminished seizure activity. It is not known whether this dietary modification works through the gut-brain axis. Zebrafish are a commonly used animal model to study human disease, including epilepsy and gut microbiome mechanisms. The aim of this study is to validate the use of zebrafish to study the interactions between the gut-brain axis and epilepsy, as well as further explore the mechanism by which the microbiome alters the course of the disease. We hypothesize that antibiotic-treated fish will experience diminished seizure responses to Pentylentetrazol (PTZ) due to a decrease in intestinal bacterial abundance. Zebrafish were treated with broad-spectrum antibiotics to alter the diversity of the microbiome. Fish were then given PTZ to induce a seizure-like state. Seizure activity was recorded and evaluated using EthoVision tracking system and software. Intestinal and brain tissue were harvested for bacterial DNA and RNA respectively. Bacterial abundance was significantly decreased in antibiotic treated fish. Seizure activity was significantly increased in PTZ-treated fish and was surprisingly

augmented in antibiotic-treated fish ($n=5$, $p \leq 0.05$). In addition, we observed an increase in glutamate along with a decrease in GABA receptor expression in PTZ-treated fish; these results were reversed in fish treated with both antibiotics and PTZ. Collectively these results indicate that zebrafish are an effective model for studying gut-brain communication involving epilepsy and modulating the gut microbiome may influence seizure activity in PTZ-treated fish.

Center for the Advancement of Teaching and Learning

Motivational Factors that Support Female Interest in Introductory Earth Science Labs*

Avery Davis (Dr. Kelsey S. Bitting, Dr. Katherine Ryker, & Dr. Rachel Teasdale) Center for the Advancement of Teaching and Learning

Increasing the number of women in STEM, specifically in the Earth sciences, is a long term effort that has had limited success. Due to the strong link between interest and motivation, improving female interest in STEM may encourage females to pursue these fields (Hill et al., 2010). Sociocultural norms and expectations have led to differences in what types of learning activities trigger interest in males and females. Therefore, this study aims to determine what motivational factors are consistent across multiple introductory Earth science labs focused on varying topics. Our goal is to understand which motivational factors are most important in promoting female interest in these labs, based on the value-expectancy (Wigfield & Eccles, 200) and self-determination theory (Deci & Ryan, 2013) frameworks for motivation. Interest data was collected with a survey for each lab from undergraduate students participating in an introductory Earth science course at a large public research institution. Average interest scores by gender were compared using a paired-samples t-test to determine which lab designs consistently promote one gender's interest over another across two semesters. There were no statistically significant differences between interest based on gender, but there was a range of Cohen's d values from small to medium effect with four labs favoring male interest (Platetect, Earthquakes, GeoTime, Stream Discharge) and one lab consistently favoring female interest (MetaRx). Focusing on the labs that maintain directionality across semesters (i.e. consistently promote interest for one gender), the written labs were coded for motivational factors related to competency, relatedness, autonomy, and value (Deci & Ryan, 2013; Wigfield & Eccles, 2000). Two coders iteratively examined and coded the labs and discussed all discrepancies to achieve consensus (Cohen, 1960). The relationship between the interest data by gender and the coded lab design will be used to determine which motivational factors best support female interest, which can be used to design labs that help to close the gender gap in the Earth sciences without diminishing the interest of others.

Center for Design Thinking

Redesigning Higher Education for Equity and Social Justice*

Soniyah Robinson (Dr. Danielle Lake) Department of Center for Design Thinking

This research presentation explores research findings examining the impact of the Center for Design Thinking's student-led social justice workshops series. The series, entitled Redesigning for equity and Social Justice, was co-created in the spring of 2020 in partnership with the Center for Race, Ethnicity, and Diversity Education and the Center for Design Thinking. The workshops integrate research on implicit bias, cycles of oppression, and liberatory design practices, engaging participants in the process

of redesigning both their own individual practices and the institutional structures and cultures for which they are embedded. Since February of 2020 over 100 workshops within the series have been offered to on and off-campus communities. Sessions have been evaluated via an optional Qualtrics survey participants are invited to complete at the end of each workshop Quantitative findings were analyzed using descriptive statistics and qualitative findings were analyzed via a grounded theory approach. In particular, open, axial, and selective coding was used to assess respondents' perceptions of the value and limitations of the series. Our scholarship found that students benefited substantially from equity and social justice teachings with a focus on design thinking tools and methods. The major conclusion of our research was that there is a strong need in higher education, specifically at Elon University, for workshops that teach equity and social justice concepts and provide tools for design-based action.

Chemistry

Investigating the Trace Metal Content of Cigarette Butts in Environmental Systems

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

A substantial amount of research has addressed the environmental impact of nicotine from cigarettes and cigarette butts (CBs) on human and environmental health. However, very little research has involved studying the trace metals found inside tobacco of cigarettes and their impact on human and environmental health. Moreover, the previous studies that have examined 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 confusion by developing a baseline of trace metals content in CBs before subsequent environmental release studies. In Phase I of this project, a mass balance was completed to determine how much metal was found inside each component (paper, tobacco, 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). The metals found in the paper varied by brand, but the metal in the highest concentration in five of the six brands was iron (~300 $\mu\text{g}/\text{Cig}$). The metals measured in the tobacco samples were higher than that of the paper or filter. Specifically, the metal found in the highest concentration inside tobacco samples from every brand was magnesium (~2.3 mg/Cig). Phase II of this study used CBs produced from a laboratory simulated smoking and tested their ability to leach trace metals from the CB into received water bodies. Test fluids included DI water, simulated precipitation, buffered solutions (pH 7, pH 10), and artificial seawater. Filtered leachates were digested using EPA method 3015A and were then analyzed via ICP-OES. Between 10 and 15 trace metals were detected in the CB leachates, including aluminum, copper, and zinc. Concentrations varied depending on the leaching solution used. In the future, CBs collected from around Elon University's campus will be studied against artificial CB leaching to determine whether CBs are a source or sink for trace metals in the environment.

Investigating the Efficacy of a Rhodium-Centered Complex as a Catalyst for the Electrochemical Reduction of Carbon Dioxide

Lauren O. Butler (Dr. Karl D. Sienerth & Dr. Anthony Rizzuto) Department of Chemistry

Greenhouse gas emissions have a serious impact on the environment and climate, with carbon dioxide being one of the largest contributors due to how long it persists in the atmosphere. One way to combat

the problem would be to decrease emissions by repurposing carbon dioxide. This could possibly be accomplished by electrochemically reducing carbon dioxide and subsequently converting it into other chemical compounds, such as methane and methanol, which could then be used for the production of fuels and industrial chemicals. Due to the high stability of carbon dioxide, electrochemical reduction needs to be catalyzed to make it energy-efficient, and much of the research in this area focuses on determining what materials are effective catalysts. Although some materials have shown potential, there are still many issues with current catalysts including low efficiencies, low product selectivity, and high input of energy required. This research seeks to determine the efficacy of an organometallic complex, $[\text{Rh}(\text{bpca})_2]^+$, for the electrochemical reduction of carbon dioxide. To date, $[\text{Rh}(\text{bpca})_2]^+$ has been synthesized and characterized using Fourier-transform infrared (FT-IR) spectroscopy and nuclear magnetic resonance (NMR) spectroscopy. Electrolysis experiments have been conducted in acetonitrile in the presence of carbon dioxide, $[\text{Rh}(\text{bpca})_2]^+$, and benzyl chloride, which acts as a CO_2 radical scavenger resulting in the formation of phenylacetic acid (PAA). As a result, the amount of PAA in each sample can be used to approximate the amount of CO_2 reduced. Standard solutions of PAA in acetonitrile were prepared and subjected to the same procedure as is applied to solutions after electrolysis in the presence of benzyl chloride. The amount of PAA in each solution was determined using GC-MS. The method demonstrated an overall 91% recovery of PAA when 50mM nitric acid was added to protonate the PAA. The same method was used to determine the efficiency of the CO_2 electroreduction in the presence of the rhodium-centered complex.

Assessing the Effects of Climate Change on the Release of Metals into Agricultural Products

Hayley S. Clos (Dr. Daniel Wright) Department of Chemistry

Agriculture is a key development in civilization that allows for the production and distribution of food. Impacts due to climate change such as increased levels of CO_2 , extended drought conditions, and increased temperature can have negative effects on agricultural processes. Current research has tied increased metal uptake in fruits and vegetables to increased temperatures, though not specifically associated with climate change. Certain trace metals such as Pb and As have been shown to pose health risks to humans. The uptake of trace metals into produce can be monitored using inductively coupled plasma (ICP) and X-ray fluorescence (XRF) spectroscopy. The current research begins a 5 to 10-year longitudinal study to analyze how changing temperature affects the amount of trace metal uptake in local produce from states along the Atlantic coast. The metals of focus for the analysis include Al, Cd, Pb, As, Fe, Mn, Zn, Mg, Ca, Ni, Cu, Co, and Cr. XRF spectroscopy is the preferred method of analysis due to the fact that it is greener, faster, and more cost-effective than ICP analysis, but measurements made with ICP spectroscopy can be used to compare and verify the measurements collected from the XRF. Currently 500 samples have been collected at farms and markets in over 10 states. Preliminary results show ranges of detection for Mn (24 -52 ppm), Fe (61 - 378 ppm) and Cu (9 - 304 ppm) which are comparable to published values in other studies. Some metals of possible interest (Co, Ni, Pb and Cd) have not been detected at significant levels in the first round of sample collection. Initial results indicate that XRF and ICP analysis are also comparable. Future analyses may lead to the identification of specific regions or produce samples to monitor.

Investigating the Molecular Basis of Tay-Sachs Disease

Melissa B. Denish (Dr. Kathryn Matera) Department of Chemistry and (Dr. Tonya Laakko Train) Department of Biology

Tay-Sachs disease (TSD) is a rare but fatal disorder that disproportionately affects the Ashkenazi Jewish population and results in progressive neurodegeneration. Patients with TSD have lower levels of an enzyme, hexosaminidase-A (Hex-A), which causes a neuronal lipid (GM2) to accumulate in brain cells. There currently is no cure for TSD, and the molecular basis of this disease is not fully understood. A human neuroblastoma cell culture model was employed to investigate TSD by using RNA interference to reduce Hex-A levels and then comparing these cells to cell cultures without RNA interference treatment. Relative Hex-A protein levels were determined by western blot analysis using GAPDH as a total protein control, and preliminary experiments indicate that the TSD model had a 65% reduction in the level of Hex-A expression as compared to non-treated cells. GM2 cell-based ELISA, resorcinol quantification, and thin-layer chromatography of extracted gangliosides from cell cultures are being used to both quantify and identify the ganglioside components in the TSD cell culture model. This analysis will determine whether the Hex-A enzymatic decrease in cells treated by RNA interference also results in increased GM2 accumulation. Establishing such a cell model for TSD will allow for further investigation of therapeutic methods to treat the disease.

Investigating the BCL-2 Family of Proteins in Pancreatic Cancer to Overcome Chemotherapy Resistance

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

Pancreatic ductal adenocarcinoma (PDAC) is a deadly cancer with relatively few treatment options. Due to difficulties in detection, PDAC is rarely diagnosed prior to the cancer spreading from its original site, leaving chemotherapy as the primary form of treatment. A four-drug cocktail known as FOLFIRINOX is the current standard of care but proves susceptible to chemotherapy resistance, in which cancer cells stop responding to chemotherapy treatment. One mechanism of chemotherapy resistance involves cancer cells having increased amounts of the BCL-2 family of proteins, which prevents the cells from dying when they should. Despite this known mechanism of uncontrolled cell growth, research is limited to the expression levels of only a select few members of the BCL-2 family in PDAC. This study will first characterize the expression levels of a wide range of BCL-2 family proteins in PDAC cell lines. Following this, obtained data will be utilized to strategically evaluate the combined effect of FOLFIRINOX with various BCL-2 inhibitors of over-expressed anti-cell death proteins in efforts to overcome intrinsic and acquired FOLFIRINOX resistance in PDAC.

Investigating Vanadium–Tetracycline Complexes: Synthesis and Structural Analysis

Samantha E. Eastman (Dr. Jennifer Dabrowski) Department of Chemistry

The fast-paced evolution of bacteria has resulted in the development of resistance to common antibiotics. This has generated a significant medical problem in the modern world which demands the development of novel antibiotic compounds. A recent approach in drug research has explored the coordination of metal atoms to compounds with antibiotic activity. Some metal atoms can be substituted into organic compounds because they exhibit similar physical properties as other non-metal atoms. One example of medicinal organometallics is the incorporation of vanadium, a transition metal, into diabetes therapeutics. For antibiotics, coordination to a metal atom may alter the molecular structure of the compound so that it can bypass the resistance mechanism of the bacteria. Previous research conducted in the group has demonstrated that a complex of tetracycline and vanadium maintains antibiotic activity. However, the exact structure of the formed compound is unknown. The goal of this research is to characterize the structure of vanadium–tetracycline and optimize the conditions for its synthesis. Experimental results highlight the influence of light, solvent, temperature,

atmosphere during the synthesis, and physical state on product structure. Additionally, a highly probable structure has been identified for the major product. Methods of analysis and instrumentation utilized include infrared and ultraviolet-visible spectroscopy, nuclear magnetic resonance spectroscopy (^1H , ^{13}C , DEPT, HSQC, HMBC), and X-ray absorption spectroscopy. Further research on speciation and reaction kinetics are ongoing.

Surfactant-Modified Method for Analysis of Explosives Through Fluorescence Quenching

Victoria E. Gorman (Dr. Karl D. Sienerth) Department of Chemistry

The most recent Census of Publicly Funded Forensic Crime Laboratories reported almost 4,000 cases requiring analysis of explosive-related trace evidence that are backlogged at state and federal crime labs. This issue is due to the expensive equipment and highly trained personnel required for the current method of explosives analysis. The majority of local law enforcement agencies do not have enough incidents involving explosives to warrant expenditure on the necessary equipment and personnel, so when they do need explosives analysis carried out, the samples are sent to state and federal forensic labs where they become backlogged. Therefore, the aim of this research was to develop an inexpensive method to analyze explosives, which requires minimal training and can be performed by officers on sight of a crime scene. Because many unidentified subjects have a “modus operandi” or “style” to their crimes, the explosives composition could be very advantageous when solving a crime. More specifically, this study investigated the use of electrochemiluminescence (ECL) quenching to detect explosives encapsulated in micelles in solution. Each explosive–luminescor pair has a unique quenching rate that can be used for identification, and ECL is a far less expensive method than what is currently used to detect explosives. Encapsulation in micelles allows the experiments to be conducted with water as the solvent and at mild pH, thus making it safer than more traditional ECL quenching techniques that require organic solvents and extreme pH. These drawbacks contribute to the safety issues surrounding the current methodology. It has been demonstrated that this issue could be avoided with the use of surfactants as they allow luminescors to dissolve in water at non-extreme pH conditions.

Exploring Nonlinear Quenching Behavior in Determination of Explosives Through Fluorescence

Erin E. Ierace (Dr. Karl D. Sienerth) Department of Chemistry

Due to the large number of cases and lack of laboratory resources, criminal investigations into arson or explosive cases are restricted by a backlog of analyses in crime laboratories. A more efficient method of analyzing explosives that has been proposed involves the use of fluorescence quenching with an algebraic multifactor analysis that can be performed on site. The algebraic formula will be generated based upon the relationship between fluorescence quenching and explosive concentration (the Q:C relationship). One challenge encountered in the development of this method is that, in early experiments, the Q:C relationship is often observed to be nonlinear. The hypothesized source of this nonlinear behavior is the occurrence of both static and dynamic quenching which occur at different concentrations. To determine the concentration ranges of static and dynamic quenching as well as the transition range in between, time-resolved fluorescence will be utilized. Initial investigations were performed on the quenching of luminol by the explosive model compound 2,4-dinitrophenol (DNP) at a wide range of concentrations. Further investigation then continued with the explosive trinitrotoluene (TNT) with luminol. While DNP was found to quench luminol luminescence to a far greater extent than TNT, in both cases the fluorescence decay rate varied significantly over a range of quencher concentrations but remained steady over a range of luminescor concentrations. These preliminary

results indicate that this approach can be used, with further study, to determine the type of quenching taking place.

Products of Peroxidase-Catalyzed Oxidation of Estrogens

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

Estrogenic carcinogenesis has been widely associated with breast cancer initiation. Studies suggest that mammalian peroxidases catalyze the oxidation of catecholic estrogens to quinone methides, a conjugated organic compound. Quinone methides are proposed to cause toxic DNA modifications. Within these studies, there is a lack of evidence that a quinone is truly the oxidized product of estrogens, as well as a lack of recognition of possible toxic implications of semiquinone intermediates. In this study, oxidized estrogens are examined for their structure and quantity. This can give insight to the oxidative mechanism of mammalian peroxidases when exposed to estrogens, and to the mechanism by which oxidized estrogens may covalently bind to DNA. To analyze these interactions, the oxidation of β -estradiol in the presence of hydrogen peroxide was catalyzed by horseradish peroxidase (HRP) as a standard enzymatic reaction, and then with lactoperoxidase (LPO), an enzyme found in mammary glands. The oxidized compounds were analyzed through thin layer chromatography (TLC) and $^1\text{H-NMR}$. TLC results indicate that both HRP and LPO catalyze the formation of various shared intermediates. $^1\text{H-NMR}$ results suggest that HRP forms a catecholic oxidized product, while LPO forms a quinone methide oxidized product. This is consistent with previous studies. Further studies are being conducted to determine the ability of the products to covalently bind to 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 transports retinol and thyroxine throughout the body. In transthyretin amyloidosis disease, TTR abnormally aggregates and builds up in body tissues. This aggregation is associated with oxidation, inflammation, and organ failure. Normally TTR exists as a stable oligomer of four identical monomeric peptides, but with amyloidosis it destabilizes and the tetramer dissociates. The monomers then misfold, oligomerize, and eventually form fibrils that are deposited in tissues. TTR aggregates are associated with increased reactive oxygen species (ROS) levels and oxidative stress. In addition, TTR aggregates interact with the high density lipoprotein (HDL) cholesterol carrier. HDL becomes ineffective at carrying cholesterol to the liver to be metabolized, so 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 will be investigated. Numerous methods will be used to analyze TTR aggregation including Thioflavin T assays to assess fibril formation, SDS-PAGE to characterize aggregate size, and western blotting of oxidized proteins in HDL to measure the oxidative ability of TTR aggregates. Initial results from SDS-PAGE indicate that aggregates of up to eight monomers form after ten days at physiological temperature (37°C). Assay methods to quantify oxidative damage through western blotting have been developed. 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.

Methods for Characterizing Near Surface Defects on SiC Wafers

Harry Masker, Stratton Bacogeorge, & William Tunis (Dr. Scott Wolter) Department of Physics, Engineering Programs and (Dr. Anthony Rizzuto) Department of Chemistry

Defects in the near surface (<100 nm) of semiconductor wafers can impact the performance and reliability of solid-state devices. The devices that are manufactured on these wafers rely on low defect concentrations as crystalline abnormalities can adversely affect the quality of epitaxial layers which can in-turn affect device electrical characteristics. Methods to characterize defects in the near surface should be non-destructive, non-contact, and automated to provide high throughput production capability. Further, candidate characterization methods should provide high spatial resolution to accurately determine defect location and size. In this presentation, we will report on the application of Raman Spectroscopy for characterizing the crystallinity in the near surface of silicon carbide wafers. This characterization technique exploits vibrational modes of scattered light to provide information regarding crystalline structure and associated defects. Typical Raman spectroscopy systems are capable of 1-micron spatial resolution while depth resolution can be adjusted by the incident angle of the laser source. Combined with the application of a motorized stepper stage, we will report on accurate location and quantitative measurement of the size and depth of subsurface damage. This is possible through studying variations in the sampling dwell time and incident laser spot size. The findings from this research will contribute to the development of characterization methods towards improving wafer surface characterization.

Sustainable Medicine: Investigating Green Solvents in Conversion of Sugars

Claire T. McGrath (Dr. Jennifer Dabrowski) Department of Chemistry

Most medicines are primarily prepared from crude oil (fossil fuel) sources, and synthesizing these compounds under more sustainable conditions is becoming increasingly important. Due to crude oil existing in a finite amount, this resource is not reliable as it will eventually run out. Furthermore, the extraction of crude oil from the Earth is harmful and destructive to our environment. It is vital for our progression as a society to find more organic alternatives; we want to maintain being able to make medicine when crude oil sources do run out. Prior research has developed strategies to convert bio-renewable sugars to medicinally relevant molecules. However, chloroform, the medium used to carry out the reaction, is a known cancer-causing substance that is produced from crude oil. Our research explores green solvent alternatives for one readily available sugar (linear galactitol) derived from dairy products, sugar beets, avocados, etc. Our first step was to prepare a version of galactitol that was used as our starting material in the previously optimized cyclization catalyzed by tris(pentafluorophenyl)borane and trimethylallylsilane. Next, we used inert atmosphere techniques, including the Schlenk line and glovebox, to conduct the reaction in each of the following green solvents: toluene, cyclopentyl methyl ether (CPME), and dihydrolevoglucosenone. Progress was monitored via carbon-13 nuclear magnetic resonance spectroscopy (NMR) to achieve this. Analysis utilized MestReNova software to compare our results to previously obtained results. Preliminary comparative solubility -studies suggest that all the green solvents studied are promising alternatives to chloroform. Ultimately, our goal is to find green solvent alternatives that will achieve similar levels of efficiency to previous experiments in the cyclization reaction. Our hope is this will allow for a more sustainable future in the field of medicine.

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 (CO₂ and water). This 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 $0.030 \pm 0.007 \text{ ms}^{-1}$. 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.

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

Makayla Oby (Dr. Victoria Moore) Department of Chemistry

Oral cancer is one of the most common forms of cancer among developing countries but despite current efforts, the prevalence of oral cancer has remained constant. 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 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 four drugs used to treat other forms of cancer: 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 gathered from both cell lines treated individually with each of the four different drugs. High GI50 values across the cell lines indicate that both Cal-27 and OECM-1 are resistant to the four drugs that were tested. In the future, Cal-27 and OECM-1 will be treated with a panel of 10 drugs currently used clinically to treat oral cancer to gather baseline data to understand how these cell lines react to current treatment. They will then 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.

Investigation of the Preparation and Structural Properties of Vanadium-Amoxicillin Complexes

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The purpose of an antibiotic is to fight bacterial infection with maximum effectiveness and minimum side effects. Growing concerns over antibiotic resistance has called for the modification of existing drugs to serve as analogues to combat this issue. One strategy to transform existing drugs is to incorporate a transition metal onto the antibiotic compound; previous research has shown that attaching a transition metal onto a beta-lactam produces an analogue that is just as, if not more, efficient than the original compound. This research examines complexing vanadium with amoxicillin with starting reagents vanadyl(IV) acetylacetonate [VO(acac)₂], tris(triphenylsiloxy) vanadium oxide [VO(OSiPh₃)₃], vanadium chloride, amoxicillin, amoxicillin trihydrate, and amoxicillin sodium salt. Then characterizing the synthesized complexes utilizing NMR, IR, and UV-vis spectroscopy. Preliminary NMR analysis points toward solvent effects resulting in a full conversion; structure determination is ongoing. Future research will explore reproducibility of results, compound amplification, and an examination of the synthesized vanadium-amoxicillin complexes antibiotic activity against *E. coli*.

Transformation of CeO₂ Nanoparticles in Surface Coatings: Potential Hazards of Inhalation During Application

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Surface coatings, including paints, stains, and sealants, have recently become a focus of “nano-enabled” consumer product engineering. Specifically, cerium dioxide (CeO₂) nanoparticles (NPs) have been introduced to surface coatings, such as deck stains, to increase UV resistance. As more products available for purchase are made with NPs, questions arise regarding the long term environmental and human health effects of these materials. Additionally, a lack of regulation and public awareness allows companies to provide little readily available information about the NP composition of their products. This study aims to shed light on the transformation of CeO₂ NPs commonly included in surface coatings after potential inhalation during application of the coating. CeO₂ NPs were dispersed in Milli-Q water as well as a commercially available deck stain. Test solutions were then incubated in two common synthetic lung fluids (SLFs), Gamble’s solution (GS, pH 7.4), and artificial lysosomal fluid (ALF, pH 4.5). Subsamples were taken throughout incubation over the span of a week. These subsamples were analyzed via atomic emission spectroscopy to determine both the total suspended (including particulate) cerium concentration and dissolved cerium concentration. Results suggest that incubation in GS results in NP aggregation and large decreases in suspended cerium concentrations relative to controls. Suspension in ALF resulted in similar cerium concentrations relative to the controls; however, ~50% of the material was determined to be dissolved in nature. These results demonstrate the potential for transformation and uptake of CeO₂ NPs if exposed to the deep lung. Future research will track changes in CeO₂ NPs speciation during incubation.

Kinetic Investigations of the Decomposition of Aqueous Carbonic Acid

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The human bloodstream has a slightly basic pH of 7.4, and even minimal deviations from this number can result in detrimental health conditions such as acidosis, which can lead to coma and death. Carbonic acid (H₂CO₃) is one of the primary buffer components in the human bloodstream, where it helps to regulate blood pH. Despite its physiological importance, many of the specific kinetic properties (i.e., reaction rate) of aqueous H₂CO₃ are incompletely understood due to a rapid, bidirectional equilibrium, where H₂CO₃ simultaneously decomposes to form two sets of products: 1) bicarbonate (HCO₃⁻) and an acidic proton (H⁺), and 2) water (H₂O) and carbon dioxide (CO₂). This

study aims to describe the kinetics specific to the latter decomposition pathway. Because H_2CO_3 is so short-lived in aqueous solution, past studies have been limited to computational approaches or indirect experimental probes. This study couples high resolution Raman scattering spectroscopy with a high-speed liquid mixing system wherein H_2CO_3 is generated *in situ*, allowing us to probe the carbonic acid molecule directly, and quantitatively measure its rate of decomposition. We have experimentally determined the rate constant for the dissociation of aqueous H_2CO_3 into H_2O and CO_2 . This decomposition proceeds according to first order kinetics with a rate constant of $0.030 \pm 0.007 \text{ ms}^{-1}$. Future studies will be conducted to shed light on the decomposition of H_2CO_3 under physiological conditions, specifically using a phosphate buffer system that more closely mimics the human bloodstream.

Why is Acetyl CoA a Better Choice for Condensation Reactions than an Ester Analogue in the Citrate Cycle? Contributions by Resonance and Inductive Effects toward Alpha Carbon Acidity

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Acetyl coenzyme A (Acetyl CoA) is an important two-carbon source in reactions that join carbon-carbon bonds in biochemical pathways. One example is the condensation of acetyl CoA with oxaloacetate to synthesize citrate within the citrate cycle. Acetyl CoA contains a thioester group, which allows the alpha carbon to be deprotonated more easily than the alpha carbon of an ester. The enhanced acidity of thioesters is potentially an outcome of the different contributions by resonance and inductive effects in thioesters versus esters. The goal of this research is to computationally quantify the separate contributions by resonance and inductive effects toward the acidity of thioesters and esters, in order to better understand why biochemical processes use thioesters instead of esters. A vinyllogue extrapolation computational method was applied to determine the contributions by resonance and inductive effects on the deprotonation at the alpha carbon of thioacetic acid (model for a thioester) and acetic acid (model for an ester). Quantum theoretical calculations were carried out using Gaussian09 software with density functional theory (DFT) at the B3LYP/6-311++G(d,p) level. Results show that thioacetic acid is 11 kcal/mol more acidic at the alpha carbon than is acetic acid. The contributions by resonance were similar for both compounds, within approximately 1 kcal/mol. Nearly all of the 11 kcal/mol acidity enhancement results from inductive effects. Future directions of this research will aim to study the contributions of resonance and inductive effects when the leaving group is attached by other second row elements, such as phosphorus or chlorine.

NUT Carcinoma: Investigating Drug Synergy and the Production of Drug Resistance

Carolyn E. Vaughan (Dr. Victoria Moore) Department of Chemistry

NUT Carcinoma (NC) is a rare cancer that results from the formation of an oncogenic fusion protein, causing high levels of undifferentiated cells to develop into malignant tumors. The average patient prognosis is between 6-7 months with a 0% survival rate, because clinical applications indicate that NC has a high chance of becoming resistant to drug treatments. Current clinical studies focus on the impacts of single drug treatments, while gaps remain on the effect of synergistic drug treatments. The purpose of this study is to investigate different drug combinations that could be of use clinically, as well as to create cell resistance in NC cell lines which will then be used to determine if resistant cells obtain collateral sensitivity or resistance to other chemotherapy drugs. Three separate cell lines (NC-14, NC-1015, and NC-690) directly derived from NC patients (gifted from Dr. Christopher French, Brigham and Women's Hospital, Boston) were evaluated individually for initial sensitivity to different chemotherapeutic drugs. Seven drugs were selected based on either clinical application in NC patients

or use in cancers sharing similar mechanisms to NC. Over 90 repeated trials indicate that the three drugs, Mirdametinib, Trametinib, and Venetoclax, do not individually have an impact on any of the three NC cell lines. However, promising results for the additional separate drugs, ARV-771, (+)-JQ1, and Birabresib, for 1015 and 690 cell lines were obtained due to the cells' higher sensitivity to each of the three chemotherapeutics. Ongoing experiments include growing resistant 14, 1015 and 690 cell lines to Birabresib, ARV-771, and (+)-JQ1, respectively, using dosing concentrations determined based on the collected data, as well as evaluating their sensitivity to combination treatments.

How is the Enolase Enzyme Capable of Deprotonating 2-Phosphoglycerate in the Glycolysis Pathway? Contributions by Resonance and Inductive Effects

Andie R. Weinberg (Dr. Joel Karty) Department of Chemistry

Enolase is an enzyme in the final reaction in glycolysis, a metabolic pathway that converts glucose into pyruvate. A key elementary step in the reaction is a deprotonation of the alpha carbon of 2-phosphoglycerate, and without any external influence, the deprotonation would require a very strong base that would be incompatible with physiologic conditions. Enolase uses two magnesium ion cofactors to enhance the acidity of the alpha hydrogen, and therefore allow for the deprotonation to occur under physiologic conditions with a weak base. This study aims to quantitatively determine the contributions of resonance and inductive effects towards the acidity enhancement, by using a vinyllogue extrapolation computational method. Quantum theoretical calculations were carried out using Gaussian09 software with density functional theory at the B3LYP/6-311++G(d,p) level. Acetate anion was used as a model for 2-phosphoglycerate. The results show that the acidity enhancement by one magnesium has contributions by both resonance and inductive effects, with inductive effects accounting for the majority of the acidity enhancement, about 80% overall, while the other 20% is accounted for by resonance. Future directions of this research aim to study the impacts by the second magnesium ion cofactor in the active site of the enolase enzyme.

Internal Melanin and Oxidative Stress: An Investigation of Lizard Livers

Liora Wittle (Dr. Victoria Moore) Department of Chemistry

The habitats of the lizards *U. ornatus* and *U. graciosus* overlap in Arizona, and in that overlapping range, there is a hybrid species with the nuclear DNA of *U. graciosus* and the mitochondrial DNA of *U. ornatus*. The mitochondria in the hybrid lizards are much more inefficient than those in the two parental species. All these lizards have internal melanin in their livers, with the hybrids possessing much higher amounts. One hypothesis is that the higher melanin content in the hybrid lizard livers helps protect them against oxidative stress caused by that inefficiency. In order to test whether or not internal melanin has protective effects against oxidative stress, melanin expression was induced in human epithelial kidney (HEK) cells using 1,2-dimethyl-3,3-butanediol (1,2DM-3,3BD). While this method was not successful in causing large amounts of melanin expression, a small amount of melanin was present in the HEK cells. Using cell viability and oxidative stress assays with flow cytometry, the capacity of the HEK cells with melanin to resist oxidative stress was tested. The results were inconclusive, as the amount of melanin produced was very small, and the process of producing the melanin killed the same amount of cells as the oxidative stress inducing agent. In addition to using HEK cells, primary cell culture from North Carolina tree lizards was produced. Currently, different methods are being tested of maintaining the cell culture long enough to treat it with 1,2DM-3,3BD to see if melanin expression can be increased in the cells.

Cinema & Television Arts

The Art of Being Seen: How Independent Comics' Representation of Gender and Sexuality can inform Film*

Elizabeth V. Bigham (Prof. Sowjanya Kudva) Department of Cinema & Television Arts

This paper is a comparative analysis of how women and queer people are represented in independent (indie) comics and mainstream cinema, and it examines how comics can inform cinema in this regard. Representation has become a marketing trend in mainstream film, using tactics like queerbaiting to attract queer viewers without meaningfully representing them. Independent comics, made by creators not working for corporations, challenge the mainstream, and female and queer creators and consumers, including myself, have historically favored them over film in order to see ourselves better represented. In this paper, I conducted comparative analyses between the lead characters in the comics-based films *Wonder Woman* (2018) and *Captain Marvel* (2019), and queer creator ND Stevenson's comic *Nimona* and TV show *She-Ra: Princess of Power*. Each lead character is queer or queer-coded and female-identifying. To measure the representation's quality, I examined whether these depictions were "harmful" or "harmless," a metric proposed in the documentary *Disclosure* that measures the positive, negative, or neutral impact of a depiction on a wider cultural understanding of the represented groups (e.g., use of harmful stereotypes/tropes). What I found is that *Captain Marvel* and *Wonder Woman* skew towards being harmful representation, using the aesthetics of feminism and queerness as nearly exclusive informants of their characters without developing them past their identities and their relationships with the men around them. Stevenson's characters, however, are harmless and exist in tandem with their identities. They are more nuanced than *Captain Marvel* or *Wonder Woman*, and do not blatantly serve as meta-commentary on the studio's views about gender or sexuality. Stevenson treats his queer and female characters not as tools for profit amidst a progressive cultural shift like many mainstream films, but as chances to represent women and queer people as they are. These findings suggest that a shift in filmmaking practices that favors including character-focused representation not incentivized by profit, like in indie comics, would create a space that promotes more harmless representation. Though comics and film production overlap and diverge in many ways, this paper proves that film can learn from comics to create better representation.

The StrongBlackWoman: Gendered Racism & The Hidden Costs of Strength*

Cierra Johnson (Prof. Nicole Triche) Department of Cinema & Television Arts

Racialized pressures, both internal and external, influence black women in a multitude of ways. These pressures, including media perpetuated stereotypes, microaggressions, imposter phenomenon, and maladaptive perfectionism, lead to mental exhaustion. Black women are then faced with the daily task of reconciling media perpetuated narratives with one's own selfhood through hypervigilance, self-policing, and filtered responses to racial discrimination as a means of presenting strength and resilience in a "respectable" manner under the White gaze. This research acts as a race-gendered analysis of black female archetypes perpetuated in film and television to inform the writing of a television pilot episode, in a series titled, *Things We Do In the Dark*. The one hour drama will explore the complexities of human nature, where the truth is provocative and self-acceptance is a political act, not in spite of the realities of race, but because of it.

Dismantling the White Savior in Film: An Analysis of White Ignorance, Privilege, and Guilt in Films About Undocumented Immigration and a Creation of a Short Film on the Subject*

Hannah E. Otos (Prof. Youssef Osman) Department of Cinema & Television Arts

This undergraduate thesis explores the representation of undocumented Latinx immigrants and their white counterparts in film through review of relevant literature and a qualitative analysis of films about immigration. The second part of this thesis is the creation of a short film titled “Wake Up Call” which explores white silence and xenophobia in regards to the detainment and deportation of undocumented immigrants in the United States. It was concluded that Latinx and undocumented immigrant characters are typically misrepresented and/or underrepresented on screen. The researcher also found that the white savior trope is common in films about migration. In their article, “Refugees as Innocent Bodies, Directors as Political Activists: Humanitarianism and Compassion in European Cinema”, Celik-Rappas argues that filmmakers make these “white savior films” so they can appear as righteous, political activists (Celik-Rappas, 2017). When the white character(s) in the film saves or goes to extreme and unrealistic lengths to try to save the refugee, immigrant, or minoritized character(s), the film is a white savior film. In an attempt to make an anti-white savior film that criticizes white silence, privilege, and xenophobia in regards to the immigration crisis in the United States, the researcher, with the help of a Mexican-American cultural consultant and a black co-writer, wrote “Wake Up Call”, a short, psychological thriller. The film follows a white woman named Jennifer who moves into a new house and gets a call from a woman at an immigration detention center on the landline phone who claims that her family still lives there. After ignoring the woman, Jennifer begins to believe that the house is haunted by the immigrant family. The twist at the end of “Wake Up Call” is that Jennifer ends up threatening to kill the father of the immigrant family when he shows up at the house looking for his wife. The intention of the twist is to push white audience members to interrogate their own white privilege and how it may manifest as silence and/or xenophobia. The genre of psychological thriller also helps to bring this thesis to the forefront of the film as xenophobia is based in fear.

A Critical Analysis of Intersectional Racial Representation in Children's Live-Action Television*

Jordan O. Young (Dr. Naemah Clark) Department of Cinema & Television Arts

This study investigates the racial representation present in current children and tween’s live-action television, additionally focusing on its intersections with gender identity and sexuality. The impact of racial representation in children and tween television cannot be understated. Although conversation of diversity in media has been a popular topic for decades, many young people today continue to fail to see themselves represented on the television screen. Particularly in children and tween’s programming, studies have found that only 26% of actors in lead roles are people of color. Previous studies have shown that so much of how we come to understand the world is through the media we consume. When young people don’t see themselves or others in the television programming available to them, it sends a message about what is right or wrong about themselves. This paper analyzes twenty-two series across cable and streaming for which racial groups were included and excluded and where there were intersecting conversations with gender and sexual orientation. The analysis focuses on who is in charge of what stories and the positionality of characters of colors in the stories overall. It is clear from the results of the research that there are patterns in the ways that non-white characters are portrayed that differ from how white characters are seen on screen for young audiences. This study adds to a body of research surrounding racial representation in children’s media as it discusses the role of marginalized racial groups in television. It additionally suggests different possibilities that could lead towards better

and healthier representation that includes and uplifts young people of marginalized identities in the future.

Communication Design

Three Little Words: Law and Order, Videostyle Analysis, and Dog Whistle Racism in Richard Nixon's 1968 Campaign*

Catherine E. Dalrymple (Dr. Harlen Makemson) Department of Communication Design

Accepting the Republican nomination in July of 2016, Donald Trump promised the convention he was the country's "law and order candidate." Law and order has been a GOP catchphrase since the early 1960s but was largely popularized by Richard Nixon in his 1968 presidential campaign, borne of the era's nationwide anti-Vietnam and Civil Rights movements. In a carefully crafted campaign centered on his image and use of television, Nixon adopted and normalized the term "law and order." An employment of dog whistle racism, the phrase implicitly refers to law enforcement but suggests to a targeted audience of conservative, White voters that crime and violence is the fault of Black Americans. The goal of this study was to understand how Nixon used video production elements to augment his language surrounding dog whistle racism. The research used sociolinguistic analysis, a qualitative method of examining media (Rosenberry and Vicker, 2022), further situated in the field of videostyle framing. Adopting and modifying Johnston and Kaid's (2006) videostyle framing system, this research analyzed the verbal, nonverbal, and production components of Nixon's television spots and how they utilized dog whistles. Among the findings were that of the 21 spots, none included Nixon speaking on-camera with live audio, only pre-recorded narration over footage of other people. Those that referenced law and order, even indirectly, displayed tones of "toughness" and "aggression," rather than positive ideals like "charisma" and "optimism." Of the advertisements Nixon narrated, his image only appeared in three, aligning with existing literature that Nixon's campaign staff aimed to limit his time on screen. These findings serve as not only a case study of Nixon's campaign but demonstrates the importance of a racialized element in strategic and political communications. By including a historical analysis of dog whistle racism, the evolution of political television, and the cultural context of 1968, this research contextualizes the current applications of dog whistle racism in modern political communications.

Computer Science

How Does Using Generated Data Impact Bias on Machine Learning?*

Caleb Dunham (Dr. Scott Spurlock) Department of Computer Sciences

In the era of big data, machine learning is used to create models that influence a wide variety of important decisions such as loan approval or prison sentencing. In many cases, these models perpetuate underlying bias found in the data used to create them. For example, in the UCI Adult Census Data, a common benchmark dataset used in machine learning research, many variables, including sensitive attributes such as race and gender, are used to predict whether a given person qualifies as high or low income. Because of bias in the underlying data, statistical models are more likely to predict low income for female data samples. This work evaluates several ways to reduce bias. We investigate undersampling, where a subset of male examples is selected to equalize the count of male and female

examples used in the machine learning process. We compare this approach with oversampling, where female examples are used multiple times to equalize counts. We also incorporate a recently-introduced machine learning approach, Generative Adversarial Networks (GAN), to generate new synthetic data samples to promote dataset equality. The different approaches are evaluated in terms of prediction accuracy, as well as fairness metrics: demographic parity and equality of odds. Experimental results show that all three techniques can impact machine learning fairness, but with different trade-offs in terms of accuracy and fairness metrics, so different approaches may be preferable in different situations.

Social Network Analysis of Christian Identity Hate Groups

Katherine J. Grant (Dr. Megan Squire) Department of Computer Sciences

In the 1920s, some white supremacist groups adopted an antisemitic and racist ideology that is known as “Christian Identity” (CI). As CI evolved, its tenets were adopted by white power groups such as Aryan Nations, The Order, and different Ku Klux Klan chapters. Many violent criminal acts such as the Oklahoma City Bombing and the murder of Alan Berg are tied to belief in this religious ideology. As an ideology that encompasses a multitude of organizations, people, and events connected to each other over many years, CI can be studied as an example of a social network with clandestine characteristics. Social Network Analysis, a data science technique used to analyze collections of social relationships, was used to understand the spread of this religious ideology over time and its influence on domestic terror and criminal activities. To analyze this historical network of relationships, we collected data from arrest reports, news coverage, books, and primary source documents. The data was modeled as an undirected network of individual/organization/event nodes, with edges reflecting salient relationships between the nodes. Statistical measures and data visualization techniques common to Social Network Analysis were then used to understand and expose the structure of this violent, hate-based ideology. This study illuminates the organization of adherents throughout the decades and confirms information shared across various sources by merging data and shedding bias.

Economics

The Success of Soap-Making: How Entrepreneurial Training in Ugandan Refugees Impacts Their Outcomes in Village Savings and Loan Associations

Aniyah S. Adams (Dr. Steve Deloach) Department of Economics

While microfinance gives refugees the opportunity to create businesses, generate wealth, and escape poverty, Village Savings and Loan Associations (VSLAs) offer access to credit in environments with low banking availability at lower interest rates, making them more accessible to refugees. VSLAs rely on interpersonal accountability as they are peer-funded groups and often have withdrawal commitments. Literature suggests that VSLAs are generally successful in increasing income for participants, but they struggle with loan defaults and are still impoverished. This study will examine if improving financial education in members would allow for better outcomes. Using panel data from 4 cycles of Seed Effect’s microfinance programs, I analyze the impact of business training on the VSLA group members. These self-selected groups of refugees work together to save and distribute loans, which are repaid with interest. I will use a difference-in-differences model to analyze the treatment group, the individuals who received business training after the first period, versus the control group, the VSLA members who did not yet receive the training. The results show that there was no clear

impact on the amount of business loans, animal assets, or average weekly income. However, the business training improved share-out by about 355,523 UGX more per year and savings by about 83,031 UGX more per year. Other improved aspects were land ownership and health variables for the participants.

Productivity in the National Basketball Association: The Effects of Rest Time and Age in the Regular Season on Postseason Productivity

William Davies (Dr. Douglas Redington) Department of Economics

Load Management is a recent concept that has swept across the National Basketball Association and changed the way the game is looked at. At its core, Load Management is the idea of resting a player in the regular season in order to maximize long term productivity specifically in postseason games. That said, this study answers the central question of whether Load Management does in fact increase productivity in the playoffs given more time off in the regular season. The theoretical framework for this study is based off the neoclassical model of labor optimization also commonly known as the labor-leisure model. In this case, labor is when playing and leisure is when resting on the bench. The labor-leisure model goes hand in hand with the concepts of diminishing returns as there is a point where each additional minute played has a decreasing effect on productivity. Specifically, the metric of Player Efficiency Rating (PER) will be the value representing productivity as it serves as the dependent variable of labor in the neoclassical model of labor optimization. However, in order to then compare the postseason to the regular season, players have been grouped by age within the context of the collective bargaining agreement between players and the National Basketball League and identified as a starter or bench player. All this analysis will be done via the software program called Stata which utilizes regression analysis to evaluate data. With this analysis, we hope to see a strong correlation between age or minutes played in the regular season in relation to postseason performance.

Measuring the Effect a Woman's Age at First Birth has on Income

Madison Duchesneau (Dr. Casey DiRienzo) Department of Economics

Research has consistently shown that having a child lowers a woman's lifetime earnings and disrupts her accumulation of human capital. This phenomenon is known as the "Motherhood Penalty" and is often analyzed comparing fathers and mothers, as well as mothers and childless women. There is approximately a 7% wage penalty for mothers after their first child and a 13% wage penalty for every child after, which shows the stark difference in income facing working mothers compared to childless women. For this research, I am looking to analyze the difference in how a mother's age at first birth (AFB) affects her long-run income. Using panel data from the 1997 Longitudinal Survey of Youth, I analyze the relationship between age at first birth on income while controlling for marital status, education attainment level, type of occupation and race. It was expected that the older a woman's age at the birth of her first child, she would face a lower wage penalty than a young mother. I benchmark three ages to represent a young mother (eighteen), an average aged mother (twenty-six) and an older mother (thirty-one). After running regressions, my results were consistent with past research that for every year a woman delays childbirth she will see a 2.1% increase in her wage. I also found that the group that experienced the greatest loss in income, regardless of education status, were women who were under the age of twenty-five at their first birth. While I am still improving my regressions, the overarching results of this study is that delaying childbirth shows a decrease in the motherhood gap when analyzing age at first birth. This research will be an addition to past literature on the

“Motherhood Penalty” but will also address the disparities between young and old mothers labor income.

The Predictive Ability of Cognitive and Non-Cognitive Skills at Kindergarten Entry on Fifth Grade Achievement

Bridget Foehl (Dr. Katy Rouse) Department of Economics

Early childhood research suggests that prior achievement is predictive of future achievement. In education specifically, achievement test scores have been found to be related to prior cognitive functioning in the form of skills in mathematics and literacy. More recently researchers have focused on the predictive ability of non-cognitive skills in relation to education and labor markets. This study uses the 2010-11 ECLS-K, to examine the predictive ability of cognitive and non-cognitive skills. Through regression analysis, this paper estimates the correlation between each fall of kindergarten cognitive skills and non-cognitive skills and spring of fifth-grade reading and math achievement, using school fixed effects and controlling for baseline child, geographic, home environment, parental, child-care, and neighborhood differences. This paper concludes that despite there seemingly being an increase in the value of non-cognitive skills in modern society, through statistical analysis, this paper ultimately did not find that the predictive power of school-entry non-cognitive skills on future academic achievement has increased since the previous study was performed. Attention skills also remain the most predictive socioemotional skill of future academic achievement. This paper also finds differences between subgroups by sex and race/ethnicity and discovers that socioemotional skills are indeed predictive of future socio-emotional skills.

The Gender Difference in Test Scores and Teacher Grades in ECLS-K:2011: The Role of Noncognitive Skills

Kara L. Friske (Dr. Katy Rouse) Department of Economics

Recently there has been growing concern over observed gender differences in educational attainment, with males falling notably behind their female counterparts. Gender disparities in achievement have been found to emerge as early as kindergarten. While some gender differences favor boys when achievement is measured by test scores, evidence suggests they fall behind girls in all subject areas according to teacher grades. For example, in a 2013 study published in *The Journal of Human Resources* Cornwell, Mustard, and Van Parys found a considerable gender difference in standardized test scores and teacher grades. Using data from the ELCS-K 1998 cohort, the study finds boys who perform as well as girls on reading, math and science test scores are given lower assessments by their teachers than what their ability would indicate. Their study ultimately found that noncognitive skills were able to explain the gender gap in teacher grades favoring girls in all subjects reading, math, and science. This research utilizes data from the ECLS-K:2011 to assess whether these trends persist in a more recent cohort of children. Applying grade fixed effect regression models, this research finds that the gender gap between student test scores and teacher grades across all subjects has decreased in size from 1998 to 2011, but still persists. Similar to the prior study, noncognitive skills are able to explain much of these gaps. This finding highlights the impact that gender norms and expectations have on achievement in the classroom as boys with equal academic skills to girls are rewarded by their teachers for behaving well.

Women's Family Planning Access and its Impact on Income Generating Activity in Southwest Kenya: An Individual Level Analysis

Cole Haecker (Dr. Casey Dirienzo) Department of Economics

The ability to plan when and how to start a family has serious social, financial, and interpersonal ramifications. This study examines the relationship between family planning access and personal income generating activity for women in the Nyanza region of Kenya. The ability to have agency over when a family is started or expanded gives an individual control and the ability to decide about the question of opportunity cost. To establish or reestablish agency, necessary access to contraceptive resources is paramount. To better understand how this question of opportunity cost works, individual level survey data will be analyzed to find causality between family planning use and a change in personal income. The data used in this study was collected by Dr. Hans Peter-Kohler, an esteemed sociologist at the University of Pennsylvania for his work on the Kenyan Diffusion and Ideation Change Project (KDICP). A Fixed Effects model demonstrates that current use of family planning resources significantly increases monthly personal income generating activity compared to women who are not currently using family planning resources. These results argue for a policy focused on equally increasing access to family planning resources in the Nyanza region as well as educating the residing populations on the consequences of having a child.

The Effects of Farmland Preservation on Residential Property Value in Hunterdon County, New Jersey

Kyle F. Hensler (Dr. Brooks Depro) Department of Economics & (Dr. Ryan Kirk) Department of History and Geography

Prior research has found that there is a strong relationship between open space and housing prices as a result of perceived amenity value. However, very little research has been conducted on permanently preserved agricultural land and its impact on single-family residential housing prices. The purchase of development rights has become an increasingly common means to halt urban sprawl, ease property taxes, and preserve natural areas. This paper applies a hedonic-price approach to identify the amenity value associated with permanently preserved agricultural land observed in housing prices in Hunterdon County, New Jersey. Housing data from Garden State Multiple Listing Service (MLS) and preserved farmland data from New Jersey Geographic Information Network (NJGIN) are used in conjunction to identify indices of spatial correlation between single-family residential homes and preserved farmland. The hedonic-price model builds on previous literature employing a vector of housing characteristics and a town dummy variable to control neighborhood characteristics. The coefficient of the spatial indices captures the perceived amenity value associated with farmland preservation. Prior literature has come to various degrees of causation to the effects of preserved farmland on the price of housing nearby depending on geographic location. However, economic theory suggests that houses near preserved farmland will have higher property values relative to similar homes that do not.

The Impacts of Mental Illness on Employment Status

Jack Heretz (Dr. Mark Kurt) Department of Economics

Across the globe health standards and life expectancy have seen tremendous growth over the past decades. However there has also been a steep increase in diagnosed mental health disorders. About 300 million people across the globe are diagnosed with depression, and nearly as many with anxiety (Jarl et

al., 2018). Mental health issues are also a significant cause of disability, putting people out of the workforce. As a growing issue, there needs to be further research into economic outcomes of mental illness. The central relationship this research aims to map out is the impact of various mental illnesses, and classes of mental illness, on probability of working full time. The data for this project is sourced by the National Comorbidity Survey, a psychiatric survey with many employment variables included. The primary methodology will be a logit regression, with working full time as the binary dependent variable. The key independent variable is respondents who are diagnosed with a mental illness. Preliminary results indicate a strong, negative relationship between suffering from mental illness and being full time employed.

The Effect of Secondary School Teacher Expectations on Student Enrollment in Post-Secondary Education - A Gender-Specific Analysis

Isabella K. Hindley (Dr. Katy Rouse) Department of Economics

At present, the gender gap in post-secondary enrollment is the largest it has been to date and continues to widen. Of the 19 million students that enrolled in an institution of higher education in 2020, less than 50 percent were male (NCES, 2020). Male enrollment rates are dropping year-over-year and, as a result, educational attainment disparity between genders is increasing and leading to lowered economic prospects for males in the long run. Previous research suggests that teachers play a role in these college-level disparities as the work and traits of teachers play an important role in the shaping of their students. This paper uses data from the Educational Longitudinal Study of 2002 to explore the impact that teachers have on their students' future educational attainment. Specifically, it examines to what extent faculty expectations of students at the secondary level influence their outcomes at the postsecondary level and how these effects vary based on the gender of the student and on student-teacher gender match. This study's empirical approach is modeled after that introduced by Papageorge, Gershenson, & Kang (2020), which exploits differences across two teachers' expectations of the same student to identify the effect of teacher expectations. Ordinary least squares regressions are used to estimate the impact that teacher expectations of the attainment of a bachelor's degree have on a student's likelihood of applying to a post-secondary institution. The analysis is reported through a breakdown of student decisions by gender, and then further by the alignment of student and teacher gender. The results of this study conclude that the expectations of teachers do impact the post-secondary decisions of their students. For male students, this impact is more apparent, especially if their teacher is also male. Such results suggest that interventions to promote strong relationships between teachers and their male students, like increased teacher training and the diversification of the teaching profession, may be pertinent but simple solutions to the growing educational attainment gap problem.

Accumulating Consequences of Sexual Violence: Age of First Experience on Human Capital

Morgan J. Kearns (Dr. Casey DiRienzo) Department of Economics

Sexual assault can occur at any point in someone's life but a significant number of people experience it during their childhood or adolescence: 1 in 3 sexual assault survivors first experienced it between the ages of 11 - 17 and 1 in 8 reported that it occurred before age 10 (CDC 2021). While studies have shown the negative effect that various forms of sexual violence can have on educational attainment, job security, and occupational well-being (CDC 2021; Sabia, Dills, and DeSimone 2013; Wadsworth, Krahe, and Allen 2019; Loya 2014), there are still questions surrounding the decisions and consequences for survivors. Using data from the National Longitudinal Study of Adolescent Health

(ADD Health) 1995, 1996, 2001, 2007-2008 provided information on over 6,000 women and their experience with sexual assault. Sexual assault is not only traumatic in the moment but interferes with human capital accumulation have long term economic and psychological impacts. Using an ordinal and multinomial logistics regression model, this paper focuses on those economic impacts by seeking to shed light on the question: How does the age of one's first experience with sexual assault impact their educational attainment? The way that sexual assault impacts individuals differently is indicated in the findings of this study as the effect of childhood versus adolescent varies for both educational attainment and occupational choice. Experiencing sexual assault in adolescence led to a lower likelihood of attaining an education level of high school or above. Both childhood and adolescent sexual assault were connected with choosing a lower skill occupation as well. Both of these findings could be due to the human capital barriers that previous literature has alluded sexual violence creates. Understanding these distinctions can inform policy and create further understanding of suitable responses based on the survivor's respective experience.

An Analysis on the Relationship between Alcohol Consumption and Labor Market Outcomes

Kimheng Larch (Dr. Mark Kurt) Department of Economics

Alcohol is the most widely consumed drug among Americans. Alcohol consumption has adverse social and economic effects on the individual drinker, the drinker's immediate environment and society as a whole. Alcohol abuse may lead to undesirable labor market outcomes such as an increased absenteeism from work in the short run and health problems in the long-run. The purpose of this paper is to study the effect of alcohol consumption on the labor market outcomes. Previous studies have indicated that economic downturn leads to a reduction in alcohol consumption due to two main reasons: income effect and fear of losing jobs which result in a smaller negative effect on income. Using data from the 1979 cohort of the National Longitudinal Survey of Youth, a panel dataset extending from 1979 to 2018, I estimate both Ordinary Least Squares and Fixed Effect regressions to compare the effects of binge and heavy drinking on income during both recessions and non-recessionary times. The regression results indicate a negative relationship between binge drinking and heavy drinking and income. While recession also has a negative impact on income, its insignificance suggests that the negative effect could be because of the individual's drinking behavior and how they respond to the economic crisis.

The Effect of the Gender Pay Gap on Economic Growth

Olivia Leggett (Dr. Brandon Sheridan) Department of Economics

This research seeks to better understand the effect of the gender pay gap on economic growth. A study conducted by Seguino in 2000 sought to evaluate the relationship between the gender wage gap and economic growth. She states that the gender pay gap is positively related to economic growth (Seguino, 2000). However, other research found that high, medium, and low skilled work in 18 countries, was negatively correlated with economic growth (Wolszczak-Derlacz, 2013). These mixed findings in literature on this subject support further research into the relationship between the gender pay gap and economic growth. Based on past literature it is difficult to predict the outcomes of this analysis. The data for this analysis is primarily sourced from the World Development Indicators provided by the World Bank Database. It includes yearly data for 27 countries from 2004 to 2018. To measure the gender pay gap, I am using pre-calculated data provided by the United Nations Economic Commission for Europe. The variable is given as a percent, representing the difference of men and women's average monthly wages as a percentage of men's wages and averaged by year. The data is

estimated using a theoretical model based on the aggregate production function and a fixed effects empirical model. Results and interpretations of this analysis are forthcoming.

Investigating Environmental Outcome Convergence in North Carolina

Jack O. Libby (Dr. Brooks Depro) Department of Economics

Since the Warren County protests of 1982 in North Carolina, environmental justice has been at the forefront of both research and policy efforts. As there have been clear links found between environmental hazards and adverse health outcomes, investigating and correcting for disparities in environmental outcomes based on race, income, and education level has and should be a priority. The Clean Air Act of 1970 (CAA) and the subsequent National Ambient Air Quality Standards (NAAQS) opened the door for increasing efforts to clean communities that have the worst environmental hazards. Through these measures, policymakers are able to set acceptable levels on key pollutants, and allow for strong punishments for all U.S. counties who do not meet these standards. While the 1970 CAA did not have environmental justice in mind when adopted, there is an argument that the implementation of the policy leads to reducing disparities in environmental outcomes. Research conducted by Currie, Voorheis, and Walker (2020) found that the targeted nature of the CAA and NAAQS can explain a large portion of the shrinking gap between white and black community air quality. This study looks to investigate patterns of improving air quality (measured by PM 2.5) in North Carolina census tracts between 2012 and 2016. It utilizes ordinary least squares (OLS) regression analysis to show how racial demographics, educational attainment, and income level correlate with air quality improvement. The results indicate that in North Carolina, communities with larger Black populations have seen greater increases in air quality.

Impact of Abortion Clinic Closures on Evictions

Maria J. Mendoza (Dr. Steven Bednar) Department of Economics

Many studies report that restrictive state legislative bills on abortion that result in clinic closures decrease access to abortion and produce adverse socio-economic consequences, like lower educational attainment, bankruptcy, and bad credit. However, little is known about the effects of abortion clinic closures on evictions. We aim to answer this question using data from Texas and Wisconsin where state legislations led to the immediate closure of clinics. I use a difference-in-differences design to estimate the effect of changes in travel distance to the nearest clinic and congestion on evictions. In Texas, we find large and statistically significant effects of increasing distance to abortion providers on eviction rates. This was seen the same year clinics closed, as well as one and two years after. In Wisconsin, we find that clinic closures did not affect evictions.

An Analysis of the Relationship Between Right-to-work Laws and Reduced-Price Lunch Participation

Benjamin T. O'Connor (Dr. Mark Kurt) Department of Economics

From 1964 to 2014, American union membership decreased from nearly 1 in 3 people to nearly 1 in 10. A 2021 report by the Bureau of Labor Statistics reported that nonunion workers earn median wages of about 16% less than union workers. Decreases in union membership result in decreases of workers' representation which is cause for concern because unions are one of the most crucial entities in ensuring equitable workers' rights, fair wages, and safe working conditions. While the decreases in

union membership can be attributed to cultural changes and/or America's larger shift away from manufacturing, many point to the passage of the right-to-work laws (RTW), which restrict businesses from requiring workers to pay union dues. While many RTW laws have been active since 1947, a handful of states have passed the law in the 21st century including Wisconsin, Michigan, Indiana, West Virginia, and Kentucky since 2010. This research considers the effects RTW laws have on workers' rights and seeks to ask what downstream implications RTW passage has on statewide poverty indicators and income inequality. The expectation is that RTW laws will cause downstream increases in inequality and poverty because of how they restrict bargaining power and decrease real wages of working class jobs. This research will focus primarily on RTW passage effects on the five states that have passed the law in the 2010's. Effects on poverty and inequality will be measured through the National School Lunch Program (NSLP) statewide participation rates collected by the US Department of Agriculture from 2005 to 2019. This research will use a difference-in-difference (DiD) model comparing the treatment states against the trends of similar non-RTW and already RTW states from the Lower 48. Finally, the research will evaluate the performance of RTW laws in meeting the goal of improving statewide economic well-being and will also provide policy implications.

An Analysis on the Relationship between Public Library Innovation and Social Capital

Liam O'Connor (Dr. Steve DeLoach) Department of Economics

Public libraries have juxtaposed themselves as anchor institutions for the communities they serve, providing an influential node that spreads access and knowledge throughout neighborhoods (Mersand, 2019). Libraries are widely inconsistent across the United States and rely on volatile funding that often falls victim to political agendas. As libraries continue to see decreased use, there is a need to adopt social innovations to maintain the public library's relevance in society (Windberry, 2021). This paper examines how United States' public libraries affect social capital within communities. The paper uses a Putnam framework for social capital by measuring networks and organizations (2000). Penn State's Social Capital database, the Public Library Survey, and the American Community Survey provided three years of observations across all 50 states between 2005-2014. This paper finds evidence to support a positive effect between the public library and a community's social capital; however, the public consumer must interact with the resources inside the library rather than just utilizing the space available. Libraries must be designed and made with intention: an unemployment office with programs enriching discouraged workers, reading circles for mothers and their toddlers, workshops for entrepreneurs in a maker-hub, or masterclasses with musicians or podcasters in a recording studio. Public libraries must innovate beyond the current archive of books and fulfill holes in a community's current public services. At this point, causality is still being evaluated and tested.

Measuring the Economic Value of Walkability

Charles N. Purrington (Dr. Tonmoy Islam) Department of Economics

With the invention of the automobile, cities were faced with a choice. Cities could either focus their development around people or automobiles. With the rise of automobiles, many older European cities replaced pedestrian friendly transport systems, with roads crossing through the city. In the last couple of decades, there has been a reversal of the damage that was inflicted upon European cities from automobiles. In contrast, many American cities were still young during the rise of the automobile. Not being as developed as European cities, these American cities grew with cars in mind. These new American cities would be afflicted with "urban sprawl" where cities grow outward instead of upward. Cheap suburban houses were desired by most Americans, so much that it became a part of the

“American Dream”. But creating a better environment for non-motorized travel can have direct health benefits on the city’s residents as the most common form of exercise is “Active Transport”. Many shopping districts and resort communities are often reliant on the “walkability” of their environments shows that replacing walkable spaces with roadways is an economic detriment (Littman 2017). This is in line with the general consensus from prior literature that shows increasing walkability leads an overall economic benefit to a local economy. Human and physical capital are both affected by increased walkability, however the effect on both capitals is indirect making it hard to directly measure the benefits of adding walkability. This paper will focus specifically on the effects that walkability has on the GDP per capita and other equity measures such as gentrification and segregation. Using data from the US Census Bureau, Department of Transportation, County Health Rankings and walk score, I will gather county level data on population metrics, crash statistics, violent crime and walkability. I will be running three different Ordinary least squares regressions. The first one will be using GDP per capita as the independent variable. The second regression will use the log of the GDP per capita as the independent variable. And the final regression uses walk score as an independent variable, GDP per capita will still be used as a dependent variable.

An Analysis on the Relationship between Legalized Gambling and Crime Rates

Campbell W. Shepard (Dr. Douglas Redington) Department of Economics

In 2018, the Supreme Court struck down the federal ban on state authorization of sporting events betting allowing individual states to vote on the legalization themselves. With a robust legal market, many Americans are choosing to leave their illegal bookies and switch to regulated marketplaces throughout the United States. More than half of all Americans live in a legal betting jurisdiction, and increases have even been seen in established markets such as Nevada and New Jersey. However, with this unprecedented increase in legal sports gambling, it can be hypothesized that criminal activity will increase alongside. According to a 2001 study, there is a viable increase in crime rates for counties in and around active casinos in Wisconsin due to increased amounts of cash being freely used and dishonest character from the players (Gazel). Similarly, a 2009 study concluded that male and divorced people are more likely to become addicted to gambling, and this addiction has a spillover effect leading to further criminal activity, such as a high rate of substance abuse (Wood and Williams). To investigate the issue, data from the FBI’s Uniform Crime Reporting Program (FBI: UCR) from 2014 to 2020 will be used to run a Difference in Difference model to examine the changes in criminal activity in states that have legalized gambling after the 2018 Supreme Court decision. Initial results show an increase in criminal activity in these states, but further analysis will be conducted to conclude if this is a direct outcome of the legalization of gambling. This paper helps to build upon prior research on the topic and show that tax benefits from legalized gambling may have unintended consequences to people through criminal activity.

The Relationship Between the 2008 Recession and Birth Rates in the United States

Malia J. Takei (Dr. Steve DeLoach) Department of Economics

With progress and technology, the decision to become a parent and have children is influenced by rational choice. Thus, economic factors influence a woman’s decision to have a child. Birth rates in the United States have been declining. From 2001 till 2007, birth rates increased in the United States, but the country had been experiencing declining birth rates since 2008, except for in 2014 (Morse, 2021). Declining birth rates can have severe consequences for countries, with labor shortages, the downfall of industries, and increased usage of health and medical services (Eberstadt, 2012). Because of the

consequences from declining birth rates, evaluating the factors contributing to declining birth rates in the United States is extremely important to identify efficient solutions to prevent future strain upon the economy. This research will evaluate how the 2008 recession influenced a woman's decision to have a child, if at all. The research relies upon data from the National Longitudinal Survey of Youth (NLSY) from the 1997 cohort. Ultimately, the unemployment rates are significant for predicting the likelihood of a woman becoming pregnant at the 90% confidence interval. A 1% increase in the unemployment rate causes a 2.5% increase in the likelihood of a woman being pregnant. This increase means that children are inferior goods. Inferior goods are goods that people purchase and consume less of with an increase in income. The increase in the number of children being born during a time of economic uncertainty and decreased purchasing power shows that children can be classified as inferior goods. The results suggest that the substitution effect may influence a woman's decision to have children because they perceive a lower cost of having children and are willing to withdraw from work to have children and reenter when market conditions are better.

Education and Wellness

Compassion Fatigue in Pre-Service Special Educators

Meredith G. Adair (Dr. E. Stephen Byrd) Department of Education & Wellness

Research conducted in medical settings has shown people who work in environments where their helping others is a predominant identifier of their occupation are more likely to experience symptoms of compassion fatigue than others (Figley 1995). From previously conducted research, compassion fatigue is a theoretical framework that works to relate feelings of fatigue, burnout, irritability, and overall dissatisfaction with professional occupations that relate to helping others, as they assert emotional strain onto the professional (Figley 1995). There is significantly less research conducted on whether or not compassion fatigue affects special educators, which in turn, prompted this investigation. This study centered around the present levels of compassion fatigue in undergraduate special education majors, dual-majors, and minors, and progressed in a manner to determine the effectiveness of combative techniques utilized to alleviate the symptoms and consequences of compassion fatigue. The purpose of this research was to identify if these feelings originate within the intensity of special education academia, practicum experience, or if the feelings truly originate upon attaining professional experience in the field. Further, this study aimed to determine whether or not the implementation of specific grounding techniques attenuate the symptoms of compassion fatigue. The initial information was gathered through an anonymous survey that asked special education majors, dual-majors, and minors non-identifiable demographic information. These questions were tailored to determine their understandings and present levels of compassion fatigue, and where they feel this fatigue originated. Twenty-two students provided responses. From the preliminary results, every student responded that they do experience compassion fatigue in some manner; however, older students with more field experience felt stronger feelings of compassion fatigue. After a week passed, participants received detailed explanations of activities shown to decrease feelings of fatigue and burnout, and the participants were asked to select and participate in their chosen activity. Another week passed, and the participants were surveyed on whether the activity they chose alleviated any symptoms of compassion fatigue. Initial results showed that the activities were beneficial, but would need to be implemented more regularly to ultimately be effective.

Benefits of Outdoor Recreation and Outdoor Education on Mental Health

Maddie A. Anderson-LaPorte (Dr. Carol Smith) Department of Education & Wellness

In recent years, there has been more interest in the benefits of outdoor education and outdoor recreation, specifically on mental health. Outdoor education is education that is about or in the outdoors (Ford, 1986) and it has been growing in popularity recently as well as research about it. Previous research (Flom, 2011) on this topic has looked at how outdoor education can be incorporated into schools and how it can benefit students in many ways. Outdoor recreation can include all types of leisure that use or rely on the outdoors and natural environment (Lackey, 2019) and there have been many studies (Thomsen, 2018; Flom, 2011) focusing on the benefits of outdoor recreation on mental health. Most research surrounding outdoor education and outdoor recreation has looked at the benefits in one area but this literature review will focus on an overview of the benefits from an array of different situations and compare results from different studies. Multiple studies including Twohig-Bennett (2018), Lackey (2019), and more on outdoor recreation and outdoor education, and a literature review (Flom, 2011) will be used for this research. This research will first look at the benefits of outdoor education, then it will look at the benefits of outdoor recreation. In the end, this literature review aims to find what the mental health benefits are of outdoor education and recreation in people of all ages.

Examining Elementary Educators' Awareness and Perceptions of Trauma-Informed Teaching Approaches

Lucy Callicott (Dr. Katherine Baker) Department of Education & Wellness

A current topic in education is that of embedding trauma awareness and sensitivity into teaching practices. The greater movement around trauma awareness is often referred to as trauma-informed care (Felitti et al., 1998). Past research has shown that trauma and toxic stress affect almost every aspect of a child's school experience (Carello & Butler, 2015; Perfect et al., 2016). Underlying trauma can inhibit students' cognitive functions and lower academic performance. Prior research reports that trauma-informed care can mitigate traumatic impacts (Udesky 2018, McInerney & McKlindon, 2014); however, the research base lacks teachers' insights about trauma-informed (TI) teaching approaches. Teachers' voices are needed in the research in order to ensure sustainable, effective, and equitable implementation of these transformative approaches. My qualitative study documented and examined elementary educators' awareness levels and perceptions of TI approaches through a two-phase data collection process: Phase 1, an open-ended survey of 75 elementary educators about trauma-informed teaching in their contexts, and Phase 2, semi-structured interviews to clarify participants' lived experiences with trauma-informed approaches. This presentation will provide an update to the research and overview pertinent findings. Survey respondents represented diverse geographical backgrounds and a variety of PreK-5 teaching and elementary support positions. While 64% noted awareness of trauma-informed approaches, findings revealed that participants' understanding of trauma-informed approaches ranged drastically. Educators also expressed limited access to trauma-informed support structures among the barriers to implementation. These themes bring up meaningful questions about how educators can best be supported in implementing approaches that center their students' best interests. Findings from this project will further the research base by highlighting educators' voices on the support needed to make trauma-informed implementation equity-minded and sustainable for all involved.

Place-Based Inquiry: Five Essential Questions to Move Theory Towards Classroom Practice*

Megan R. Farris (Dr. Scott Morrison) Department of Education & Wellness

This project is about the ways that place-based inquiry (PBI) can be integrated into K-12 social studies classrooms. PBI comprises four parts. First is reality pedagogy. According to Emdin (2016), reality pedagogy focuses on meeting students on their personal, cultural, and emotional level and accessing their experiences and expertise so they become curricular collaborators and co-teachers. Next is the Inquiry Design Model (IDM). According to the National Council for Social Studies, IDM is an approach to creating curriculum outlined by the four key elements of the Inquiry Arc: developing questions and planning inquiries, applying disciplinary concepts and tools, evaluating sources and using evidence, and communicating conclusions to take informed actions. The third part is place-based education. Place-based education uses authentic experiences that are connected to students' local communities and environments with the purpose of teaching how everyone and everything in a community are interconnected and interdependent (Anderson, 2017; Sobel, 2004). Finally, there is transformative citizenship. According to Banks (2017), transformative citizenship is when students engage with authentic problems that are occurring in their society and practice the skills needed to take thoughtful action. The purpose of this project was to connect the theory of PBI to practice. To do so, I developed five questions to guide K-12 teachers when developing social studies units and lessons: What are the standards and expectations for this unit of study? What are the big ideas or main concepts in this unit? What do my students know already and what do they have questions about? What are my students curious about? In what ways are the big ideas and main concepts present in current events and in our local community? In my presentation, I will demonstrate how these questions can be applied in middle school social studies units and draw upon my own experiences using PBI with adolescents.

An Examination of Dual-Language Immersion Practices & Programs in North Carolina and Texas*

Xiomara Y. Garcia (Dr. Lisa Buchanan) Department of Education & Wellness

Over the years, dual-language immersion has been introduced to districts, counties, and states as a gateway to biliteracy. Though dual language education can be provided in different languages such as French and Mandarin, this project focuses on the implementation of Spanish and English in a dual-language classroom. Since the start of dual-language two-way immersion programs in the United States in 1963, programming has evolved into several different methods of program instruction. These include one-way 90:10, in which students from one language group (i.e. predominantly Spanish) are immersed into the Spanish language for 90% of the day and English for 10%, one-way 50:50, where students from one language group are immersed in both languages equally, two-way 90:10, in which native-English-speaking students join their bilingual peers to receive 90% of their instruction in Spanish and 10% in English, and two way 50:50, where native-English-speaking students join their bilingual peers to receive instruction equally in both languages. The goal of this project was to better understand and determine long-term recommendations based on the evaluation of dual immersion programs across the country. The main focus will be on programs within Texas' Independent School Districts (ISD). This review will examine the differences between each of these approaches, how they have been implemented into Texas districts and what Alamance-Burlington School System has implemented here locally. Through a literature review, data collection took place based on the practices described within journal articles and studies by dual language researchers. Available data on student exam scores were also analyzed. Inferences were drawn about the different practices such as enriched thematic units on core academic curriculum and an intentional global learning approach, to

help aid the implementation of dual-language programming in the Alamance-Burlington School System.

Gender, Math Anxiety, & Math Performance: Connected or Not?

Alexa Goldberg (Prof. Erin Hone) Department of Education & Wellness

This study investigates the relationship between high school students' math anxiety levels and gender identification. It further probes how this correlation impacts students' math performance, experiences, and dispositions. Two different bodies of research present differing perspectives on the correlation between math anxiety and gender, and in turn its impact on students' math performance. The discrepancies in the findings of previous studies, lead this research to focus on providing clarity in the correlation between gender and math anxiety. To research this, the project was divided into two phases. The first, quantitative phase, collected data with the goal of looking into gendered math anxiety. A qualtrics survey utilizing the AMAS math anxiety instrument explored students' level of math anxiety, where female identifying participants' data was analyzed separately and in comparison to male identifying participants. The second phase was more qualitative in nature and included interviews that seek to provide insights into the math experiences and dispositions of participants. The ultimate goal of the qualitative data collection was to discover how participants' math anxiety affects their math performance and dispositions towards math. This research has yielded quite surprising results that lacked sufficient evidence to decipher the difference between female and male levels of math anxiety in high school students. These insights did however reveal the connection between student's math anxiety levels to their math classroom experiences and their dispositions about the subject in general. The overarching conclusion to this study is that high school students with higher levels of math anxiety tend to have less positive classroom experiences as well as more feelings of confusion, frustration, and dislike for mathematics. This conclusion emphasizes the importance for math educators to provide positive classroom environments and experiences in hopes of reducing math anxiety and improving the mathematical performance of high school students.

Access is Not Enough: Supporting People from Diverse Backgrounds, Cultures, and Identities in Outdoor Experiential Education*

Jacob C. Hyle (Dr. Scott Morrison) Department of Education & Wellness

In this presentation, we present findings from a qualitative study in which we surveyed and interviewed outdoor experiential education (OEE) leaders and facilitators across the United States about their perceptions of social justice and their training and preparation for supporting people of diverse backgrounds, beliefs, and cultures in their organizations and programs. Almost 20 years ago, Warren (2002) wrote that "more research is needed on the effectiveness of social justice training in outdoor programs, the nature of social justice competencies, and the development of ways to assess how well programs have integrated social justice in practice" (p. 237). Now in 2022, after the impacts of COVID-19 and the #BlackLivesMatter movement, social justice education and training is now more important than ever to ensure that OEE participants are included, supported, and valued. Different perspectives and identities not only should be accepted in OEE, but also welcomed and supported. This support moves past just words, and instead can lead to a culture of empowerment. With this in mind, the goal of this project is to illuminate where some of the gaps with social justice education lie within the OEE field, as well as present ways where we see growth being possible and necessary. The participants are located across the country, working for a variety of programs encompassing for-profit and nonprofit organizations, and college and university programs. Out of the 51 leaders that responded

to our Qualtrics survey, approximately 85% of respondents at least somewhat agreed that participants from marginalized groups feel supported during their programs. The 22 interviews we conducted, however, painted a more complex picture. Several participants shared that access to OEE is not enough, and that belonging and welcoming are goals that go beyond “just adding more colors” for the sake of promoting diversity. All participants agreed that effective social justice training and assessment is needed in OEE, which has been a conversation in the field for decades.

Missing from the Conversation: A Case Study of Elementary Grading Practices

Madison M. Meehan (Prof. Erin Hone) Department of Education & Wellness

Grading, although one of the most important aspects of education, is one of the most uncomfortable practices for teachers. Despite the emphasis on grades in schools, teachers are not adequately prepared for this work. Teachers are left to figure out their method of grading alone. This leads to a variety of different grading systems among teachers, leaving students to question what is important to focus on in each of their classes. Not only is the process of grading itself flawed, but the grading scale is as well. “Failing” makes up over half of a traditional 0 - 100 grading scale, which causes an immense amount of stress to be put on students (Feldman, 2020). Equity-focused grading “can reduce bias in grading and promote education success, particularly for students who have historically been underserved” (Feldman, 2019, p. 2). Often, grades reflect student behavior rather than their academic performance (Feldman, 2019). This is one way in which implicit bias plays into teacher grading practices. Along with bias in the classroom, minoritized students fall behind due to their lack of resources in comparison to their classmates. Factoring students’ homework into grades can be unfair due to differences in home environments. The luxury of a quiet home environment with access to support through parents, guardians, or tutors is not one that all students have. Including unnecessary factors into a student's grade can increase biases and lead to distorted grades that reflect privilege over academic progress. This case study involves five teachers in a single local elementary school. Through individual interviews with each teacher, qualitative data was collected about their current grading practices and training they have had in grading and assessing. The analysis will take place through the spring semester. Nvivo coding will portray trends and differences in grading practices, frameworks, and confidence in the act of grading. Initial findings will be presented and results will add to the inadequate conversation around equitable grading practices at the elementary level.

Mental Health Training and Practices of Elementary and Middle School Teachers

Erica J. Patterson (Dr. Heidi Hollingsworth) Department of Education & Wellness

Limited conversations are held regarding the mental health of students in elementary and middle school classrooms. It is important for teachers to be given training due to the high levels of mental illness experienced within elementary and middle schools with over 13% of elementary and middle school students diagnosed with anxiety or depression (Centers for Disease Control and Prevention, 2013). This study strives to answer the following: What are elementary teachers trained to do to provide support to students with mental health issues, and what support is actually being provided? To answer the research question, a survey was conducted of 34 elementary and middle school teachers who primarily teach in public schools. Within this survey, teachers were asked about their previous training, their preparedness as a result of their training, their experiences with students who have mental health disorders, and supports implemented within their classroom. Additionally, a follow-up interview was conducted with two educators to further dive into their specific training and accommodations. Results of the surveys and interviews supported the preliminary findings in the

literature. The results showed that the majority of teachers do not have any training in the areas of mental health despite having students each year who are diagnosed with them. They are not given any guidance in what helps their students, and many teachers are not prepared to help students with serious mental health issues. Despite the lack of training, the majority of teachers have accommodations and supports set up for students who struggle with anxiety and/or depression like “calm down corners” or individualized education plans (IEPs). This study supplements existing literature regarding the need for mental health training, and aims to bring awareness to the necessity of mental health training in school systems.

Race Representation in American Literature Classrooms*

Ashley M. Tatum (Prof. Allison Bryan) Department of Education & Wellness

This research explores how high school teachers of American literature in North Carolina implicitly define what it means to be American through the literature they use, and whether the catalog of literature used aligns with educators' beliefs. Secondary education in the United States has a long history of ignoring the narratives of marginalized people. However, the narratives of these communities are foundational to students' understanding of American literature and society (Lopez, 2011). This study considers the current racial representation among authors of texts used in American literature to discover whose narratives are considered “American.” Fifteen high school teachers of American literature were surveyed about the texts they assign throughout their courses, the factors that contributed to their choices, and their attitudes about race representation in literature. The survey data were coded to determine reasons for text selection, and the texts were evaluated to determine the ethnicity of the author. While the participants expressed an interest in using a diverse catalog of literature, the majority of texts they used in their classrooms were written by white authors. Participants listed relatability and a need to present diverse viewpoints as the two largest reasons for text selection. Those who listed those factors had the most diverse catalog of texts. However, the majority of texts were still written by white authors. Those who listed lack of choice and test preparation had catalogs that were over 50% white. Overall, the participants seem to leave the answer to the question “what does it mean to be an American,” up to white authors, regardless of reason for text selection. The professional educational community has long emphasized the importance of race representation in curriculum materials (Barry, 1998). English educators who leave out diverse narratives of the American experience not only deny their students the opportunity to critically engage with diverse perspectives, but also invalidate the lives of students of color, which contributes to systemic racism in our schools (Krueger 2019; Reddy 2018). This research suggests that it is not lack of will from educators that results in a lack of diverse literature, but perhaps rather a lack of resources and professional autonomy.

Educator Identity Development in Online Spaces: A Systematic Literature Review

Chloe Yoon (Dr. Jeffrey Carpenter) Department of Education & Wellness

Professional identity is an important factor in teacher retention and development. Teacher identity is constructed, negotiated, and refined in response to community values, education policies, and cultural scripts, among other forces (Beauchamp & Thomas, 2009; Howard, 2021). Traditionally, this identity construction, negotiation, and refinement has occurred primarily in local, face-to-face contexts. However, opportunities for professional activities have expanded as online spaces have grown, and these activities can result in reflection on and reshaping of professional identities. For example, online spaces can lead to the blurring of personal-professional boundaries. Existing identity ideals may limit

identity expression or may be Existing identity ideals may limit identity expression or may be challenged in online spaces (Robson, 2017). In this ongoing research, we are conducting a systematic literature review using four databases – ERIC, Academic Search Complete, Google Scholar, and Psych Info – to collect empirical articles that discuss both a) educator professional identity and b) online spaces. We have delimited our search to peer-reviewed journal articles that were published in English from 2011 onward and that were focused on in-service K-12 educators. Multiple search terms were used to look for articles related to the two focal concepts (i.e., educator professional identity, online spaces). The search results were downloaded to Zotero for duplicate removal, and review of titles and abstracts. Titles and abstracts were screened based on inclusion and exclusion criteria aligned with the delimitations noted above. The two members of the research team first reviewed a set of titles and abstracts together. After the review of titles and abstracts, the full text of articles that have met the inclusion criteria were read, with data about each article recorded in a spreadsheet (e.g., sample size, grade level, content area). In this poster we report on preliminary results regarding how many articles satisfy the criteria for inclusion in the review, and descriptive statistics regarding some of the features of the set of articles, as well as initial trends identified in the articles.

English

Public, Private, Personal: Essays on Finding an American Identity*

Haley D. Acosta (Prof. Tita Ramirez) Department of English

This research seeks to understand the process of creating national narratives of the United States. The work of shaping the identity of the United States is ongoing, and this research partakes in the collectively shaped narrative of nationhood. In exploring public, personal, and private identity, this work contributes to the body of work that intentionally highlights the diversity inherent in the American experience. Focusing in on people's diverse relationships with self-definition within the United States is necessary. The public rise of Anti-Asian sentiment in the wake of Covid-19 is one of many examples revealing an ongoing discord in the national narrative. With these creative essays, I seek to more effectively investigate how my own perspective as a female, queer-identifying, Filipino-American writer has been shaped and has the power to shape a broader U.S. identity. Through a collection of creative essays, I situate myself and those around me as threads of this historical fabric. In the narratives of my own life, I investigate individualism, American exceptionalism, the model minority myth, and hybridity as shapers of both historic and contemporary understandings of what it means to be an American. This work was accomplished through a process of writing, workshopping, and revision. With guidance from my mentor, I conducted deep readings and annotations of relevant nonfiction seeking to understand various authors' approaches to elements of craft such as structure, narrative, theme, language, imagery, sentence construction, voice, tone, mood, syntax, and diction. Nonfiction sources, especially by women of color, were read closely to learn approaches to writing effectively about identity as well as inform my understanding of the various ways that narratives function. This thesis rejects the idea that there is one "American" voice. The final product identifies various imagined communities in my life, places them in the contexts of individualism, the model minority myth, and hybridity, and investigates their role in shaping a collection of U.S. American identities.

More than an English Education: A Case Study of the English as a Second Language Program's Crisis Response to the COVID-19 Pandemic at Alamance Community College*

Elizabeth Crouse (Dr. Jennifer Eidum) Department of English

In light of the COVID-19 pandemic, community colleges were forced to respond to the emergent public health crisis by communicating with stakeholders about health protocols, new rules, as well as volatile economic, social, and health-related conditions. The immediate and dramatic demand for crisis response put organizational communicators and the channels through which they distributed information under extreme stress, resulting in an information gap between stakeholders and organizations that attempted to communicate crisis information. This gap is especially visible among adult English Language Learners (ELLs), a group that has generally lacked both health and digital literacy skills that allow them to decipher and contextualize health-related information especially when it is communicated via new or unfamiliar technological platforms (Nimmon 2007; Warriner 2015). This study uses Institutional Ethnography methods (Smith 2005) to study the communicative practices of ACC, an institution in rural NC that serves a student body of 45 percent non-white students, many of whom are non-native English speakers. Through focus groups, interviews, and institutional observation, the study identifies gaps between how community colleges currently function and how such institutions can use their position within the communities they serve to distribute necessary resources, communicate relevant information, and educate ELL students about health literacy-related topics. From the data collection and analysis, we determined that the most prominent obstacles to effective communication to ELLs were related to connectivity, digital illiteracy, student and faculty mental health, and student distrust of organizations. All of these issues were present in some form or another before the pandemic, but the extreme conditions caused by social distancing amplified these problems. In response to the findings, this project develops a new framework for crisis response with special focus on communicating with linguistically diverse populations and prioritizing audience members' well being over organizational reputation. Some of these recommendations include frontloading primarily important information in communication documents, using representative imagery, and employing culturally sensitive language. Ultimately, this project aims to bridge the gap between crisis response research and crisis communication recipients in order to promote holistic success of community college students, especially during emergency situations.

Crisis Response for the Modern Organization: An Inclusive Approach to Crisis Communication*

Elizabeth Crouse (Dr. Jennifer Eidum & Dr. Jessie L. Moore) Department of English

This Capstone project, which is a companion study to the Honors Thesis “More than an English Education: Community Colleges and English Language Learners during Covid-19,” uses the narrative analysis data from stakeholder interviews and focus groups at Alamance Community College (ACC). Using this data to outline a new emergency response framework, this capstone project builds the practical application and focuses on the creative production of a handbook that communicators in community colleges can refer to when communicating with English Language Learners (ELLs) during crisis situations. The literature in the field of crisis communication is almost exclusively based around Situational Crisis Communication Theory (SCCT), which prefers outcomes that reduce reputational damage and prioritizes responsibilities based mostly on organizational reputation (Coombs, 2007). SCCT works on Attribution Theory, which states that people will naturally begin to look for the cause of—or an attribution for—negative events. However, among the research surrounding crisis communication and management, the literature is sparse when it comes to crisis communication

strategy for service-oriented community organizations such as nonprofits and community colleges. Community colleges serve diverse populations within their communities, many of whom are English Language Learners (ELLs) (Blumenthal, 1998). ACC's role in serving a linguistically diverse population positions itself as a prime case through which this study can observe and analyze non-reputational crisis communication strategies. This research reviews the current scholarship in the field of crisis communication with the goal of synthesizing a proposed alternative to SCCT for service-oriented organizations. Crisis communication for modern organizations should prioritize the needs of the audience over reputational protection by championing the social, physical, and emotional wellbeing of stakeholders over the reputation of the organization, which is especially practical during "sticky crises," defined as situations that are not an organization's fault but to which an organization must respond (Jin, 2012; Rickman et al., 2021). Finally, this project addresses the gap between researchers of crisis communication theory and actors who communicate in crises every day through the production of user-centered design materials that offer strategies for incorporating inclusive strategies into the crisis communication practices of service organizations.

Breaking the Binary: Heteronormativity, Authorship and Bisexual Invisibility in Literature*

Skylar Flechsig (Dr. Kevin Bourque) Department of English

Bisexual invisibility was a problem in classic LGBTQ literature, such as in the novels *Giovanni's Room* by James Baldwin and *The City and the Pillar* by Gore Vidal, and remains a problem in contemporary literature, including in the texts *Adaptation* by Malinda Lo and *Grasshopper Jungle* by Andrew Smith. Literature, specifically queer literature, has been forced to exist on the straight-queer binary that is enforced by a heteronormative society. Previously, individuals had to choose between identifying as straight or queer and were not able to exist anywhere in between. There currently seems to be more acceptance of all identities, though this is not the case for bisexuality. This project seeks to understand how and why literature perpetuates bisexual underrepresentation through examining how both classic and contemporary Young Adult literature engage and resist engagement with the straight-queer binary. By exploring the way critics read LGBTQ texts, how characters understand their own sexual identity, and the difficulties in portraying and maintaining bisexuality in fiction, this project hopes to help ameliorate critical disengagement with bisexuality in fiction, and aims to recover the buried identities of bisexual individuals in literature.

Dominating the Digital Domain: A Quantitative Response to Ensure Fiscal Success and Brand Awareness

Hannah K. Fox (Dr. Jessie Moore) Department of English

Digital Marketing has seen great success after the COVID-19 Pandemic; every business has the opportunity to improve and populate all major platforms, specifically social media and email marketing. PR firms and Marketing agencies "face internal and external pressures to adopt a digital presence in social media platforms (Tiago, Veríssimo 2014) In my PWR Core Capstone project, I will be testing different variables to see what ensures success for a brand: video length, engagement reciprocation, and consistency all on a quantitative basis. I will create content, interact with other users, and vary my engagement/posting schedule while recording my analytics and external user interaction to ensure success. These factors make a brand successful in the online space? We have seen incredible conversion rates and astronomical sales of corporate entities who know how to do this correctly these days. My research can be distributed widely and used by other social media managers around the world, as this is extremely marketable research. I will be making two products for two

audiences: one for academia, and one to sell on behalf of my company, HanKimFox, LLC. The academic version will be number heavy and focused exclusively on the PWR discipline. The latter will be more digestible to the average consumer and will be useful to people in my field. These factors are proven to boost social media success, but I want to see how I can maximize my odds of a favorable outcome. Over time, I will discover correlations in my work, and the amalgam of different techniques will reveal itself via my company's Instagram account (@hankimfox.co) to ensure the establishment of my personal brand via my 7-week plan to carry out this project. My scholarship will discover key elements and techniques for social media managers and individuals in the digital marketing field to focus on to ensure the success of their clients.

Families-in-Residence: An Analysis of the Experiences of Faculty and Families Living on College Campuses (for Elon Experiences)

Kristina N. Gutierrez (Dr. Jennifer Eidum) Department of English

Research conducted about faculty-student interaction, both within and outside the classroom, has shown these interactions lead to student success. One particular form of faculty-student interaction that is growing in popularity is the Faculty-In-Residence (FIR) program, where a faculty member (the FIR) lives alongside students on campus (Healea, Scott, & Dhillia, 2015; Shushok, Henry, Blalock, & Sriram, 2009; Shushok, Scales, Sriram, & Kidd, 2011; Sriram & McLevain, 2016). Faculty who participate in these programs report increased opportunities to interact with students, within a well-structured program (Cox & Orehovec, 2007; Cox 2011). While a number of studies focus on the positive and negative experiences of faculty members participating in residential and FIR programs (Golde & Pribbenow, 2000; Rhoads, 2009; Sriram, 2015), few mention the role of the faculty member's accompanying partner and family (which we term the "Family-in-Residence"). This is despite the fact that not only is the faculty member making a transition to campus life, but so too are their family members: partners and children who may not have deep connections with the University. In addition, few studies investigate the lived experience of family members of university faculty in general. Largely, these studies show that universities do not do a particularly great job of supporting the partners of their faculty (Careless & Mizzi, 2015; Norrell & Norell, 1996). Sherr & Jones (2007) highlight the importance of the family in making decisions interviewing both new faculty members and their spouses. Therefore, this study reports the findings of a comprehensive examination of families-in-residence with a content analysis of survey results including: job descriptions, descriptions of home, and incentives to becoming an FIR. Specifically, it reports the preliminary results of a nationwide survey of faculty-in-residence and their partners about their experiences living on university campuses across the United States. The data reveals a cross-institutional view of the benefits and challenges of living in residence for faculty and their families.

Teacher Perceptions of Grades: What do They Measure?

Olivia Hoffer (Prof. Margaret Chapman) Department of English

Grading is at the center of the American education system. Faculty spend countless hours providing feedback on students' work just for a number or letter to define their success in the classroom. Although there are a variety of grading practices used by faculty, each is critiqued on the extent to which they are accurately assessing students' learning. (Schneider & Hutt, 2014). Faculty are pressured from both sides by administration and students to perfect these imperfect grading practices to ensure they are valid, reliable, and equitable which is a very difficult combination. This study explores the ways in which university faculty grade across all disciplines to ultimately understand why professors

grade the way they do. We combined both qualitative and quantitative analysis and surveyed 106 Elon faculty from across different primary disciplines, specifically asking faculty to categorize their grading systems and asking questions such as “What best describes the grading system you use?”, “How did you arrive at this system?”, etc. We then coded the data for each question, creating topics to categorize the responses and form quantitative explanations. We broadly compared disciplines to see how grading practices may differ or share similarities. Thus far we have found that there is great variability in how faculty grades across campus. For example, there is a large difference in what is included as a grading category in the business school compared to the school of communications. Additionally, we have noticed some disciplinary differences in what their grading systems account for, though we found many similarities across disciplines in how educators have come to create their grading practices. These results allow for deeper understanding and inquiry into why grading practices are unique and the purpose they are serving for an educator. This research will contribute to the field of education because this data will allow educators to evaluate their grading practices and hopefully lead them to use more equitable, accurate, and student-oriented grading practices.

Bringing Together an Elon University Writing Center Alumni Network

Emily P. Holland (Dr. Jessie L. Moore) Department of English

One upcoming area of focus for Elon’s Writing Center, where I have worked for three years and am now a Lead Consultant, is alumni networking—i.e., keeping alumni connected with each other (in their professional lives) and with current consultants (in order to foster lasting mentoring relationships and show consultants how their Writing Center work could impact their future writing lives). This project begins the process of forming that alumni network. The project builds upon the study I contributed to over the past two years, “Rhetorical Training Across the University” (Bleakney et al., 2021). The Peer Writing Tutor Alumni Research Project (Hughes, Kail, & Gillespie, 2010) also influenced its conception. Both studies discuss how skills learned through university writing experiences transfer to the workplace—the latter specifically focusing on the Writing Center—which informs the connection that alumni still have to the Writing Center and why current consultants could benefit from networking with alumni. The project involved interviews with five consultant alumni from various graduation years and majors, which focused on skill transfer between the Writing Center and their postgraduate endeavors as well as reflection on their time as consultants. Additionally, qualitative content analyses of three other Writing Center websites using an emergent coding method were performed to see how they incorporate alumni into their content. Throughout the project, I consulted with the Writing Center Director, Dr. Bleakney, to ensure that my work fit her networking vision. Based on these findings, I then created an action plan and sample social media posts for the Writing Center. The interviews provided insight into the ways that consultant alumni’s Writing Center work influences their professional and personal lives after graduation. The content analysis also led to conclusions about effective methods and specific benefits of networking for the consultant alumni, current consultants, and the Center as a whole.

Rewriting Injustice in Alamance County: Fostering Youth Agency and Community Engagement Through Social Justice Writing (A Leadership Prize Project)*

Gillian Kick (Dr. Heather Lindenman) Department of English

Pandemic fatigue, educational disparities, and increased community tensions around local and national inequalities have wrought havoc on the lives of young people across the country, including youth in Alamance County. The power of adolescent voices to speak against the forces of social injustice is

considerable (Applegarth 2020, Flower 2008, Ingalls 2012, Jocson 2006), but youth, including youth in Alamance County, have been largely silent due to lack of opportunities to advocate for change. However, this does not mean this problem is without solutions. In this SURF presentation, I will share how I implemented a six-week creative writing for social justice workshop focused on uplifting and empowering the voices of 11th grade students at the Alamance-Burlington School System's Early College. Students in this Spring 2021 workshop produced various creative works, including poetry, creative nonfiction essays, and short fiction, and these works were featured in a published collection of the students' writing. In this presentation I will share how I went about planning and leading the writing workshops, as well as the themes that emerged through my analysis of the texts that the students produced. Additionally, I will shed light on the ways the students used creative writing as means to address and cope with the issues facing them and our larger community during the 2020-2021 school year. Specifically, I argue that the students' writings employed the childlike voice as a narration strategy and explored the fragile nature of human hope, both of which were used to highlight their experiences with injustice. Through analysis of the writings produced by the students during the workshop, the presentation will highlight the tools, storytelling methods, and rhetorical strategies students used to create thoughtful, justice-centered creative writing and how that writing makes meaningful contributions to the world.

Exploring English Pronoun Usage and Contemporary Usage of They, Them, and Their as Epicene Pronouns*

Lucas D. Leveillee (Dr. Kathy Lyday) Department of English

Recent social movements in academia have attempted to create space for non-binary, transgender, and/or genderqueer identities in the classroom and the public sphere by de-gendering language, encouraging the sharing of personal pronouns, and actively promoting the use of gender-neutral pronouns such as singular *they*, *them*, and *their* in discourse. Despite this, the historical development and grammatically acceptable usage of *they*, *them*, and *their* as singular epicene (indeterminate gender) pronouns is still frequently contested or unacknowledged, and consequently has been underexamined. Even in spaces where the grammatical usage is assumed correct, the history in particular is absent from both lower- and higher-level education agendas, from elementary classrooms to college-level Queer Studies courses. As a response to this observation, this research originated as an investigation of this history and the grammatical movements which have occurred since the adoption of the pronouns *they*, *he*, and *she* into the English language, compiling textbook reading with research garnered through online databases and archives. The research first examines the roots of grammatical gender in Old English and the shift to natural gender in Middle English. The research additionally outlines the function of epicene pronouns and the movements by 18th-20th century grammarians to promote or deny the status of *they*, *them*, and *their* as chief epicene pronouns in the English language. The usage of these pronouns is contrasted with the widespread usage of androcentric, sex-indefinite *he* in both literature and speech. Ultimately, the research found that recent movements to popularize the use of the pronouns have a surfeit of benefits for the classroom learning environment and social conceptions of non-binary identities. Among scholars in the fields of grammar and queer studies, there is widespread acknowledgement of a semantic gap in the English language which can be filled in by more established vocabulary such as singular *they*, *them*, and *their* (Baron 1981). Increasing contemporary usage serves to legitimize the use of such pronouns, and this is reflected through their inclusion in widely-referenced publishing guidebooks such as the APA, MLA, and Chicago stylebooks.

How Historical Tragedy Can be Presented Appropriately During Walking Tours*

Grace M. Magness (Dr. Scott Proudfit) Department of English

In recent years there has been increased academic interest in the way heritage sites and walking tours work to re-present darker elements of history to tourists. The study of dark tourism has uncovered problematic issues in the tourism industry including the commodification of tragedy and the dissonant relationship between history and heritage. History, in regards to this project, is defined as the unbiased record of events in the past, while heritage refers to a modern audience's preconceptions of a site. Sometimes this dissonance between history and heritage takes the form of erasure. For example, southern slave plantation tours frequently focus on the opulence of the white slave holders rather than the oppression said opulence was built from, to the point that these sites may not even mention the word "slave." Other times, tragic events are sensationalized in ways that objectify, stereotype, and misrepresent past subjects as seen in prison tours such as those conducted on Alcatraz Island that both romanticize and demonize inmates in order to promote a marketable narrative for tourists. This project examines ghost tours in the American South and ethical ways to discuss historical tragedy, specifically analyzing the ways racial history is depicted in the dark tourist experience. This research is important for a number of reasons. Tourists' understanding of authentic history is based on the narratives presented in tours. By erasing or exaggerating aspects of history, tour guides are creating the groundwork for historical myths that will affect future ideologies. In addition to a survey of current criticism and theory on dark tourism, this research examines the promotional material of multiple ghost tours throughout the American South, focusing on their portrayal of slavery. While this still ongoing, some conclusions include the unfortunate fact that slavery is usually disregarded on these tours, barring stories of exceptional cruelty. It can be concluded that historical accuracy is often sacrificed in favor of protecting heritage. And, in terms of best practices, it can be concluded that more effort needs to be put towards including diverse voices, both as the creators and guides of these tours and in their targeted demographic.

External Influences on Non-Binary Resilience: Protective Factors of Living and Thriving in One's Gender Identity at Elon *

Madelyn A. Mahoney (Prof. Margaret Chapman) Department of English

The World Professional Association for Transgender Health's (WPATH) "Standards of Care" guides the treatment of transgender individuals seeking mental health therapy or counseling. Despite the fact that many argue that "non-binary" identities fall under the category of transgender, the current Standards of Care (WPATH7) does not discuss such gender non-conforming identities. The present study is intended to offer insight into the current mental state of non-binary and gender non-conforming adolescents, as well as perceptions of bias and acceptance of such identities within the mental health field. In data collection, both qualitative and quantitative methods are used. The first part of the study consists of a questionnaire that includes questions from the Gender Minority Stress and Resilience (GMSR) scale. The questionnaire was taken by a group of roughly 20 gender non-conforming undergraduate Elon students and focuses on their experiences with discrimination, forms and quantity of social support, and feelings towards therapy. Questions utilized Likert scales; scores for each factor were examined via ANOVA analysis in SPSS. The second portion of the study involves in-depth interviews with the same group of students on topics covered in the questionnaire; these interviews are coded using qualitative methods in order to see patterns in responses. These results are then used to discuss specific stressors and areas of resilience for non-binary adolescents. This

improved understanding may have significant implications on the therapeutic care of gender minorities.

Celebrity Influence in Book-to-Film Adaptations for Commercial Book Publishing

Stephanie L. Neu (Dr. Jessie L. Moore) Department of English

Research suggests a strong correlation between big-name celebrities and big box-office numbers (Gilbert, 2005), but there is limited research on the correlation between such celebrity involvement in book-to-film adaptations and the book's promotional response to its newfound celebrity connection. This research seeks an understanding of the role that fame, celebrity "success" (Lindenberg et al., 2011), and "star power" (Cook, 2017) has in the industry of book publishing through the lens of book-to-film adaptations. In seeking such understanding, this research aims to examine the correlation between the rise in book sales with celebrity involvement in several book-to-film adaptations by collecting, organizing, analyzing book sales data from before and after particular dates of celebrity involvement. This data is contextualized with existing research on celebrity attachment and endorsement (Choi et al., 2005; Tolson, 2001; Bosman, 2013). Based on the findings of this analysis of book sales and other metrics, this project will also examine the visual rhetoric of book-to-film tie-in covers to discover what visual rhetoric techniques book publishers use to capitalize on existing celebrity and film success. This analysis consists of color theory, C.R.A.P. (Contrast, Repetition, Alignment, and Proximity) principles, font and text choice, the visual prominence of the film's featured actor, as well as looking particularly at designs which highlight the film's star rather than the book's author, (Mahlknecht, 2012) and overall design choices reminiscent of the film's advertising.

Shock and Awe: An Analysis of Anti-War Theatre in the 21st Century

John Lee Rudolph (Dr. Scott Proudfit) Department of English

In this oral presentation, I will share my research findings on the most effective methodologies for creating Anti-War theatre for a 21st century American audience. My research found that the path forward for anti-war theatre is the inclusion of emotional intimacy into traditional Brechtian Aesthetics. The framework for creating political theatre in the modern age is typically found in the work of Bertolt Brecht, who pioneered the concept of the Epic Theatre and "verfremdungseffekt", otherwise known as The Alienation Effect. Brecht utilized Dialectical Aesthetics to create an emotional distance between the audience and the play, which would enable the audience to think logically about the political argument of the work. But, in the 21st century, do Brechtian Aesthetics still work? Which theatre-makers writing about Iraq utilized a Brechtian framework? And was it effective? Through an analysis of the seminal works in the subgenre of anti-war theatre created about the Iraq War, this project determined that Brechtian Aesthetics are, indeed, still a hugely influential framework for creating anti-war theatre, though there was a limited effectiveness in alienating an already alienated American audience. However, Brechtian Aesthetics were not the only methodology these artists used. Many of the anti-war plays about Iraq rejected Brechtian metatheatricality for a more traditional theatricality. These works focused heavily on creating emotional intimacy for the audience, and using that intimacy to shape opinions on the war. After researching this subgenre of play, this project transitioned to creation. The product was a solo-performance piece, developed using Brechtian Aesthetics, but including emotionally intimate theatrical moments within this framework, performed to an audience of Elon Students. Audiences responded well to the Brechtian Aesthetics, identifying moments of Alienation as being particularly effective in educating them on the history of the Iraq war. However, audiences identified the more traditionally theatrical elements as the parts they were most

drawn to emotionally and the parts that changed not only their opinions, but their worldviews. The response the project received demonstrated the effectiveness of incorporating emotional intimacy into Brechtian Aesthetics in creating anti-war theatre for American audiences.

Origin of Selective Terms from Mental Illness and the Mental Health Movement

Kaitlyn L. Vigeant (Dr. Kathy Lyday) Department of English

My research explores the history of the language of mental illness and mental health to discover its contributions to the English language. Mental illness is common and mental health is a prevalent and important topic. The acknowledgement of mental health and the treatment of mental illnesses have a long history dating back to 5000 BCE (Foerschner, 2010, p. 1). Throughout this long history, the advances in knowledge, treatments, and perceptions have brought new vocabulary and concepts. In the history of mental health language, meanings of many of the words have evolved over time and new words are constantly being added. Additionally, many words have completely disappeared from the English language as they have lost their meanings. This research is important because the constant evolution of language reflects a continuously changing world. Over the course of one semester, I collected information online from scholarly articles, the online *Oxford English Dictionary*, and websites. In my research, I examine vocabulary entering the language from the evolution of psychological concepts and treatments. My research also follows the evolution of the word “hysteria.” In addition, I look at vocabulary from the evolution of classifications offered for the severities of mental illness. My research also delves into the history of how the phrase “mental health” came into the language. Lastly, I study the words describing the cycle or dynamics of any mental illness. My research demonstrates that the history of the language of mental illness and mental health has contributed to the development of the English language through new vocabulary.

Exercise Science

Pilates for Breast Cancer Survivors Experiencing Cancer-Related Fatigue and Cancer-Related Cognitive Impairment

Mackenzie K. Boyd (Dr. Aaron Piepmeier) Department of Exercise Science

Cancer-related fatigue (CRF) and cognitive impairment (CRCI) are two of the most common symptoms of cancer survivors that negatively affect their quality of life. This study was the second iteration which assessed the feasibility of conducting an online exercise study examining the relationship between acute exercise, CRF, and CRCI in breast cancer survivors. The purpose was to identify barriers to recruitment and retention, determine the acceptability of an acute bout of moderate intensity aerobic exercise (Pilates) for breast cancer survivors, and provide data for use in designing a subsequent randomized controlled online study. The long-term goal of this research was to create and test a method of investigation to reduce CRF and CRCI in breast cancer survivors using Pilates, thus improving quality of life. Using the online platform Gorilla, this study used a randomized, control design that consisted of questionnaires, an exercise and non-exercise control condition, and neurocognitive assessments. A total of N=48 participants were screened with N=12 participants eligible, N=13 eligible with doctor’s consent, and N=23 not eligible. Enrolled participants were sent materials to begin the study. N=2 participants completed the study. Participants self-reported their fatigue on a scale (0-10) before and after exercise/control, and self-reported their perceived exertion (RPE) on a scale (6-20) after exercise/control. The recruitment goal of 12 participants was attained,

however retention goals were not. Future research should investigate ways to enhance retention (e.g., theory-guided messaging, usability, compensation).

Exploration of Faculty-Student Partnerships in an Exercise Psychology Course*

Alana Campbell (Dr. Eric Hall) Department of Exercise Science

The concept of student partnerships with faculty in higher education has received an increased attraction in recent years. These partnerships for students can be an important element of their higher education experience, allowing students to engage with faculty to promote new ideas and introduce new materials to the classroom. In addition, this idea of student-faculty partnerships can also break the power dynamic and allow a more inclusive and accommodating environment for students. The partnership can open both students and faculty to different perspectives that they may not have recognized prior to this relationship. Students may find this partnership both educationally and interpersonally beneficial for themselves. In this study, we will examine the benefits of student-faculty partnerships on Elon University's campus based on student feedback from an Exercise Psychology course. The student feedback was given in a four-prompt questionnaire from 16 students (4 second-year; 8 third-year; 4 fourth-year; 15 female; 1 male). The survey questions were constructed based on the structure of an Exercise Psychology course (e.g. "What are your current thoughts on the classroom environment created so far?"), consideration of student-faculty partnership (e.g. "Would you consider engaging in student-faculty partnership on course (re)design in the future?"), values of the partnership (e.g. "What is the most valuable aspect of student-faculty partnerships?"), and benefits of the partnership (e.g. "Was there any educational benefit for you in this partnership?"). We will use a qualitative data analysis approach to investigate further into this relationship. We aim to see that student partnerships with faculty are beneficial and valuable towards students' education. As well as the inclusive practices of recognizing the differences among students and using this to ensure all students can access and participate fully to their best ability. Through this, we can look for common themes among the responses and can be used to enhance the understanding and value of faculty-student partnerships in higher education.

The Impact of a Workplace Physical Activity and Nutrition Education Program (HealthEYou) on Behavioral Change

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

The risk for diabetes and cardiovascular disease increases in individuals with metabolic syndrome (MetS), which is defined as the clustering of various risk factors of metabolic origin including obesity, dyslipidemia, hypertension, and hyperglycemia. Physical activity and nutrition behaviors widely practiced in the United States do not support effective control of these risk factors, and different variables such as lack of knowledge and resources inhibit the necessary behavioral change. Previous studies have shown that educational programs designed to address and support the dietary and lifestyle changes required to control diabetes risk factors are efficacious. The purpose of this study is to determine the efficacy of a nutrition and physical activity education program in changing behaviors that have a negative impact on health outcomes. Participants (n 24; age = 51 ± 10 ; BMI = 31 ± 5) were recruited from a local university and enrolled in the HealthEYou program, a 16-week education program consisting of 8-weeks synchronous in-person weekly group and individual sessions; 8-weeks asynchronous weekly newsletters and two individual sessions. Group education sessions consisted of modules covering healthy eating, meal planning, physical activity, and stress management, whereas

individual sessions focused on goal setting and attainment. Various assessments including The Automated Self-Administered 24-Hour Dietary Assessment (ASA24®), International Physical Activity Questionnaire (IPAQ), Self-Regulation of Eating Behavior Questionnaire (SREB), Short Form Self-Regulation Questionnaire (SSR), and Adult Eating Behavior Questionnaire (AEB) were completed before, at midpoint, and after the program. These assessments will be used to evaluate dietary and physical activity behavioral change. Results will be analyzed using repeated measures ANOVA. It is hypothesized that full participation in the education program will result in the development of behavioral changes that could mediate the risk of MetS. Data analysis is currently in progress. Preliminary analysis of the ASA24® shows a significant decrease in the intake of total kilocalories ($p = 0.002$), fat ($p = 0.003$), and carbohydrates ($p = 0.006$) during the first 8 weeks of the intervention program.

A Community Needs Assessment Used to Develop A Workplace Nutrition And Physical Activity Education Program

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

Metabolic syndrome (MetS) is a growing concern, 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. Community needs assessments increase the effectiveness of interventions by enabling programs to be tailored to the local community and their needs. The project is a two-phase study with phase 1) the community needs assessment and development of a nutrition and physical activity education program, and 2) the 16-week workplace education program and assessment of its effectiveness. The purpose of phase 1 was to investigate the needs and interests of faculty and staff at a small liberal arts university to design a workplace nutrition and physical activity education program to decrease the risk factors associated with MetS. Faculty and staff members ($n=53$, weight 85 ± 19 kg, BMI 31 ± 6 kg/m²) completed a community needs assessment and intervention program interest survey. The community needs assessment survey included demographics, overall health satisfaction, lifestyle habits and interest in a nutrition and physical activity education program. After completion of the survey, 16 individuals participated in the Zoom focus groups. Meetings were video recorded and used for data analysis. During these focus groups participants were asked about what topics, skills, and resources they would like to learn in a workplace nutrition and physical activity education program to help support long-term lifestyle behavioral change. 63% of the survey respondents were dissatisfied with their physical activity habits, 47% with their eating habits, 49% with their overall health and 60% said they would be interested in the education program. Information collected from the focus groups resulted in the identification of relevant themes for the education program including mindful eating, calorie counting, meal planning, grocery shopping, effective physical activity, motivation for exercise, sleep, and physical and mental health self-care. The collected information was used to develop an engaging 16-week workplace nutrition and physical activity education program for a target population to encourage lifestyle behavioral change and to reduce the risk of developing MetS risk factors.

Prolonged Sleep Duration may be Associated with Increased Adiposity in College Students

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In adolescents and adults, suboptimal sleep (e.g., short sleep duration, inconsistent timing, and high variability in sleep characteristics) has been associated with increased adiposity. It is unknown whether

these sleep characteristics are related to adiposity during college, where excess weight gain is prevalent. Moreover, the interplay between sleep and lifestyle behaviors such as physical activity (PA) and nutrition are well documented, but it is unclear whether these factors mediate the relationship between sleep characteristics and adiposity. Therefore, we aimed to assess associations among sleep characteristics and adiposity, and to explore whether behavioral variables might mediate this relationship. This observational longitudinal study took place over two academic semesters. The sample included college students aged 18-22 years ($n=45$, 84.6% female; 88.2% white) yielding a total of 90 observations. Anthropometric measurements including height, weight, and waist and hip circumference were collected. Sleep characteristics, diet, and PA were assessed subjectively using various validated online questionnaires. Sleep, PA, and sedentary behavior were also assessed objectively using a wrist-worn tri-axial accelerometer for 7 days following each testing visit. Lastly, bioelectric impedance spectroscopy was used to assess fat mass (% and kg) and fat free mass (kg). Data were analyzed using linear mixed models with a random intercept and fixed slope. Models nested timepoints within people to allow for multiple observations. All behavioral predictors were centered to the sample mean. In univariable models, sleep duration was positively associated with percent fat ($B=1.51$, $p=0.020$, 95% CI: 0.263-2.750), while no other sleep characteristics reached significance. Associations persisted in multivariable models that included all sleep variables and controlled for sex as a covariate ($B=1.43$, $p=0.030$, 95% CI: 0.161-2.698). Similar, non-significant associations were seen when fat mass (kg) replaced percent fat as the outcome variable ($p=0.056$). Healthy eating index, PA, and sedentary behavior were not significant predictors of percent fat when added to multivariable models and did not alter associations. The findings of our study agree with previous literature that suggests there may be a U-shaped association between sleep duration and adiposity. Particularly, college students who exceed the recommended 7-9 hours of sleep may be at increased risk for adiposity.

Tart Cherry Juice and Whey Protein Reduce the Perception of Muscle Injury Recovery in College Age Females

Hailey E. Jurgens & Sara A. Higgins (Dr. Svetlana Nepocatych) Department of Exercise Science

BACKGROUND: Nutritional interventions to prevent and reduce the effects of exercise-induced muscle damage (EIMD) and muscle soreness, including natural anti-inflammatories, have been found to decrease inflammation and aid in the recovery of EIMD. Protein consumption is important for stimulating muscle protein synthesis, an important aspect of muscle injury recovery. **PURPOSE:** To examine the effects of tart cherry juice and whey protein (WP) on measures of recovery following fatiguing forearm exercises. **METHODS:** Recreationally active women ($n=20$, age: 20.95 ± 1.1 yr; BMI: 23.4 ± 2.8 kg/m²) were randomly assigned to either one of two supplemental protocols (S1: 2x8 oz tart cherry juice + 30 g WP/day or S2: 30 g WP/day) for 3 days. Participants completed 3 sets of 7 hand, wrist, and forearm exercises until fatigue with 60 s rest in between. Hand-grip strength, wrist circumference (WC), perceived recovery (PRS), fatigue, and muscle soreness (MS) were measured at pre-, 0, 24, 48, and 72h post-exercise. All measurements and exercise sessions were completed and monitored by a proctor virtually over Zoom after all equipment and supplements were shipped to the participant's home. Data was analyzed using an ANOVA two-way analysis of variance to compare the two supplemental protocols throughout the testing period, with an alpha level of 0.05. Significance was set at $p<0.05$. **RESULTS:** No significant time, supplement, or interaction effects were observed for handgrip strength, fatigue, or wrist circumference at any timepoint. However, a significant time and supplement interaction was observed in muscle soreness (S1: pre = 3.1 ± 3.3 , post = 4.0 ± 2.2 , 24 hours = 4.0 ± 3.1 , 48 hours = 5.0 ± 3.5 , 72 hours = 3.6 ± 3.4 , and S2: pre = 1.8 ± 2.2 , post = 5.4 ± 2.4 , 24 hours = 5.0 ± 3.4 , 48 hours = 4.8 ± 3.4 , 72 hours = 3.7 ± 3.4 , $p=0.006$) and PRS (S1: pre = 7.5 ± 2.7 , post = 4.7 ± 2.4 ,

24 hours = 7.0 ± 2.6 , 48 hours = 7.2 ± 2.2 , 72 hours = 7.4 ± 1.8 and pre = 6.8 ± 2.6 , post = 4.8 ± 2.2 , 24 hours = 7.2 ± 2.0 , 48 hours = 7.0 ± 2.0 , 72 hours = 7.1 ± 1.7 , $p = 0.02$). **CONCLUSION:** The addition of tart cherry juice to WP following fatiguing forearm exercise could be used to reduce the perception of recovery and muscle soreness after exercise more than just the supplementation of WP.

The Effects of Pilates and White Noise on Attention in College Students with ADHD

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An estimated 2-8% of college students are diagnosed with Attention-Deficit Hyperactivity Disorder (ADHD) (DuPaul et al., 2009). College students with ADHD perform worse on executive functioning tasks compared to those without ADHD. This difference in cognitive performance may lead to the reported poor academic performance among students with ADHD. Studies have investigated how a cognitive distraction (i.e. background white noise) improves attentional processing of people with ADHD. A single bout of exercise has also been shown to benefit cognitive performance in this population. Preliminary research into the effects of Pilates on cognition shows a positive relationship in multiple populations (Multiple Sclerosis, middle-aged adults, older adults, and college students). However, no studies have investigated the role of an acute Pilates session plus a cognitive distraction on cognitive performance in people with ADHD. The purpose of this online study was to gather preliminary data on the feasibility and acceptability of an acute Pilates session plus cognitive distraction on cognitive performance in college students with ADHD. We used a randomized control crossover study design (Enrollment Goal N=12). The exercise condition consisted of participants following along to (exercise) or watching (control) an online Pilates video. The cognitive distraction condition consisted of four levels of white noise volume (no noise, low volume, moderate volume, high volume). Data is still being collected through 3/11/2022, but out of 90 screened so far, a total of 16 were eligible to participate in the research. Of those eligible, one person completed both sessions, and three people dropped out. One major limitation relates to physical activity as an exclusion criterion, with most individuals exceeding the criteria (exercising more than 2 days per week for greater than 30 minutes per day in the last 6 months). While not assessed, another potential limitation is that participants had to commit to two sessions, one week apart, which is a demanding obligation for individuals who struggle with time management, as is common for many students with ADHD. This study did not meet the feasibility goals, but it did provide essential information toward the design of future studies, specifically considering participant burden and inclusion criteria.

Yoga and Fatigue in Breast Cancer Survivors: An Online Feasibility Study

Hannah G. King (Dr. Aaron T. Piepmeier) Department of Exercise Science

Background: An estimated 70% of cancer survivors experience cancer-related fatigue (CRF). The National Comprehensive Cancer Network defines CRF as “a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning”. Cancer-related fatigue does not improve with sleep and has negative implications on overall quality of life (QoL). Research shows that yoga reduces CRF. No studies have been performed to explore the feasibility of an online-based yoga intervention for breast cancer survivors with CRF. **Purpose:** The objective of this study is to determine the feasibility of an online-based yoga intervention for adults with CRF who have completed treatment of a breast cancer diagnosis. **Methods:** This study will assess the feasibility of a 4-week online-based yoga intervention for breast cancer survivors experiencing CRF. **Outcomes** will include barriers to recruitment and retention, CRF, and health-related quality of life. **Benefits:** This study will

1.) potentially improve CRF and quality of life for those who complete the study, 2.) assess the feasibility of a highly accessible, and scalable, exercise intervention, and 3.) provide additional information pertaining to the benefits of yoga for cancer survivors.

Moderate Intensity Exercise for Young Adult Cancer Survivors Experiencing Cancer-Related Cognitive Impairment

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

Cancer-related cognitive impairment (CRCI) is a problem that affects 25-27% of young adult cancer survivors. There is increasing evidence that physical activity can positively affect certain symptoms of CRCI. Our study's objective is 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. Our goal is to obtain information relating to feasibility (retention rates, recruitment rates, and satisfaction) in order to inform the design of future studies. This feasibility study will recruit 20 young adult cancer survivors (18-39). Who will be randomized to either an exercise or control condition. We will use Qualtrics for the initial screening form. The online Research Platform, Gorilla, will be used to administer the exercise/testing protocol. Participants will complete a rating of fatigue self-assessment then follow along with a 20-minute exercise video (or watch video while remaining inactive for the control group). After this video is completed, both groups will complete a Borg's rating of perceived exertion (physical) and a second rating of fatigue self-report. Cognition will be assessed with the Digit Span test, Stroop task, and the Hopkins Verbal Learning Test. Mental effort will be assessed following each cognitive task using a perceived exertion scale. The results will provide vital data for future studies.

Exploring Diversity, Equity, and Inclusion Practices and Content Within Sport Psychology*

Mikayla J. Medley (Dr. Lauren Walker) Department of Exercise Science

In the field of sport and exercise psychology (SEP), considerable scholarly attention has been paid to better understanding how issues of cultural diversity and equity operate on the playing field and in exercise settings. However, the same attention has not been paid to equity, diversity and inclusion (EDI) regarding how these topics are taught in the SEP classroom or how inclusive and equitable practices may contribute to student interest in becoming future practitioners or researchers in this space. As part of a wider project aimed at using student-faculty pedagogical partnership to evaluate EDI content within the Exercise Science classroom, this project focused specifically on: 1) refining the structure of a Sport Psychology course to utilize more inclusive pedagogy, and 2) adapting content, focused on identity and performance in sport, to more meaningfully facilitate dialogue on relevant EDI topics. These purposes were addressed in a structured student-faculty partnership model. Student-faculty partnerships, specifically in the EDI space, focus on righting the harms educational institutions can cause students in epistemic, affective, and ontological ways. However, these partnerships must be based upon respectful and honest communication between student and faculty partners. In this model of student-faculty partnership, changes were discussed and co-created, enacted by the professor, and evaluated each semester (Spring 2021, Fall 2021, N = 36) through an anonymous, quantitative survey. While students left few comments on the structural inclusive pedagogy changes made within the course, their Likert style evaluation of the EDI focused "Identity in Sport" unit showed they felt this material was: 1) moderately-very important to the overall course (M = 4.47), 2) moderately-very useful in helping them better understand EDI topics in sport (M = 4.25), and 3) moderately-very well-structured and well-facilitated by the instructor (M = 4.50). Students found that EDI content discussed

in class helped prepare them for a future career in the health field. This project reflects that student-faculty partnership can be critical in creating an environment where students and faculty both feel comfortable in voicing their opinions and feel represented in discussions about EDI. This is critically important in making the SEP classroom more impactful.

Objective and Subjective Memory Assessment Tools for Concussion Baseline Testing

Michael A. Mesrobian (Dr. Caroline Ketcham & Dr. Eric Hall) Department of Exercise Science

The gold standard for assessing Sports-Related Concussion (SRC) is using the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT) to assess neurocognitive function and symptom load. This test produces two objective memory composite scores (verbal, visual), which in the case of injury are compared to a baseline score or a normative score if a baseline was not collected. In addition, to the ImPACT, a subjective symptom score is also collected. The goal of this study was to compare the results of this commonly used assessment tool to determine how well objective memory assessments and an assessment of memory based on the participant's perception of their memory. Sixty-six collegiate student-athletes completed baseline testing which included Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT), a neurocognitive assessment, the HVLTR (Hopkins Verbal Learning Tool), a clinical assessment tool word recall immediately and after a 20-minute delay (delayed recall), and the Brief Rating Inventory of Executive Function (BRIEF), an assessment where an individual can report their own impression of their cognitive function capabilities and processing of working memory. The variable of focus for this study included: Total Recall (HVLTR); Delayed Recall (HVLTR); Global Executive Composite (BRIEF); Verbal Memory Composite (ImPACT); Visual Memory Composite (ImPACT); and Total Symptom Scores (ImPACT). Correlations across these variables are reported in the table below. ImPACT Verbal Memory was significantly correlated with HVLTR Total Recall ($r=.46$, $p<.001$); HVLTR Delayed Recall ($r=.48$, $p<.001$); and ImPACT Visual Memory $r=.43$, $p<.001$). ImPACT Total Symptom Scores was significantly correlated with BRIEF GEC ($r=.50$, $p<.001$). HVLTR Total Recall was significantly correlated with HVLTR Delayed Recall ($r=.71$, $p<.001$) and ImPACT Visual Memory ($r=.38$, $p<.005$). All other correlations were not significant. The results indicate that the objective memory measures are correlated as well as the subjective measures suggesting that the ImPACT assessment tool seems to be a good measure of both objective performance and subjective perceptions of athletes. This has implications in concussion assessment and recovery.

Examining Gender Differences of Athletes on Coaching Behavior in Collegiate Distance Running

Andrew G. Miller (Dr. Lauren Walker) Department of Exercise Science

Gender and sex within sport have been, and continue to be, topics of interest in conversation about sport performance. Researchers have highlighted the importance of separating discussion of physiological sex differences (e.g., menstruation, difference in Q-angle) from gendered norms and assumptions regarding athlete potential for high performance. This distinction is important when considering the education and actions of sport coaches, as the research highlights little psychosocial reason to coach athletes of varying genders differently to optimize performance. However, due the continued presence of female athletes being "problematized" within coaching education literature, and the continued presence of gendered coaching practices, even at an elite level of performance, the overarching purpose of this study was to examine whether gendered coaching practices were present within collegiate running, when both the men's and women's team shared a head coach. More specifically, the study aimed to understand: 1) whether male and female athletes were coached

differently based on gendered assumptions, 2) where those gendered assumptions may have originated in the coach's background and education, and 3) the athletes' perceptions of this gendered treatment. To examine these questions a qualitative case study approach was utilized, where the head coach and athletes from both the men's and women's cross-country teams were interviewed. The male head coach and a total of five athletes (4 female) were interviewed from a Division I college program. Qualitative content analysis reflected that generally speaking, athletes did not perceive strong gendered treatment from their coach. Athletes cited the equal authority and respect given to the male and female assistant coaches and their head coaches individualized approach to adapting training to them as a person as two reasons they did not perceive gendered dynamics on the team. However, there was some nuanced variability in response among athletes, with younger females on the team and international athletes on the team, citing more variance in their perception of the head coach's behavior. In congruence with these athletes' comments, the head coach cited a greater desire to be more personally reflective regarding his coaching behaviors, and where they might originate, to better improve individual coach-athlete dyadic relationships.

The Effects of Yoga on Perceived Anxiety, Depression and Salivary Cortisol Levels in Prepartum Women Aged 18-30

Lillian C. Niehaus (Dr. Takudzwa Madzima) Department of Exercise Science

Close to 7% of adults in the United States experience an episode of major depression annually (Hedden, 2015). Furthermore, between 1.9% and 5.4% of the general population experiences generalized anxiety disorder consistently throughout their lifetime (Bahrami & Yousefi, 2011). Among some of the interventions that have been plausible for alleviating depression and anxiety, non-pharmacological interventions such as exercise, particularly exercise that focuses on mindfulness such as yoga could be impactful (Woodyard, 2011). Previous research has shown that the short-term practice of yoga can help alleviate both physiological and psychological distress and improve overall quality of life (Woodyard, 2011). Furthermore, positively affirming core values may help at-risk individuals manage their responses to negative emotions (Falk et al., 2015). The primary purpose of the proposed study was to determine the effectiveness of yoga—with its associated breath control and words of affirmation—in reducing salivary cortisol levels and subsequently perceived anxiety and depression in females aged 18-30 years old. There were 13 participants total with a mean age of 20.9 ± 1.1 yrs, a mean BMI of 22.6 ± 3.1 , and a mean of 1.7 ± 0.26 years of yoga experience. The physical practice as well as the mindfulness aspect of yoga could generate psychological as well as physiological benefits in young adult women. There was a significant condition effect for Rosenberg Self-Esteem Scale (RSE) ($p=0.036$) and Beck's Depression Inventory ($p=0.010$), with all pre-yoga session conditions being greater for RSE and lower than Beck's compared to baseline. When baseline and control measures—when participants were not doing yoga—were compared to post yoga sessions, there was a significant condition effect for RSE ($p<0.001$), the General Self-Efficacy Scale (GSE) ($p=0.006$) and for Beck's ($p<0.001$). There was a condition effect ($p=0.049$) for the GSE with the normal yoga group being greater than the alternative yoga group. There were significant time effects for all pre to post yoga sessions measures. The two acute sessions of yoga improved subjective measures of anxiety and depression in college aged females with no difference between the two yoga styles. Furthermore, perceived anxiety and depression were improved post both yoga sessions when compared. The salivary cortisol samples are still being analyzed at the present moment.

The Impact of the COVID-19 Pandemic on College Student Mental Health and College Counseling Practices: The Perspective of College Counselors

Corinne Orgettas (Dr. Eric Hall) Department of Exercise Science

Research over the last few decades has emphasized a concerning decline in college student mental health. The sudden onset of the COVID-19 pandemic has exacerbated this issue as students have been faced with new challenges and stressors while adjusting their lives in accordance with COVID-19 protocols. This has led to a further increase in mental health problems in this already vulnerable population. College counselors were also hit hard during the pandemic; they not only had to make impromptu adjustments to their own lives and counseling practices, but simultaneously had to deal with an influx of students needing support. The purpose of this study is to explore the impacts that the COVID-19 pandemic has had on the mental health of college students as well as college counseling practices as a whole. Participants of this study include 16 college counselors from 13 different North Carolina institutions who were interviewed via zoom. Participants were asked a series of questions covering the topics of background, student mental health, counseling practices, implications for the future, and lessons learned. Preliminary results were obtained through transcribing and coding the interviews; they suggest that some of the most prevalent stressors faced by college students during the pandemic have been feelings of isolation, loneliness and lack of connection to others, concern about family members, and academic related concerns. Responses from the counselors also suggest that there has been an increase in both the severity and frequency of anxiety disorders and depression overall. There has also been evidence of a major shift to telehealth services on college campuses; the benefits and drawbacks of this shift are still being analyzed along with a variety of other factors in this study. This research will shed light on the specific COVID-19 related stressors and mental health disorders that students have been experiencing. Our findings may have the potential to influence the way that college counseling centers function post-pandemic. We also believe that our findings will help prepare college counselors to better address the needs of their clients in the coming years.

Creating an Optimal Performer: A Body Composition and Performance Analysis

Cassidy M. Perry (Prof. Renay Aumiller) Department of Performing Arts and (Dr. Takudzwa Madzima) Department of Exercise Sciences

Dancers have historically monitored their weight and body shape to optimize performance (Evans et al, 1985); however, this study aims to investigate correlations between a dancer's training, body composition, and overall performance. Dancers are unique athletes that require a system of assessment that incorporates both the aesthetic elements and physical vigor dance involves. The rationale for this study is the gap in research on dancers in general and more so, for non-ballet dancers (Koutedakis, 2018). Therefore, this study combines objective body measurements and performance analysis to capture dance in terms of aesthetics and functionality through a mixed methods approach. Professionally trained female dancers (n=27; age 19.59 ± 1.25 years; mean \pm SD) completed body composition (BIA), performance testing, and genre-neutral dance movement. Qualitative data were collected from nine dance professionals' scores of the performance using a rubric for specific criteria on a scale of 1 to 5. Data were analyzed via a one-way ANOVA to compare differences in outcome measures between dancers using the median relative lean mass (high relative lean mass: HLM, ≥ 15.77 kg and low relative lean mass: LLM, < 15.77 kg) and years of experience (MDN=16years) as comparison cut points with significance at $p < 0.05$. Right elbow flexion (HLM: 18.92 ± 3.4 kg, LLM: 16.73 ± 1.7 kg; $p = .046$) and all circumference measures except right and left arms 5 cm above joint and right and left calves 15 cm below joint were greater in HLM than LLM. Additionally, HLM scored

lower on all dance performance criteria except grounded use of weight and clarity of stylistic choices. In conclusion, the data suggests that a higher amount of muscle relative to height does not support better dance performance. Though supplemental exercise training does increase fitness and reduce injury in dancers without inhibiting aesthetics, hypertrophy-focused routines may not be the preferred method of cross training (Koutedakis, 2018). In the future, researchers may delve deeper into this discrepancy between the objective measures which appear to favor more lean body mass and the subjective assessment which seems to disparage it.

Sports Positions Yielding the Highest Concussion Rates Among Elon Club and Varsity Athletes: An Analysis of Elon University's ImPACT Data from 2009-2021

Caroline E. Seelman (Dr. Caroline Ketcham & Dr. Eric Hall) Department of Exercise Science

In recent decades, the issue of concussions in relation to sports has become a widely discussed topic. Although the injury cannot be physically seen by the naked eye like a broken bone or bruise, the effects can be long lasting and detrimental to an individual's ability to go about their normal, daily life. Annually, millions of concussions occur due to sports participation. As a result, concussions constantly pose a threat to athletes, especially those in contact sports (e.g., football, basketball, soccer, lacrosse). This study aims to determine which positions in multiple sports (baseball, basketball, field hockey, football, ice hockey, lacrosse, soccer, softball, and volleyball) yield the highest concussion rates. Despite the influx in research on concussions, there is still little literature available on the vulnerability of concussions for the respective positions in different sports. To answer this question, an analysis was performed on ImPACT data of club and varsity athletes from September 2009 to March 2021. The data was organized by deleting duplicate tests, those with no previous concussion history, and those without an answer for their sport and/or position. Furthermore, research to confirm positions for the remaining observations was conducted using the Elon Athletics website. Using R, it was concluded that there were the following number of observations for 9 sports: baseball (81), basketball (65), field hockey (24), football (112), ice hockey (27), lacrosse (158), soccer (164), softball (35), and volleyball (29). Next steps will be to use R in determining the average number of concussions each position sustains. Within this analysis, certain factors will be accounted for, including gender, multisport athletes, previous concussion history, and disparity in number of observations of positions, which will be further discussed in the presentation. This research will help coaches, athletes, and trainers identify positions and players at the highest risk for a concussion. As a result, this can help team personnel more quickly identify a potential concussion and provide the proper and necessary treatment.

The Impact of Dietary and Exercise Habits on the Extent of Frailty in Adult Survivors of Childhood Cancer

Alexandra K. Stoll (Dr. Takudzwa Madzima) Department of Exercise Science

Frailty, physical weakness, is one measurable indicator of poor health that is a predictor of chronic disease. Typically, frailty is prevalent among older adults who are experiencing the natural effects of aging. However, recent research recognizes that the harsh nature of current cancer treatment disrupts the body's homeostasis and accelerates aging making early the onset of frailty a concern for cancer survivors. This is especially true for women, a high-risk group in geriatric populations, and those who survived cancer in adolescence as there is more time for frailty to develop abnormally early. Frailty is defined as experiencing three or more of the following: low muscle mass, exhaustion, low energy expenditure, slow walking speed, or muscle weakness. This study will analyze the extent of frailty in women survivors of childhood cancer in comparison to an age-matched group. Additionally, dietary

and exercise habits will be examined to see if lifestyle habits and the extent of frailty are correlated. To assess these factors, the following virtual surveys and questionnaires will be used: Medical History, Dietician Involvement, the Functional Assessment of Cancer Therapy – General (FACT-G), the International Academy of Nutrition and Aging FRAIL Scale, the International Physical Activity Questionnaire (Version 4), and the NHANES Dietary Screener Questionnaire. Data collection is currently ongoing and results will be presented at a later time. It is expected that cancer survivors, compared to age-matched women, will experience higher levels of frailty as demonstrated by higher scores on the IANA FRAIL Scale. Additionally, decreased frailty will be associated with positive dietary and exercise habits in both cancer survivors and age-matched controls.

Socio-Economic Status, Gender, Race, and the Impact of COVID-19 on the Incidence of the Pediatric Inactivity Triad (PIT)*

Jahmai Sylvestre (Prof. Elizabeth Bailey) Department of Exercise Science

More than 75% of youth don't meet the recommended 60 minutes of physical activity/day, and therefore meet criteria for exercise deficit disorder. In addition, COVID 19 has exacerbated the incidence of sedentary behaviors in children. Previous research establishes that inactivity in children leads to a myriad of health issues across the lifespan. The Pediatric Inactivity Triad (PIT) has been proposed to describe the negative impact of inactivity in youth. It encompasses measures of exercise deficit disorder, muscular dynapenia, and lack of physical literacy. PIT has been suggested to identify children needing encouragement to be more physically active to prevent further negative consequences. The purpose of this investigation was to examine the relationships between race, gender, and socioeconomic status and the incidence of PIT. Children were recruited from afterschool programs. Parents gave consent and completed a questionnaire to determine their child's activity pre and during COVID, socioeconomic status, and their child's gender and racial identity. 31 children (12 males and 19 females) completed a series of physical evaluations and questionnaires. Questionnaires assessed physical activity (Evaluation of Physical Activity in Youth: EASY), physical self-efficacy (PLAY_{self}) and self esteem (Rosenberg Self Esteem Scale). Physical evaluations included; muscular strength and power (hand grip, vertical leap), physical literacy (Physical Literacy Assessment for Youth: PLAY_{basic}), and anthropometrics (BMI, waist circumference). A third each of participants (n =10) were white or black, with the final third from a variety of other races. Six children were described as ethnically Hispanic. 29% of children came from households with moderate/ high risk of poverty. Hours spent in sedentary behavior increased with COVID (Pre hour/day = 11 ± 5 hrs; During = 20 ± 7 hrs). Data collection and analysis is ongoing. Preliminary findings indicate 42% of participants had exercise deficit disorder, 22% of participants were identified with poor physical literacy, with 16% lacking physical self-efficacy. 87% of participants were deficient in power and 13% strength. The relationships between the variables of interest and PIT will be examined to see if they add support for the use of PIT to identify the children most at risk from a lack of physical activity.

A Preliminary Study on Psychological Well-Being, Concussion Symptoms, and Menstrual Symptoms in Correlation with Hormonal Birth Control Use

Abigail H. Thomson (Dr. Caroline Ketcham and Dr. Eric Hall) Department of Exercise Science

Current research supports that women typically take longer to recover from concussions than men (Neidecker et al., 2017; Stone et al., 2016); however, there is little understanding as to why. One of the most significant differences in males and females is their fluctuations in sex hormones across the menstrual cycle, which hormonal birth control serves to regulate (Schrager et al., 2020). As a

preliminary study, the relationship between hormonal birth control use and menstrual cycle, mental health, and concussion symptoms was studied through the use of a Qualtrics survey consisting of three corresponding symptom scales. Out of 48 female participants surveyed, 29 were on some form of hormonal birth control and 19 were not on any hormonal birth control. Furthermore, 27 of the participants had some form of psychological disorder (e.g., anxiety or depression). Mental health was evaluated through The Warwick-Edinburgh Mental Well-being Scale, with higher scores being indicative of better mental well-being. Concussion symptoms were measured through the use of the ImPACT concussion symptom questionnaire with higher scores being indicative of greater concussion symptoms. The menstrual cycle symptom scale used was a modified version of the Premenstrual Syndrome Questionnaire, which asks questions about the presence and severity of both mental and physical menstrual cycle symptoms. Similar to the concussion symptom scale, higher measures on this scale were indicative of more severe menstrual cycle symptoms. The datum shows that participants on hormonal birth control had a significantly higher score on the mental health questionnaire and lower scores on the concussion and menstrual symptom scales ($p < 0.05$), than participants who were not on any form of hormonal birth control. Significant correlations were found between Concussion Symptoms and Mental Wellbeing ($r = -0.39, p < 0.01$), and Menstrual Symptoms ($r = 0.65, p < 0.001$). A future study is planned to analyze specific sex hormone fluctuations across the menstrual cycle and their effects on menstrual symptoms, concussion symptoms, and psychological well-being.

Integrating Diversity, Equity, and Inclusion into Exercise Science: A Case Study of Neuromotor Control and Biomechanics*

Nsikak U. Udoh (Dr. Matthew Wittstein) Department of Exercise Science

In Fall of 2021, a team of Exercise Science (ES) students and faculty evaluated diversity, equity, and inclusion (DEI) practices in pedagogy and research to inform more equitable and inclusive practices in Neuromotor Control and Biomechanics, two core courses in the ES Major. Incorporating inclusive pedagogy is important so that students' success in ES can be maximized. Regularly, our DEI team met to discuss race, inclusion, how it relates to ES, and ways to integrate it into the classroom. A SWOT analysis (strengths, weakness, opportunities, and threats) was performed on ES faculty prior in order to set a starting point, and to see areas of strength, and areas for potential growth. In addition, faculty and students wrote positionality statements that detailed our identities within society. During this semester, in Neuromotor Control and Biomechanics, ES faculty integrated the use of inclusive language and teaching practices (ex. the use of pronouns), ungrading pedagogies, and a positionality statement assignment for students in the courses. Our hope is that ES students learn better in an environment inspired by inclusivity. At SURF, conference participants will be invited to complete their own SWOT analysis to critically examine DEI in their courses and curriculum.

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

Chad J. 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. The majority of undergraduate students report frequent postponement of educational tasks, including studying for exams and completing assignments, to the point at which optimal performance becomes improbable. Postponement could originate from mobile phones and social networking applications. The purpose of the correlational study is to examine the effects of mobile phone use on academic confidence,

procrastination, and mental health. 111 Elon undergraduates ranging from first-year to senior, 98 females and 13 males with a median age of 19.9 years old, participated in the qualitative survey. The survey consisted of the Academic Confidence Scale, Warwick Wellbeing Scale, and Procrastination Assessment Student Scale. Pearson product moment correlations were conducted. Participants reported an average screen time of 4.95 ± 1.99 hours. Results showed that average screen time had a correlation with academic confidence ($r=-0.234$, $p < 0.05$), and GPA ($r=-0.354$, $p < 0.05$). Wellbeing had a correlation with procrastination ($r= -0.246$, $p < 0.01$) and with academic confidence ($r=0.458$, $p < 0.05$). Procrastination had a correlation with anxiety ($r=0.245$, $p < 0.05$), depression ($r=0.234$, $p < 0.05$), and GPA ($r=-0.263$, $p < 0.05$). These results support the role phone use plays in procrastinatory behaviors and overall mental health. Future work will consist of implementing an intervention that aims to limit the phone use of participants to see if there is a meaningful difference in procrastination, mental health, and academic confidence.

Finance

Size, Specialization, and Venture Capital Returns

Matthias L. Ferring (Dr. Adam Aiken) Department of Finance

Given the increased number of early-stage venture capital investments over the past decade, developing a better understanding of the factors that affect venture capital funds' investment performance is a paramount research objective. This paper aims to examine two aspects of venture capital investment strategies and their impact on investment success rates: (1) The investment deal size, also referred to as the ticket size, and (2) the industry of the company receiving the investment. Together, these factors proxy for the focus or specialization of the venture fund. As a basis for the analysis, I use firm funding round data from the online investment database Crunchbase. Relevant variables include the following: organization name, funding type, money raised, announced date, investor names, funding stage, organization industries, total funding amount, number of investors, and funding status. These variables measure the types of firms and industries receiving venture capital funding and which firms are doing the financing. In the first part of the analysis, I define success factors for venture capital investments. Namely, I classify a venture capital investment as successful if the start-up receiving funding a) secures new venture capital or private equity funding, b) is acquired by another company, or c) has an initial public offering (IPO). In the second part of the analysis, I use multiple regression analysis to explore the relationship between investment success and investment deal size across industries. In the last part of the analysis, I examine if a specific fund industry-focus positively correlates with investment success rates. Overall, this analysis examines if specialization, like sector-specific investments, outperform non-sector specific investments and how the size of venture capital investments relates to investment success.

History and Geography

“Well Behaved Women Seldom Make History:” Examining Militancy versus Constitutionalism in British Suffrage, 1880-1930*

Grace K. Costa (Dr. Yidi Wu) Department of History & Geography

This project examines different strategies activists used in Great Britain's women's suffrage movement from 1880 to 1930. Historians have examined constitutionalism and militancy independently in current literature, but have not compared their relative efficacy or reached a conclusion on which method proved superior. With this opportunity to explore the suffrage from a social movement perspective, I used newspapers, personal papers, private correspondence, trial speeches, camera footage, pamphlets and scrapbooks to argue that militancy proved more successful and effective than constitutionalism to gain the right to vote. I use specific case studies from one moderate constitutionalist group, the Catholic Women's Suffrage Society (CWSS), and one radical militant group, the Women's Social and Political Union (WSPU) for comparison. I evaluated the actions of the CWSS and WSPU using criteria first articulated by Marco Guigni for efficacy and by Theodore Abel for success, respectively. Guigni defines "efficacy" as activists being viewed as valid spokespersons for legitimate interests while gaining advantages towards suffrage. Abel defines "success" in a social movement as activists experiencing suffrage as a common threat, the movement sustaining emotional dissatisfaction and opposition, including personal, and emotional involvement, and the existence of a common source of such antagonisms. Cross-examination of three specific cases of constitutionalism and militancy carried out by the two organizations reveals how militancy was more successful and effective according to both Abel's and Guigni's criteria. Suffragists who used militant violence prompted enhanced vigor, participation and dedication to suffrage more than their peers who employed constitutionalist approaches, leading to increased advantages and higher levels of success and efficacy.

The Economics of Ethnicity: A Case Study of the Maasai and Batwa Peoples

Jordan Ennis (Dr. Waseem Bin-Kasim) Department of History & Geography and International & Global Studies Program

This research traces the solidification of ethnic groups and ethnic identity through the twentieth century as it applies to two indigenous groups in the African great lakes region – the Maasai and the Batwa. For the Maasai, traditionally nomads, the implementation of forced sedentarization has led to the degradation of their herds while creating the conditions for pastoralism being a defining factor of their identity and livelihood. For the Batwa, traditionally hunter-gatherers and forest dwellers, repeated marginalization and land dispossession have forced them into menial labor, begging, and microenterprises. In research focused on East Africa these groups have been overlooked, which has allowed for mistreatment to continue. This paper seeks to remedy this, arguing that the effects of colonial policy were cemented into post-independence society by national governments continuation of these discriminatory policies. It does so through the close analysis of primary source documents from colonial departments and secondary sources written by on-the-ground researchers. This paper concludes that the policies implemented by colonial powers have directly affected the economic identity of indigenous groups today, as it made livelihood synonymous with the indigenous group itself.

The Effects of Farmland Preservation on Residential Property Value in Hunterdon County, New Jersey

Kyle F. Hensler (Dr. Brooks Depro) Department of Economics and (Dr. Ryan Kirk) Department of History & Geography

Prior research has found that there is a strong relationship between open space and housing prices as a result of perceived amenity value. However, very little research has been conducted on permanently preserved agricultural land and its impact on single-family residential housing prices. The purchase of

development rights has become an increasingly common means to halt urban sprawl, ease property taxes, and preserve natural areas. This paper applies a hedonic-price approach to identify the amenity value associated with permanently preserved agricultural land observed in housing prices in Hunterdon County, New Jersey. Housing data from Garden State Multiple Listing Service (MLS) and preserved farmland data from New Jersey Geographic Information Network (NJGIN) are used in conjunction to identify indices of spatial correlation between single-family residential homes and preserved farmland. The hedonic-price model builds on previous literature employing a vector of housing characteristics and a town dummy variable to control neighborhood characteristics. The coefficient of the spatial indices captures the perceived amenity value associated with farmland preservation. Prior literature has come to various degrees of causation to the effects of preserved farmland on the price of housing nearby depending on geographic location. However, economic theory suggests that houses near preserved farmland will have higher property values relative to similar homes that do not.

Post-World War II Immigration Policies and Experiences of Muslim Women in Italy*

Grace A. Middleton (Dr. Andrea A. Sinn) Department of History & Geography and International & Global Studies Program

Italy, once a country of emigration, has now become one of the top immigration hubs in Europe. A wave of immigration from predominately Muslim countries has entered Italy starting in the 1980s, causing increasing backlash from right-wing Italian groups fearful that their country's national identity will change. Despite being the largest minority group in Italy, Muslims are still considered an "other" in Italian society. An increasing wave of anti-immigration sentiments has led to an environment of discrimination and separation. Despite Muslim female immigration to Italy being a fairly new phenomenon, scholars have taken an interest in the experience of these women, arguing that the way in which women exist in the world is unique and specific, and Muslim migrant women have quite different integration processes than their male counterparts. This is especially true in Italy where the rise of right-wing ideologies is threatening their status. Some scholars have focused on a comparative study between Moroccan and Pakistani Muslim migrant women, but failed to look specifically at their integration process, or at the factors that affect integration in Italy. This presentation will address the question: What are the main challenges faced by Muslim Moroccan and Pakistani women immigrating to Italy beginning in the 1980's and what factors best explain struggles of integration into Italian society? The research relies on primary sources such as interviews, memoirs, laws, policies, speeches and statistics. Research into Italian integration policy and the rise in anti-immigration political leadership, as well as research into Moroccan and Pakistani culture and politics, lead to the finding that while Italy may treat its female Muslim population as a homogenous group, factors from the women's origin countries have profound, and differing, effects on their integration processes. Built upon interest started in International and Global Studies Senior Seminar, this research argues that there are different dynamics and levels of integration between Moroccan and Pakistani Muslim migrant women in Italy, despite their commonalities and uniform treatment from the Italian government.

Art for the Industrial Working Class: Ruskin's Educational Experiment

Shannon R. Rogers (Dr. Michael Carignan) Department of History & Geography

The nineteenth-century art critic and scholar, John Ruskin played an important role in the publicization and democratization of British museums. Ruskin's work about and for the industrial working class helped to popularize the idea to use art and museums to educate them, which, according to the wealthy, was necessary for moral guidance. This project examines how Ruskin put his belief in the necessity of

an art education for the working class into practice. As an educator and a frequent traveler, Ruskin utilized his experience to craft a ‘curriculum’ or educational experiment targeted to the working class. This experiment manifested in a variety of different educational facets, most notably his museum in Sheffield and a series of pamphlets titled *Fors Clavigera*. Between the years of 1871 and 1879, Ruskin worked to develop both projects to create an effective education for the working class. Ruskin wanted to create an experience for the working class that would provide a comprehensive art education, equivalent to what the wealthy might receive while completing his Grand Tour. The Grand Tour was a travel experience for the European elite that considered Rome, Naples, and Greece among others important educational destinations. Having recognized that the working class did not have the funds or the ability to complete what was considered a necessary facet of an art education, Ruskin created an educational experiment that was unique for its time. The curation behind these educational efforts shows how Ruskin conceptualized a Grand Tour for the working class, and what objects he believed were necessary to build that framework. In Ruskin’s correspondence with his museum’s caretaker, Henry Swan, he reveals how his museum works with *Fors Clavigera* and how he intended to educate the working class.

Human Service Studies

The Effect of Outdoor Educational Programming on Resilience in a Global Pandemic

Katie P. Grinnell (Dr. Vanessa Drew-Branch) Department of Human Service Studies

The global challenges experienced in 2020, such as a global pandemic that has resulted in great loss of life, social restrictions, and devastating strains to the economy, increased the need for building skills around resilience. Outdoor experiential education is a pedagogical framework that promotes the development of prosocial skills and behaviors. This study aims to assess if outdoor experiential education promotes prosocial behaviors such as resilience. One definition of resilience shows that it is the capacity "to rebound from adversity strengthened and [be] more resourceful" (van Breda, 2018). Resilience is enhanced through connection or relatedness with others. Social connectedness and personal bonding strengthen resilience (Hitchens & Payne, 2017). This research uses community resilience sites to observe groups who have completed outdoor experiential education programs at Elon University. Fifth grade through eighth grade classes were observed at the experiential campus where Elon Challenge is based and the data was collected during a period of an hour in the middle of the facilitation. During observations, data was collected and analyzed across eight different behavioral categories. This research argues that outdoor experiences are spaces where resilience can be developed and practiced. The study results show the value of including outdoor experiential education as part of social work practices in order to promote prosocial behavior in clients. This research begins a critical conversation for future human service professionals interested in utilizing outdoor experiential education to assist clients experiencing chronic adversity develop prosocial behaviors such as resilience.

International & Global Studies

Cut, Copy, and Paste: The Examination of Gender Inequality through the Lens of Punk Rock*

Carson O. Davis-Tinnell (Dr. Sarah Glasco) Department of World Languages & Cultures and International & Global Studies Program

Since the 1970s, punk has been an aggressive, politically charged cultural force. Although punk seeks to deconstruct social injustices rooted in racial, gender, age-based, and class discrimination, it still perpetuates systemic inequalities at times. Through the development of an anti-authority ethic, cutting edge music, fashion, and mentality, punk both presents and challenges the hegemonic male perspectives that have dominated for centuries. Music within the punk scene was not the only thing that was produced by punks, it was also literature in the form of zines. Throughout punk's history, zines (and more specifically feminist zines) have served as creative outlets that give voice to the individuality, collective opinions, and actions of female-identifying punks exploring their identities. In-depth exploration of historical punk movements such as the Do-It-Yourself Girl Power and Riot Grrrl movements and the oppression of minorities therein provided evidence of combating gender inequality in mainstream, patriarchal culture via zines. I analyze scholarly articles as well as song lyrics, film, music videos, and zines to inform the creation of an original feminist zine titled, "How to Fuck the Patriarchy," a project that intends to make this gained knowledge accessible to both punk and non-punk audiences. Inspired by my own identity as a woman, I designed and produced this zine to critique the sexist cultural norms that society forces on women. This study reveals the gained knowledge by studying musical subcultures, DIY practices, and responses to cultural hegemony to understand the various political, social, and economic modes of resistance within the punk culture. Ultimately, the goal of this research is to show that punk's claims that society is equal and safe for all have ironically left some wondering if this subculture is yet another false hope of equality and instead, a space for cis white men to continue to hold all the power.

The Economics of Ethnicity: A Case Study of the Maasai and Batwa Peoples

Jordan Ennis (Dr. Waseem Bin-Kasim) Department of History & Geography and International & Global Studies Program

This research traces the solidification of ethnic groups and ethnic identity through the twentieth century as it applies to two indigenous groups in the African great lakes region – the Maasai and the Batwa. For the Maasai, traditionally nomads, the implementation of forced sedentarization has led to the degradation of their herds while creating the conditions for pastoralism being a defining factor of their identity and livelihood. For the Batwa, traditionally hunter-gatherers and forest dwellers, repeated marginalization and land dispossession have forced them into menial labor, begging, and microenterprises. In research focused on East Africa these groups have been overlooked, which has allowed for mistreatment to continue. This paper seeks to remedy this, arguing that the effects of colonial policy were cemented into post-independence society by national governments continuation of these discriminatory policies. It does so through the close analysis of primary source documents from colonial departments and secondary sources written by on-the-ground researchers. This paper concludes that the policies implemented by colonial powers have directly affected the economic identity of indigenous groups today, as it made livelihood synonymous with the indigenous group itself.

Living in the Background: Analyzing the Representation of Marginalized Identities in Predominantly White TV Shows*

Matisse A. Gilmore (Dr. Daniel M. Haygood) Department of Strategic Communications and International & Global Studies Program

Television show producers and outlets have strived to engage and promote content that is more inclusive and diverse, specifically focusing on promoting shows that feature a racially diverse lead

cast. Framing theory, which is an extension of the agenda-setting theory, focuses on the way the media presents certain aspects of reality and how these depictions can affect the public's perceived knowledge of this reality (Scheufele, 1999). This study analyzed the representation of marginalized identities in predominantly Caucasian television shows during the prime time line-up. By conducting this research, this study compared the representation of marginalized racial groups in television from 1996 with television from 2016. This research highlights the importance of proper representation in communication and media fields, which can provide media companies better insight into the benefits of reaching diverse audiences. By replicating the method of previous studies and comparing the results, this study indicated that there had been major progress in the overall representation of marginalized racial identities. Through a quantitative content analysis, this study found that there was some growth in the number of racial minorities that were represented on sitcoms during the prime time television syndication. Three shows from the 1996 television syndication and three shows from the 2016 television syndication were chosen and categorized. Each of the characters were recorded by their perceived race: Caucasian, African American, Asian, Latino, Middle Eastern, or Biracial. These characters were further categorized for different demographics: age, gender, perceived income level, and role prominence. Caucasian characters amounted to 90% (79) of the 88 characters recorded from 1996 content analysis. Caucasian characters only amounted to 56% (46) of the 81 characters recorded from the 2016 content analysis. Through this study, it was shown that there was a significant increase of marginalized identities that were represented in the 2016 television shows however, there were still some demographics that were rarely represented and some demographics that were stereotypically represented.

Gods, Gurus, and Ghouls: Jain and Hindu Devotion in Medieval Tamil Literature

Nicholas Hom (Dr. Amy Allocco) Department of Religious Studies and International & Global Studies Program

Scholars have traditionally approached Jain devotional practices, or *bhakti*, as a “borrowing” from Hindu traditions. John E. Cort (2002) argues that this formulation of *bhakti* limits our understanding of Jainism's role in the early development of *bhakti* within Indian religions. As the birthplace of *bhakti*, the Tamil-speaking region of South India is a fertile site for the investigation of developments in devotional movements across various contemporaneous religious and philosophical traditions. Medieval Tamil literature offers evidence of interreligious interactions between Jains and Hindus as well as of how thinkers from each of these communities put their distinctive stamps on the emerging devotional landscape. Both Jains and Hindus utilized indigenous conceptions of feminine sacred power to serve their own agendas, whether to heighten the glory of the Hindu god Shiva or to validate aspects of Jain doctrine. This paper compares the role of *bhakti* in Tamil Jain and Hindu literature and highlights the role of women and goddesses in Tamil intellectual and religious life. More specifically, it surveys the fifth-century Jain narrative epic poems *Cilappatikaram* and *Nilakeci* as well as the sixth-century poetry of the Hindu poet-saint Karaikkal Ammaiyar. Drawing on the theoretical insights of Catherine Bell (1998), I take a performance-centered approach to interpret the devotional ritual practices described in these texts. Bell's performance-centered approach to religious phenomena stresses the agency of ritual performers as active agents in cultural change rather than passive inheritors of a system. These three literary works center on the ritual performances of women and demonstrate the convergences and divergences of *bhakti* in Jain and Hindu traditions. In my analysis of the role of *bhakti* in these texts, I argue that the Jain authors of *Cilappatikaram* and *Nilakeci* stress complex ritualistic actions as the correct performance of *bhakti*, while the poetry of Karaikkal Ammaiyar emphasizes a form of spontaneous and ecstatic devotion towards Shiva.

Stereotypes and Perceptions of Humanitarian Workers

Megan E. Hutchinson (Dr. Thomas Arcaro) Department of Sociology & Anthropology and International & Global Studies Program

Humanitarian workers respond to crises generated by both human conflict and natural disasters, engaging in relief and development work to provide support for those who have been compromised and marginalized. This project sheds light on an abundance of stereotypes surrounding humanitarian workers and the work that they do. Various manifestations of the white savior complex (e.g., mission trips, voluntourism, and aid-based gap years) have allowed for the formation of these misperceptions about the work of humanitarians. These assumptions include, for example, that anyone can be a humanitarian; humanitarian workers are mostly from the Global North; and are all young, white, and Western. No studies to date have examined this specific phenomena, and no one academic field has previously staked a claim in humanitarian research, thus an interdisciplinary lens will be used with a heightened focus through the lens of sociology. Information gathered from an online survey given to Elon University students has been used to examine the prevalence of these stereotypes and assumptions among college-aged individuals living in the United States. The utilization of both qualitative and quantitative analysis on participant survey responses, as well as an exploratory approach to analyze correlations and relationships, will be used. This study, made up of 52 participant responses, found that female students from the Global North have a distorted perception of humanitarian workers, including where most humanitarians come from, the type of work that they do on a day-to-day basis, the skill level necessary to work in the humanitarian field, and a lack of general knowledge surrounding the humanitarian sector as a whole. Further data collection on the stereotypes of humanitarian workers has the potential to help those who work in the humanitarian sector to effectively combat these false assumptions and misperceptions and provide a safer environment for humanitarian workers to do their job.

Post-World War II Immigration Policies and Experiences of Muslim Women in Italy*

Grace A. Middleton (Dr. Andrea A. Sinn) Department of History & Geography and International & Global Studies Program

Italy, once a country of emigration, has now become one of the top immigration hubs in Europe. A wave of immigration from predominately Muslim countries has entered Italy starting in the 1980s, causing increasing backlash from right-wing Italian groups fearful that their country's national identity will change. Despite being the largest minority group in Italy, Muslims are still considered an "other" in Italian society. An increasing wave of anti-immigration sentiments has led to an environment of discrimination and separation. Despite Muslim female immigration to Italy being a fairly new phenomenon, scholars have taken an interest in the experience of these women, arguing that the way in which women exist in the world is unique and specific, and Muslim migrant women have quite different integration processes than their male counterparts. This is especially true in Italy where the rise of right-wing ideologies is threatening their status. Some scholars have focused on a comparative study between Moroccan and Pakistani Muslim migrant women, but failed to look specifically at their integration process, or at the factors that affect integration in Italy. This presentation will address the question: What are the main challenges faced by Muslim Moroccan and Pakistani women immigrating to Italy beginning in the 1980's and what factors best explain struggles of integration into Italian society? The research relies on primary sources such as interviews, memoirs, laws, policies, speeches and statistics. Research into Italian integration policy and the rise in anti-immigration political leadership, as well as research into Moroccan and Pakistani culture and politics, lead to the finding that

while Italy may treat its female Muslim population as a homogenous group, factors from the women's origin countries have profound, and differing, effects on their integration processes. Built upon interest started in International and Global Studies Senior Seminar, this research argues that there are different dynamics and levels of integration between Moroccan and Pakistani Muslim migrant women in Italy, despite their commonalities and uniform treatment from the Italian government.

Rise of Nationalism in Italy and Germany: Lega Nord and Alternative für Deutschland

Anna Van Jura (Dr. Safia Swimelar) Department of Political Science & Policy Studies and International & Global Studies Program

This research investigates the factors that best explain the rise of two far-right nationalist political parties, Alternative für Deutschland (AfD) in Germany and the Lega Nord (LN) in Italy. The project specifically examines the role of elite agency, specifically their public rhetoric, and immigration as possible non-competing explanations for the rise of these parties. There have been several events that illustrate a nationalist and sometimes populist trend in European liberal democracies such as the coming to power of a nationalist-populist coalition in Italy, a far-right party winning seats in the German parliament for the first time in 60 years, and the backlash to increased refugee flows across Europe during and since 2015. These events may reflect real or perceived shifts in the role nationalist political parties play in addressing various issues within their discourse. These allow nationalist and xenophobic attitudes and policies to flourish and the ability of these savvy nationalist political parties and their elites to influence public opinion and gain electoral power. Overall, these trends indicate a need for specific case study research delving deeper into the causes of rising nationalism; this research thus examines the rise of these political parties as one key indicator of nationalism. This research utilizes a qualitative approach of discourse and content analysis and interpretive analysis of speeches and immigration trends in order to best assess the factors that explain the electoral success of these parties. In using this methodology, my hypotheses are as follows: 1.) The AfD and LN have been able to gain electoral success due to their discourse, which reflects a strong lack of trust in their respective federal governments and the European Union, as well as due to the securitization of immigration; and 2.) As immigration trends move upwards—the number of refugees and number of asylum seekers rises—so does the electoral success of the AfD and LN.

Management & Entrepreneurship

ESG Practices and Company Debt Structure in the Chemical Industry

Moritz Lederer (Dr. Scott Hayward) Department of Management & Entrepreneurship

In the past decade, stakeholders expect companies to improve their environmental, social, and governance (ESG) performance. Not only do ESG initiatives benefit stakeholders directly, but research also suggests that firms with higher ESG performance may also have higher financial performance. These studies typically focus on firm profitability or stock performance. However, the mechanisms underlying this relationship remain an open question. Using novel data from Bloomberg Business Intelligence, this paper examines the impact of firm environmental and social performance on a firm's ability to raise capital from debtors. Anecdotal evidence suggests that, in the chemical industry, banks and other debtors are willing to offer lower-cost loans to “greener” firms. According to the American Chemistry Council, more than 96% of all manufactured goods are directly touched by chemistry, making the industry an essential link for a more sustainable economy. Thus, this paper hypothesizes

that a chemical firm's documented environmental and social performance will lead to a lower cost of debt or increased leverage (i.e., capitalization through debt rather than equity.) To test these hypotheses, I will create a panel of firms identified as Agricultural Chemicals, Basic & Diversified Chemicals, and Specialty Chemicals companies from 2015 to 2020. I plan to use a fixed effects regression model to test my central hypotheses. Through this paper, I hope to shed light on the role of debtholders in supporting business sustainability.

Marketing & International Business

The Impact of Integrity Versus Competence-Based Corporate Social Responsibility Violations and Repair Strategies on the Perceived Authenticity of the NBA

Kylee N. Hebert (Dr. Chris Nelson) Department of Marketing & International Business

This research investigates the negative impact of corporate social responsibility (CSR) violations on perceptions of the National Basketball Association's (NBA) authenticity and the strategies utilized to repair trust with its fans. We utilize a three vignette experiment approach with the first study providing evidence that NBA corporate social responsibility efforts are perceived to be more authentic than a competitor (National Football League) while also demonstrating the perceived authenticity of three different CSR efforts (community outreach, environmentalism, and diversity). We are currently in the process of collecting data for our final two studies. Study two proposes the magnitude of the negative effect on perceived authenticity caused by the CSR violation will be impacted by the type of CSR violation (competence-based vs. warmth-based). It is expected that warmth-based CSR violations will be more damaging to perceptions of the NBA's authenticity than competence-based CSR violations. The final study will apply three types of repair strategies (excuses, justifications, reticence) that can be implemented to address these CSR violations to repair trust. While it is common in practice to offer an excuse when there is a CSR violation, we propose that reticence will be a more effective strategy when a violation with a relatively low impact on perceived authenticity occurs and justifications will be a more effective strategy when a violation with a relatively high impact on perceived authenticity occurs. We build upon previous research that suggests that a league's perceived authenticity does impact consumer behaviors towards that league by developing a theory about the impact of CSR violations in professional sports and the subsequent strategies that can be utilized to repair trust. This will also offer valuable industry insights by providing a more complete understanding of how both positive and negative league actions can influence fans' perceptions of the league's authenticity and consequently trust.

Mathematics & Statistics

Association Between Fire-Related Particulate Matter Exposure and Childhood Asthma in Peru: A Burden of Disease Assessment

Sarah M. Austin (Dr. Mark Weaver) Department of Mathematics & Statistics

We explore the connection between exposure to particulate matter from forest fire emissions in the Peruvian Amazon and pediatric asthma incidence among children aged 0 to 19 years. The bulk of research and media coverage surrounding the Amazon Rainforest fires focuses primarily on important environmental issues, yet the impact that these fires have on the health of children remains

underexplored. $PM_{2.5}$, which are fine particles in the air that are two and a half microns or less in width, can cause asthma and other negative health effects in children. This is primarily because these fine particles can be inhaled deeply into the lungs, causing respiratory issues. To explore the connection described above, we aligned the following data sets in the statistical software, R: spatially gridded 2016 population data for Peru, pediatric asthma incidence, and gridded $PM_{2.5}$ emissions for various years. Following an approach similar to that described by Achakulwisut et al. (2019), we used a burden of disease assessment to estimate the number of pediatric asthma incidence cases attributable to ambient $PM_{2.5}$ exposure from forest fires in the Peruvian Amazon. Our model compares pediatric asthma burden between “typical” Amazon fire years (such as 2009) with a severe fire year (such as 2016) by applying $PM_{2.5}$ concentrations of those years to the same 2016 population. With our burden of disease model, we can estimate the burden of pediatric asthma incidence attributable to increased fire-related $PM_{2.5}$ in Peru. One iteration of this model provides an estimate and 95% uncertainty interval (UI) for the number of pediatric asthma cases in Peru due to excess $PM_{2.5}$. We used the Delta Method to approximate the variance of our complex function of random terms to create more accurate uncertainty intervals. Our results estimate that 75,160 [95% UI 28638, 121682] pediatric asthma incidence cases in 2016 were due to $PM_{2.5}$ emissions, whereas applying the 2009 $PM_{2.5}$ emissions data resulted in 9,636 [95% UI 5657, 13615] fewer attributable cases (a 12.8% reduction). Our results suggest that increased forest fire emissions lead to a significantly greater pediatric asthma burden in Peru.

Comparisons of Different Q-Q Plot Models on Viewer's Assessment of Normality

Sam B. Bacon (Dr. Laura Taylor) Department of Mathematics & Statistics

This research analyzes Quantile-Quantile (Q-Q) plot variations as tools for assessing distributions of small datasets. The validity of statistical analyses is predicated on data meeting certain criteria. Features including sample size, independence, and shape must be suitable for parametric statistical tests. Statisticians assess normality using formal and informal methods. Formal tests generate a numerical summary of the dataset and compare this summary to expected summaries for a theoretical, normally distributed version. While effective for large samples, traditional methods lose statistical power as size decreases. This research investigates the usefulness of Q-Q plots as normality assessment tools when classical tests become less effective. Current literature is optimistic about viewers' ability to identify non-Normal data using these visualizations. Previous comparative studies have asked participants to identify a non-Normal dataset out of several Q-Q plots. Researchers concluded that viewers detected non-normality more accurately than when using formal methods. My analysis expands on existing research by focusing solely on small sample sizes ($n = 20$) and considering multiple variations of plots, including versions with reference lines and confidence bands. 123 statistics professors and students were shown eight Q-Q plots with data generated from Normal, F, or Uniform populations and asked whether the data appeared to be normally distributed. Differences in response accuracy based on the three Q-Q plot variations were analyzed using χ^2 tests for homogeneity of proportions. Differences based on experience level were assessed using ANOVA procedures. Finally, plots containing outliers were paired with plots without outliers to assess how extreme values impacted interpretations of various distributions. Results from this investigation provide insight into what versions of Q-Q plots enable viewers to assess normality most accurately as well as contribute to the overall usefulness of these visualizations as normality assessment tools.

Using a Network Model to Control the Spread of an Infectious Disease on a College Campus with Contact Tracing

Christopher Boyette & Sarah Ruth Nicholls (Dr. Hwayeon Ryu, Dr. John Gemmer, & Dr. Kaitlin Hill) Department of Mathematics & Statistics

College campus environments provide a breeding ground for the spread of diseases due to students studying, living, and interacting in close proximity. To study this issue, a susceptible-infected-susceptible type model is studied on a dynamic, highly cliqued network to analyze the effect of contact tracing, quarantining, and asymptomatic testing on the spread of infectious disease. The network structure mirrors a college dormitory environment and utilizes measures taken by college campuses to limit disease transmission. Monte Carlo simulations are then conducted to determine the effectiveness of different control measures in a randomized setting. From these simulations, the critical quarantine threshold required to prevent disease spread is identified. Using conditional probabilities to determine the status of a node at a specific time, ordinary differential equations are developed and compared with a compartment model. The results of this study may provide insights into what type of policy could be implemented in a future epidemic situation.

Utilizing Machine Learning Methods to Solve Rubik's Cube

Kimberly J. Creel (Dr. Jeff Clark) Department of Mathematics & Statistics

In recent years there has been great progress in the development of machine learning and its applications to real-world problems that can't be solved using other methods. I will discuss possible methods of solving Rubik's cube, a popular combinatorial optimization problem. These types of problems contain a "best" solution that can be found from a set of many different possible solutions. These solutions can be found by using some popular methods of machine learning that solve difficult problems quickly and accurately. However, there are some issues posed by these methods. Given such a large number of possible configurations of Rubik's cube, computer memory remains an issue. In addition to this, while some machine learning methods specialize in finding solutions quickly, these methods are unlikely to find the "best" solution. These two issues are confronted and solved using methods derived from a popular branch of machine learning: reinforcement learning (RL). Not only can RL be used to effectively solve Rubik's cube, these methods can also be applied to other combinatorial optimization problems.

Modeling Disease Intervention Strategies on a Dynamic Small-world Network

Danielle DaSilva, Minato Hiraoka, & Malindi Whyte (Dr. Hwayeon Ryu, Dr. John Gemmer & Dr. Kaitlin Hill) Department of Mathematics & Statistics

We investigate the economic impacts of pharmaceutical and non-pharmaceutical interventions on a labor force during an epidemic. Specifically, a dynamic Susceptible-Infected-Vaccinated (SIV) type small world network model is utilized with the controls corresponding to vaccinations, lockdown orders, and other intervention strategies. The cost functional is a Cobb-Douglas production function quantifying labor productivity, which incorporates the cost of treating the disease. Monte-Carlo simulations are conducted on the network model whose results can be generalized to a system of differential equations. These equations are used to determine the optimal level of intervention via numerical simulations. The model results can be used to inform policymakers and better equip society for emerging epidemics.

Institutional Predictors of Completion Rate Among Colleges with Differing Percentages of First-Generation Students*

Eva R. Engel (Dr. Crista Arangala) Department of Mathematics & Statistics

First-generation college students, i.e., students whose parents did not attend or graduate from college, face many challenges to obtaining a college degree. These obstacles, which often include financial struggles and a lack of parental guidance, contribute to lower completion rates of first-generation students compared to non-first-generation students. While many studies have examined the student-level factors that influence completion rate, this study focused on institutional factors that impact completion rate for colleges and universities with differing percentages of first-generation college students. We used the US Department of Education College Scorecard data to explore the relationship of factors such as undergraduate enrollment, admission rate, financial aid, and college tuition on completion rate. We categorized colleges and universities into two subgroups; (1) colleges that have greater than the median percent of first-generation students (32%), and (2) colleges that have less than or equal to the median percent of first-generation students. We used Singular Value Decomposition to cluster similar colleges/universities and regression analysis to make predictions about the relationship between first-generation populations and completion rates for each of the two subgroups described above. For schools with a higher percentage of first-generation students, the regression analysis showed that an increase in factors such as undergraduate enrollment, tuition, and average faculty salary correlated with an increase in completion rate, while an increase in factors such as age upon entry, median debt of graduates, and the percentage of students with Pell Grants correlated with a decrease in completion rate. These results suggest that schools with higher percentages of first-generation students should consider increasing faculty salaries and reducing student debt, among other initiatives, in order to increase their graduation rates and better support first-generation students. Additionally, these actions may improve faculty retention and improve students' experiences in college. Though this study is limited to reporting the correlation between factors and does not have data on individual students, future research may build upon the methods used in this study to examine how to better support college students, particularly those who are first-generation.

Confronting Gerrymandering: Building the Foundation of a Research Program for Automating Fair Political Districting

Amy Moore (Dr. Todd Lee & Dr. Crista Arangala) Department of Mathematics & Statistics

The process of creating districts to be used in political elections in North Carolina, and in other states, has been a cause of concern for many years. This process is overseen by the state legislature and recently has frequently resulted in maps that are later declared unconstitutional. These maps have been gerrymandered or designed specifically to benefit one political party over another, disenfranchising voters across the state. This project creates a foundation of mathematical and computational tools for investigating automated district formation. This includes management of the census data at the block level via GIS software, the use of applied linear algebra techniques, metric geometry, and graph theory. Several automated districting strategies are explored, each focusing on an additional required aspect of political districts, incorporating equal population sizes, contiguity, and prioritization of existing legal subdivisions. This compendium will serve as the basis for my Elon research team to develop future work. In this presentation, I will discuss the methods used to clean the census dataset and describe the mathematical methods used for computing automated districtings.

An ODE Model of Yaws Elimination in Lihir Island, Papua New Guinea

Amy Moore, Presley Kimball, & Jacob Levenson (Dr. Dewey Taylor & Dr. Jan Rychtar)
Department of Mathematics & Statistics

Yaws is a chronic bacterial infection that affects mainly the skin, bone, and cartilage and spreads through skin-to-skin contact mostly between children. The new approval of a medication as treatment in 2012 has revived eradication efforts and now only a few known localized foci of infection remain. The World Health Organization strategy mandates an initial round of total community treatment (TCT) which involves a single dose of azithromycin given to all community members. The initial TCT is then followed either by further rounds of TCT or by rounds of total targeted treatment (TTT), a process of case-finding and treatment using single-dose azithromycin of active cases and their contacts. We develop a compartmental ODE model of yaws transmission and treatment for these scenarios. We solve for disease-free and endemic equilibria and also perform the stability analysis. We calibrate the model and validate its predictions on the data from Lihir Island in Papua New Guinea. We demonstrate that TTT strategy is efficient in preventing outbreaks but, due to the presence of asymptomatic latent cases, TTT will not eliminate yaws within a reasonable time frame. To achieve the 2030 eradication target, TCT should be applied instead.

Finding Representative Candidate Sets in Double-Interval Societies

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In approval voting instead of choosing one candidate, voters may select any candidate that they deem acceptable. To picture approval voting in application, imagine a student organization trying to schedule a required event that every member must attend and which must be held at least once in both the fall and the spring. Members of the organization vote by selecting two ranges of availability, one for each semester. For instance, one member might select October and November in the fall but only March in the spring. Mathematically, we can model such a scenario using sets of intervals on a number line by having each voter's preference consist of two disjoint intervals. We call this model a double-interval society. Analyzing these intervals, the organization can find a collection of dates so that each voter can attend at least one of the mandatory events. We call this collection a representative candidate set. Our goal was to develop an algorithm that finds small representative candidate sets by creating visual representations of double-interval societies to identify consistent, provable patterns for the given societies. Through our research, we discovered an algorithm that when applied to certain double-interval societies, produces a representative candidate set consisting of three candidates.

Analyzing Data on Confederate Symbols to Stimulate DEI Discussions in the Statistics Classroom*

John R. Ruggiero & Alexandra H. Lahetta (Dr. Kirstie Doehler) Department of Mathematics & Statistics

It is crucial to infuse lessons and conversations related to Diversity, Equity, and Inclusion (DEI) into the classroom. It should not be assumed that other instructors are taking the sole responsibility for infusing DEI education into the curriculum. Instructors in all disciplines, including mathematics and statistics, should be responsible for this. Statistics and data science are ideal disciplines to incorporate DEI-based assignments due to the presence of data sets that address these issues. We present details of a DEI-based coding lab assignment that was completed in an introductory statistics class. This lab involves the analysis of data on Confederate symbols from the Southern Poverty Law Center. As part

of the assignment, students investigated geographical and historical trends in the data. Goals of the lab included increasing statistical coding abilities and raising awareness of the historical and present-day issues associated with inequality. Data was collected from students before and after the DEI-based lab was completed. In the pre-and post-surveys, students responded to Likert scale and open-ended questions. The survey items covered historical knowledge and sentiment related to having race-related discussions in class. The post-survey also asked students about ways that the lab could be improved.

Mathematical Modeling of Dengue Fever Focusing on the Mosquito Life Cycle and Preventative Measures

Shannon E. Treacy (Dr. Karen Yokley) Department of Mathematics & Statistics

Dengue fever is a mosquito borne virus that can be caused by one of four serotypes. Humans can be infected after being bitten by an infectious mosquito, *Aedes Aegypti*, which is the principal mosquito that spreads the dengue virus. Although an infectious mosquito has to bite a human for a human to contract the virus, if a non-infected mosquito bites an infected human, the disease can be transferred to the mosquito. Dengue is prevalent in the Caribbean (including Puerto Rico), Central and South America, Southeast Asia, and the Pacific Islands. The ideal conditions for increased transmission of mosquito-borne diseases are crowding, deterioration in water and sewer, and substandard housing that results from uncontrolled urbanization. Other major factors that have led to the increase in transmission are due to the fact that there are currently only a few effective mosquito control techniques. Mathematical modeling has been effective for studying the movement and trends of many viruses, including dengue virus. Susceptible-infective-removed (SIR) modeling is especially useful for understanding epidemics, because it is used in order to understand how epidemics spread and the factors that may have led to the occurrence. Modeling will be done using a mathematical software, Mathematica, which will also be used to code and visualize various aspects of models relating to the question. Intervention techniques involving larvivorous fish were investigated. The implementation of the fish within the environment consistent with *Aedes Aegypti* decreased the larvae population as well as the susceptible population of the adult mosquitoes. Two methods of implementation were investigated. The first was implementing the fish for seven days and then modeling the rest of the month with no intervention. The second was implementing the fish for seven days, modeling the rest of the month with no intervention, and re-administering the fish for the first seven days of the second month. The fish were removed again after seven days and the rest of the year was modeled with no intervention. The simulations concluded that utilizing the larvivorous fish would decrease the number of susceptible adult mosquitoes, resulting in a decrease in the spread of dengue fever.

Music

Like a Rolling Stone: The Glorification of Drug Use in American Popular Music

Daniel O. Conley (Dr. Todd Coleman) Department of Music

Music has been an inseparable part of the human experience for millennia. It is a medium of expression in which the audience has the capacity to become as engaged as the performer, and within this engagement, music creates meaning for all its participants. As a result of the countercultural movement and psychedelic revolution of the Cold War era of American history, drug use became a popular element in the processes of songwriting, producing, and performing music. This trend quickly gained traction at the time and has since evolved alongside American popular culture; substances of

choice have cycled among subcultures as new genres emerged, creating a dynamic interplay between drugs and music that continues today. This research seeks to synthesize work completed by published experts on the topic and address questions of how the psychedelic revolution mainstreamed recreational drug use in popular music, how this trend has evolved in subsequent eras of popular music, why it has continued since its entrance into mainstream culture, and how its commercialization in the modern era of popular music has raised issues for the very essence of music-making.

Classical Gatekeeping: Racial Barriers to Success in American Opera*

Alyssa M. Meritt (Dr. Polly B. Cornelius) Department of Music

Opera has been present in American society since the early 1700s. For centuries, it has been a dramatic form of expression enjoyed by many. However, admirers of opera seldom comprehend that there have been people historically excluded from both enjoying and participating due to the political and social standings of the United States. Through close readings of peer-reviewed articles, reputable news sources, and current events in the American Opera field, this research seeks to address the question of why there is such a small percentage of Black Americans involved in American opera, while analyzing the evolution of the role of Black identities in relation to American opera over time. After a brief summary of what is recognized as the beginnings of opera in the world and how it entered the United States, an overview of the historical interactions between Black identities and the opera field in the United States is provided. Then, I compare racially motivated happenings from the 1900s opera scene to the current state of the field to show how negative racial sentiment has permeated the opera industry. I follow this with an outline of what is being done to rectify these racial inequities. Finally, I emphasize Gershwin's *Porgy and Bess*, specifically, its historical significance, the opportunity it presented to uplift Black American performers, and its problematic tokenization that may prevent some Black American opera singers from advancing within the industry. America's racist history has led to systemic barriers that exclude Black opera performers' participation and success in opera. Excluding people of lower socio-economic statuses, uplifting harmful stereotypes of Black Americans, and not often including Black Americans in administrative positions within the opera field perpetuates suppression. Although recent efforts through movements like "Black Lives Matter" have tried to address these issues, institutional racism continues in the American opera field. It is the hope that with this research, *Ain't Got Nothing* will only be a song and no longer represent the opportunity present for Black Americans who aspire to be in the field of Opera.

Preparing Future Musicians: Lesson Plans and Resources that Incorporate Music Theory into Middle and High School Ensemble Classrooms

Kaylee N. Therieau (Dr. Allison Wentz) Department of Music

American public schools' recent emphasis on STEM has negatively impacted student involvement in music classes. Although many schools incorporate the arts as well and have converted "STEM" to "STEAM," surveys show that 93% of Americans support arts education in schools, funding for and enrollment in music classes continue to decline. In an effort to increase student participation, many music programs focus on performing popular, contemporary music. Unfortunately, this tends to shift curricula away from topics such as music theory and sightreading, which are essential to obtaining music literacy. Omitting these crucial subjects disadvantages future college music students. In this paper, I outline past and current research in the field, including music education and music theory pedagogy methods and philosophies. I then present a series of lesson plans that aim to aid music educators with the incorporation of music theory into high school music ensemble classrooms. I base

the conceptual focus of the lessons on the results of an informal survey of undergraduate music theory instructors. Preliminary findings show that aural skills topics, such as sight-reading and melodic/harmonic dictation, are the most difficult for students to master. In response to these results, my lesson plans seamlessly incorporate listening activities, notation practice, and dictation exercises into topics that have traditionally excluded these skills. Moving forward, I will revise the lessons and resources based on feedback from seasoned high school and college educators, as well as trials in my future student teaching experience. These lessons will help music educators better prepare music students as well-rounded musicians who are fit to take on the challenges of a college music classroom.

Performing Arts

Intersectional Discrimination in Stage Management*

Brianna M. Boucher (Prof. David McGraw) Department of Performing Arts

The theatre industry is facing a reckoning, and it is time to break free from its elitist attitude and become more accessible. In this study I will be investigating historically marginalized groups in the stage management field, the discrimination they face, and how they intersect. Last semester I worked with Prof. McGraw to publish the 8th edition of the Stage Manager Survey, which received 1,449 responses from 26 countries over a three-week period. For my study I will be examining the 1,163 responses from American stage managers which can be analyzed based on age, disability, gender, race, and sexuality. Using the collected data I will look at demographics of the stage management industry as well as the observed and experienced workplace discrimination indicated by survey participants. Artists are demanding some long overdue systemic changes and presenting the data collected could help inspire some of that change. As a theatre student it is important for me to understand who is working in the industry, and why others are not getting the same opportunities. The conclusions of this study will shed light on historically marginalized groups being discriminated against in the field of stage management. In the summer of 2020, many leaders in the theatre industry made statements saying they were committed to creating opportunities for people from marginalized groups. I hope to conduct this research again with the next edition of the Stage Manager Survey in 2023 to evaluate if the theatre industry is moving in the right direction and is staying true to their word.

How COVID has Affected Women-Identifying Stage Managers Across the United States*

Hannah E. Brown (Prof. David McGraw) Department of Performing Arts

This study explores data from the Stage Management Survey, in particular the effects of the COVID-19 pandemic on women-identifying stage managers within the United States. The survey gathered first-hand knowledge from stage managers around the world about the state of the industry during the pandemic. The information allowed me to produce new insight on the pandemic's impact on women-identifying stage managers. I explored the likelihood of this demographic leaving the industry in the next 5 years and seeing how this correlates with the number of dependents they're supporting or other contributors factors. This will explore the expectation of gender norms within the performing arts community and will reveal the disparate impact of the COVID-19 pandemic on women-identifying stage managers.

The Politics of Dancing: A Study of Ballet as a Political Tool

Katie Jo Fulks (Prof. Jen Guy Metcalf) Department of Performing Arts

During their reign, leaders of the Soviet Union relied heavily on art censorship as a tool to further their political agenda. Specific messages were intentionally woven throughout each work of art, including dance. This research investigates the Soviet Union's use of ballet as political propaganda, popularizing Soviet ideals and lending expression to opinions that could not be voiced. By creating and utilizing a new dance analysis chart, this research explores how Soviet ballet choreographers attempted to shift, disrupt, and manipulate the perception of audience members, government leaders, and performers. Furthermore, a choreographic analysis of Soviet ballets served as a framework in designing a new choreographic work exploring today's political climate in the U.S. I am creating this work by drawing from my analysis of the underlying political motives and intentions behind ballets sponsored by the Soviet state. Following the performance of this work in early April, demographic and opinion surveys of audience members will be used as an essential element of my process to explore the perception, attitudes, and current trends surrounding partisanship as presented through dance. The findings from these surveys will aid in my goal of uncovering the role of ballet in influencing the perception of political and social ideologies in modern day America.

Creating an Optimal Performer: A Body Composition and Performance Analysis

Cassidy M. Perry (Prof. Renay Aumiller) Department of Performing Arts and (Dr. Takudzwa Madzima) Department of Exercise Sciences

Dancers have historically monitored their weight and body shape to optimize performance (Evans et al, 1985); however, this study aims to investigate correlations between a dancer's training, body composition, and overall performance. Dancers are unique athletes that require a system of assessment that incorporates both the aesthetic elements and physical vigor dance involves. The rationale for this study is the gap in research on dancers in general and more so, for non-ballet dancers (Koutedakis, 2018). Therefore, this study combines objective body measurements and performance analysis to capture dance in terms of aesthetics and functionality through a mixed methods approach. Professionally trained female dancers ($n=27$; age 19.59 ± 1.25 years; mean \pm SD) completed body composition (BIA), performance testing, and genre-neutral dance movement. Qualitative data were collected from nine dance professionals' scores of the performance using a rubric for specific criteria on a scale of 1 to 5. Data were analyzed via a one-way ANOVA to compare differences in outcome measures between dancers using the median relative lean mass (high relative lean mass: HLM, ≥ 15.77 kg and low relative lean mass: LLM, < 15.77 kg) and years of experience (MDN=16years) as comparison cut points with significance at $p < 0.05$. Right elbow flexion (HLM: 18.92 ± 3.4 kg, LLM: 16.73 ± 1.7 kg; $p = .046$) and all circumference measures except right and left arms 5 cm above joint and right and left calves 15 cm below joint were greater in HLM than LLM. Additionally, HLM scored lower on all dance performance criteria except grounded use of weight and clarity of stylistic choices. In conclusion, the data suggests that a higher amount of muscle relative to height does not support better dance performance. Though supplemental exercise training does increase fitness and reduce injury in dancers without inhibiting aesthetics, hypertrophy-focused routines may not be the preferred method of cross training (Koutedakis, 2018). In the future, researchers may delve deeper into this discrepancy between the objective measures which appear to favor more lean body mass and the subjective assessment which seems to disparage it.

A Balancing Act: Mediating Internal and External Conditions to Create a Holistic Repatterning Approach for Dancers

Madeleine R. Spence (Prof. Lauren Kearns) Department of Performing Arts

Dancers are artists, athletes, and individuals who often experience high-stress environments, which can take a toll on their physical and mental health. The primary focus of this research was to emphasize the significance of prioritizing pre-professional dancers' holistic wellbeing through a mixed-methods, multiple case study approach. Considering this, a three-pronged screening tool - assessing physical, mental, and nutritional practices - was developed to analyze the effectiveness of repatterning techniques. Repatterning describes rerouting habitual practices to establish efficient and intentional patterns of the body and mind. Through this approach, three dancers were educated on both internal factors and external factors in guided group sessions. Internally, the dancer must be fueled with enough food, rest, and mental energy to stay energized. Externally, the dancer must have awareness of technical alignment and correct muscle engagement. The guided group sessions incorporated internal and external repatterning methods with the purpose of improving their overall wellness. Internal repatterning incorporated mindfulness and nutrition education, while Pilates and Bartenieff Fundamentals techniques were used to facilitate external repatterning. Participants engaged in the three-pronged pre-screening, eight group education sessions, and the three-pronged post-screening. Based on initial findings from the qualitative data analysis, mindfulness education was most effective in the short term and the use of individualized feedback and peer interaction positively impacted the participants.

Negotiating Religion, Tradition, and Modernity in Post-19th Century Korean Seungmu Dance

Emily P. Wilbourne (Dr. Pamela Winfield) Department of Religious Studies and (Dr. Casey Avaunt) Department of Performing Arts

My research explores socio-cultural and religious themes surrounding *seungmu* ("Monk's Dance"), a dance tradition with roots in Korean Buddhism. This dance form, once exclusively performed by Buddhist monks in temple rituals, is performed today largely for entertainment, and is formally designated a secular folk dance. My research draws from historical sources and ethnographic fieldwork to analyze *seungmu's* transition from religious ritual to a secular dance, as well as emphasize how current *seungmu* practitioners perceive its status in contemporary Korea. What this research revealed was that, contrary to official modern descriptions, *seungmu* still retains its connection to Buddhism. My fieldwork involved semi-structured interviews with professional *seungmu* dancers and participant observation in *seungmu* classes in Busan, South Korea in the summer of 2021. Using this qualitative data, I analyze how modern *seungmu* dancers acknowledge the impact of the Japanese colonial period on *seungmu's* re/invention and note my embodied encounters with *seungmu* as a student of the form. *Seungmu* radically transformed during the twentieth century due to Western concepts of modernity and the Japanese colonial occupation of Korea from 1910-1945. I argue that *seungmu* became an important site for Korea's national identity construction following this colonial oppression and the trauma of the Korean War (1950-1953). As a part of its contribution to nation-building, the decision to distance *seungmu* from Buddhism was intentional; it isolated the dance as a cultural practice and elevated it from the social stigma associated with Buddhism in Korea since the start of the Joseon Dynasty (1398-1910). This research reveals that *seungmu* is unable to fully escape its Buddhist origins and can still function as a personal spiritual exercise for individuals. For the dancers I interviewed, it was a tool for catharsis, meditation, and spiritual connection, even though this is no longer an inherent part of the form. I assert that the present-day form of *seungmu* challenges the potential binary categorizations of

authentic versus contemporary and secular versus religious; ultimately, *seungmu* encompasses a complex modern identity. This contributes a dimension of *seungmu* that lies at the intersection of Korean Buddhism, nationalism, and the secularizing discourse of modernity.

Philosophy

Merleau-Ponty, Flesh, and Skin: One and the Same? A Phenomenological Approach*

Sydney D. Rogers (Dr. Ann Cahill) Department of Philosophy

Due to its being the philosophical field that centers and studies lived experiences, phenomenology requires the return to root experiences by engaging particular methodologies of “relearning to see” the world, aiming to highlight experience beyond ideological and scientific understandings. This effort challenges deep assumptions of our being in the world while, simultaneously, transforming the meaning of our experiences and structures of human existence. Situated in the phenomenological field, this project is a comparative analysis of Maurice Merleau-Ponty’s notion of flesh and the lived experience of skin. This research examines three primary sources—Merleau-Ponty’s *Phenomenology of Perception* and “The Intertwining—The Chiasm,” and Frantz Fanon’s *Black Skin, White Masks*. The first two texts highlight flesh as a zone of interaction, supporting the fundamental structure of distinction between entities in experience and perception. The third text, especially chapter five, “The Lived Experience of the Black Man,” introduces a critical perspective on the experience of skin, emphasizing the effects of the racialized gaze on the colonized body. Putting Merleau-Ponty’s notion of flesh and skin in conversation showcases the phenomenological conception of skin as a potential complement to flesh through its own phenomenological and ontological qualities. This research contributes to a growing body of literature including both general and critical perspectives of phenomenological experiences so as to encourage and invite more inclusive perspectives. Highlighting the potential for flesh and skin to be conceptualized as one and the same, this research explores this impact on our meaning of experience and, more fundamentally, our being in the world.

Physical Therapy Education

Effects of Aging while Dual-Tasking on Force Characteristics and Performance during Five-Times Sit-to-Stand Task

Katey Alberto, Deanna DeMarco, Albert Meyer, Sarah Henderson, & Brandi Wiltshire (Dr. Srikant Vallabhajosula) Department of Physical Therapy Education

The sit-to-stand (STS) movement is an important, routine task that may become more difficult with age (Fotoohabadi et al. 2010; Yamako et al. 2017). Understanding the role of fatigue on this movement can provide information on whether there are certain compensations or shifts in strategies that occur during repeated movements. This can be done by analyzing the five-time sit-to-stand task (FTSTS) which has proven to be a useful test in a clinical setting (Whitney et al. 2005). The purpose of our study was to examine the effect of aging on force characteristics during FTSTS while dual-tasking. Findings from this research can potentially allow health professionals to focus on factors that lead to decreased ability to perform the movement. 12 healthy young (age: 24.3[3.8] years) and 12 healthy older adults (age: 69.6[3.5] years) performed the FTSTS movement as fast as they could while counting backwards by threes simultaneously, with their feet placed on the force plates. Time to complete the task, concentric

(standing) and eccentric (sitting) impulse, and power to stand were computed. Force characteristics were normalized by bodyweight (BW). Independent samples t-tests were run. Older adults took significantly longer time to complete (10.9[1.02]s vs. 8.37[1.75]s for younger adults; $p < 0.01$), showed similar concentric impulse (.70[.19]BWs vs. .69[.27]BWs for younger adults; $p = .422$), similar eccentric impulse (.7[.21]BWs vs. .59[.22]BWs for younger adults; $p = .131$), and a similar power (.80[.24]BW m/s vs. .92[.15]BW m/s for younger adults; $p = .161$). These results tell us that there was no significant difference in the force dissipation over time between the groups during standing or sitting, however, younger adults were able to perform the movement more quickly while performing a cognitive task. This suggests that there is a difference in the ability to perform the movement between the two ages, but the difference cannot be attributed to force impulse. Other factors that could contribute to this difference could be muscle strength and/or activation patterns (Lummel et al. 2018). Therefore, research analyzing these factors and movement characteristics need to be explored to determine the source of performance differences.

Design and Research of Customized Cervical Brace for Recovery

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The design of the modern neck brace aids the healing of broken vertebrae in the focused region through rigid stabilization over a prolonged period of four weeks to six months. This rigid stabilization, however, frequently allows for new medical issues to emerge, including muscular degradation and stiffness, particularly if worn over longer periods of time. In response to these observations, we have developed a new system which maintains rigidity in crucial areas, but allows limited flexibility to move and exercise local muscle groups in a safe way, particularly as the patient heals. As such, the research presented here demonstrates the design of a modified cervical collar with added support for movement in a low-risk range of motion. Using the proven medical technique of progressive elasticity, the brace is regularly adjusted to provide wearers with the widest range of motion possible without compromising the healing process. Our prototype neck brace design is based on a modified Aspen Cervical Collar. These modifications focus on decreasing the resistance gradually so the patient is able to have more mobility in their neck. To do this, we deconstructed the chin support of the brace and incorporated elastic bands that can be stretched under tension. Depending on the process of the patient's recovery, the bands of different strengths can be used to either increase or decrease motion of the chin. Our initial observations show that prototypes allow the wearer to exercise their flexion muscles while still immobilizing the neck. Our prototype therefore represents a promising new step towards a more advanced and adaptable cervical collar design which can support patient healing and recovery.

Comparison Between Men and Women's Foot Force Distribution During a Pole Vault Approach

Madison K. George (Dr. Scott Wolter) Department of Physics, Engineering Programs and (Dr. Shefali Christopher) Department of Physical Therapy Education

Despite evidence that women's and men's feet react differently in dynamic loading such as jumping and landing, sports shoes are still designed without attention to women's specific foot kinetics. When specifically investigating the sport of pole vaulting, gender differentiating studies are limited to kinematic data and no research has measured foot forces during a pole vault approach. Therefore, the purpose of this case control study was to compare men and women's kinetics during a pole vault

approach to provide kinetic information relevant to the design of women's pole vaulting shoes (a.k.a. "spikes"). The participants (n=11) performed a pole vault approach while wearing inserts in their shoes that recorded forces. Average force percentages of women and men applied at the heel, midfoot, and forefoot over the approach were compared via an ANOVA analysis to determine significant differences between sexes. This study provides a methodology for determining user-specific shoe designs based on foot force allocation and contributes gender differentiable data to the footwear industry.

Materials Analysis and Energy Return of Pole Vault Spikes

Madison K. George (Dr. Scott Wolter) Department of Physics, Engineering Programs and (Dr. Shefali Christopher) Department of Physical Therapy Education

For the sport of pole vaulting, specific shoes (a.k.a. "spikes") are used to promote greater velocity and heighten performance. Existing studies have measured running shoe performance characteristics such as energy return, flexion, and hardness, but such research has not been pursued with pole vaulting spikes. This project included a materials analysis and an impact test of three pairs of modern pole vault spikes (Nike, Under Armour, and Adidas models) to provide comparisons of performance and construction for future design. Materials analyses were completed using an X-Ray imaging system to determine the internal structure of the shoes and density characteristics of materials. An impact test was completed on the heel cushion and the exterior shoe ball to compare energy return as a performance metric, with greater energy return corresponding to greater performance. This study provides material density information, internal structural design, and compares the energy return of current pole vault shoes to aid construction of future pole vault spikes.

Are There Differences in Running Kinematics When Running After Childbirth?

Raelyn E. McGarry (Dr. Shefali Christopher) Department of Physical Therapy Education

Studies have shown that up to 84% of women who return to running postpartum experience pain, however research on running after childbirth and studies investigating risk factors for running related pain postpartum are limited. Running kinetics can be affected by the biomechanical, musculoskeletal, and physiological changes that occur during pregnancy and childbirth. The study included 61 total participants, 29 nulliparous (C) and 32 postpartum (PP) women all between the ages of 18 and 41. The purpose of this study was to investigate differences in kinetic variables between healthy postpartum and nulliparous women. Participants completed three overground running trials across a 23m path with two force plates embedded in the floor. The speed for each trial was monitored using timing gates and had to be between 3.61 and 3.99 m/s to get accurate force readings. No participant was explicitly informed to hit the force plates to prevent alterations to their natural running gait. Force data was corrected for body weight to get comparable numbers between participants and is represented in newtons per body weight (N/BW). For statistical analysis, peak forces were analyzed, and the data was compared between groups using a two-tailed T-test. There was no significant difference in the impact force and the vertical loading rates (PP: 2.09[0.34] N/BW, C: 2.12[0.35] N/BW, p value = 0.74; PP: 62.3[22.5] N/BW*s, C: 72.7[23.6] N/BW*s, p value = 0.08) however there was a difference in the active force between groups (PP: 2.41[0.24] N/BW, C: 2.59[0.19] N/BW, p value = 0.002). PP and C groups had no statistical differences on a number of commonly assessed kinematic loading variables, however: the analyzed kinetic data suggests that postpartum women may be at higher risk for running related pain and injuries due to lower active force, which is the largest force detected during the foot strike event in a runner's gait. Clinicians might use this information to perform a running gait

evaluation before a postpartum runner returns to running to evaluate injury risk. There is more research that should be done to determine why active forces are lower in postpartum women.

Effectiveness of Mixed Reality and Virtual Reality in Obstacle Clearance

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Purpose and Background: Virtual Reality (VR) is a prominent tool that greatly aids physical therapy rehabilitation by using virtual obstacles that do not present a tripping hazard. Mixed reality (MR) is similar, emerging technology that incorporates computer generated virtual objects in the physical world. Studies have shown a benefit in VR and MR uses for individuals at considerable risk for falling, such as older adults or individuals with Parkinson's disease. However, MR has yet to be assessed compared to the standard of VR. The purpose of this study was to assess the difference in obstacle clearance between VR and MR environments. **Methods:** Twelve healthy, young participants crossed a virtual obstacle of 15" (38.1 cm) in both VR and MR environments. The chosen height represented the first step of a bus, a realistic obstacle in everyday life. Three trials were performed in each environment, measuring the height of the toe and heel of the leading and trailing foot as they cleared the obstacle. The height of reflective markers placed on the 2nd metatarsal and calcaneus of each foot were compared to a 15" object to measure participant clearance of the obstacle. For statistical analysis, paired samples t-tests were used to compare the VR and MR conditions. **Results:** No significant difference was observed in the peak toe clearance of lead leg (MR: 68.8±8.1cm, VR: 68.9±11.3cm; p=0.977), peak heel clearance of lead leg (MR: 67.0±4.6cm, VR: 66.4±7.1cm; p=0.752), peak toe clearance of trailing leg (MR: 52.9±15.7cm, VR: 68.9±11.3cm; p=0.079), and peak heel clearance of trailing leg (MR: 70.8±12.2cm, VR: 78.9±16.0cm; p=0.080). **Conclusion:** The results of this study show that both mixed and virtual reality produce similar results with no evidence of one being more effective than the other. Further research is needed to explore if mixed and virtual will continue to produce comparable results when tested at different obstacle heights.

Physics/Engineering

Biogeochemical Gases Emitted from Juncus Effusus in Artificial Wetlands

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Artificial wetlands have become increasingly popular as research has identified these as a means of improving water quality. Such engineered wetlands have been shown to provide additional benefits of flood mitigation, the desynchronization of storm rainfall and surface runoff, cycling of nutrients and other benefits to fish and wildlife. This project entails monitoring juncus effusus, a prominent type of wetland vegetation, in artificial wetland platforms using commercial gas sensors to develop a better understanding of the biogeochemical processes involved in converting harmful chemicals that find their way in water retention basins. Our research involves a dedicated study using fertilizer chemicals dispensed in a small 400 gallon water basin positioned near the Hampl Engineering Workshop. Two 3ft x 4ft x 8in floating platforms were set into the water basin: one platform containing 8 juncus effusus plants (that enables root growth through the porous polyethylene platform into the water basin) and the other containing only soil as an experimental control. An enclosure was placed over the vegetation and experimental control containing Vernier LabPro® sensors to monitor CO₂, humidity,

light intensity, temperature, and atmospheric pressure. Further, nitrate concentration from the fertilizer additive, water temperature and pH, and oxidation-reduction potential were monitored in the water basin via a YSI ProDSS water quality instrument. We will report on environmental factors and the influence of fertilizer chemicals on emitted biogeochemical gases.

Design and Research of Customized Cervical Brace for Recovery

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The design of the modern neck brace aids the healing of broken vertebrae in the focused region through rigid stabilization over a prolonged period of four weeks to six months. This rigid stabilization, however, frequently allows for new medical issues to emerge, including muscular degradation and stiffness, particularly if worn over longer periods of time. In response to these observations, we have developed a new system which maintains rigidity in crucial areas, but allows limited flexibility to move and exercise local muscle groups in a safe way, particularly as the patient heals. As such, the research presented here demonstrates the design of a modified cervical collar with added support for movement in a low-risk range of motion. Using the proven medical technique of progressive elasticity, the brace is regularly adjusted to provide wearers with the widest range of motion possible without compromising the healing process. Our prototype neck brace design is based on a modified Aspen Cervical Collar. These modifications focus on decreasing the resistance gradually so the patient is able to have more mobility in their neck. To do this, we deconstructed the chin support of the brace and incorporated elastic bands that can be stretched under tension. Depending on the process of the patient's recovery, the bands of different strengths can be used to either increase or decrease motion of the chin. Our initial observations show that prototypes allow the wearer to exercise their flexion muscles while still immobilizing the neck. Our prototype therefore represents a promising new step towards a more advanced and adaptable cervical collar design which can support patient healing and recovery.

The Thermophone Loudspeaker

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The thermophone is a mechanism that uses heat to create pressure waves, thus generating sound. While the invention has been around since 1898, it is not until recently that any major real-world applications have surged from the devices, due to current nanotechnology. In 2008, researchers found that running an electrical current through sheets of carbon nanotubes (CNTs) results in the production of sound waves. This differs from the traditional electromagnet speaker, in that there is no movement of materials or vibration creating the sound; it is all done by heat fluctuations. Researchers studying thermoacoustics are now working on different types of arrays of CNTs that could lead to a future with smaller, more inexpensive and environmentally friendly speakers. The frequency response of the device, however, limits its applications and proposes many design challenges in the area of speaker design. This is due to its inability to reproduce low frequencies efficiently. The goal of this project was to build a thermophone and improve the low-end frequency response of the device. We will be reporting background research findings and noting the design challenges in creating a thermophone loudspeaker.

“Wait...What is Engineering?”: Elementary Teacher and Student Perspectives of STEM Education in Alamance County*

Samantha R. Dominguez (Dr. Sirena Hargrove-Leak) Department of Physics, Engineering Programs

African American (AA) women have been chronically underrepresented in science, technology, engineering, and mathematics (STEM) fields. There is a recognized and growing need for diverse workforces; encouraging AA women to pursue higher education in STEM disciplines, specifically engineering, may be a first step towards addressing this issue. There are several factors that may contribute to women, especially AA women, not to pursue a STEM degree, such as stereotype threat, bias (conscious and unconscious), missing STEM identity, and disparities regarding lack of access in the academic environments. Interest in STEM among young girls makes a large drop after elementary age, so to better understand AA girls' experiences, this project sought to learn what these young women have access to in terms of STEM education, activities, and portrayal of STEM with emphasis on engineering and design. Teachers at four Alamance-Burlington School System (ABSS) elementary schools were surveyed and individually interviewed regarding their experiences teaching STEM and their perceptions of their students' behavior and attitude towards learning STEM topics. In addition, a focus group was conducted with a representative sample of girls in ABSS. The survey responses, interview transcripts and focus group notes were analyzed qualitatively using an open-coding framework. The combined results indicate the greatest need for engineering (curricular and extracurricular) is in grades 3 and 4. This work is closely aligned with Women in a Network of Discovery (WIND), a funded NSF project aimed at increasing the diversity of women participating in engineering in Alamance County. WIND is working to create a program of accessible extracurricular and experiential learning opportunities for minority females grades 3-12 in Alamance County. The findings from this research will be used to inform the creation of the WIND programs for young women in Alamance County and provide recommendations for improvement to the current STEM education resources available.

Optimization of Denitrifying Bioreactor Configuration for Reduction of Nitrate in Retention Ponds

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Standing water in stormwater retention ponds contains fertilizers from a variety of sources, such as agricultural, residential, and commercial areas. These fertilizers found in runoff water create an environment for abundant algae growth below the water's surface. Due to the concentration of nitrate found in fertilizers, they serve as a sufficient food source for algae to consume. Excessive algae growth leads to eutrophication, which then deprives the ecosystem below of oxygen. To reduce excess nitrate in runoff water retention ponds, the team developed a novel beneficial management practice (BMP) in the form of a bioreactor that contains naturally occurring denitrifying bacteria. Denitrifying bioreactors create an anaerobic environment where naturally occurring microbes convert nitrate into nitrogen gas (N_2). Through denitrification, harmful concentrations of nitrate can be removed from the stormwater retention pond, improving water quality downstream for ecosystems and human consumption. The group was tasked with designing and constructing a bioreactor that provides favorable conditions for the growth of denitrifying bacteria while using woodchips as the carbon source. The team varied several design factors to determine optimal configuration of the bioreactor. Variables included woodchip species, woodchip size, and biochar presence. From those design elements, nine different configurations were made and tested for ability to decrease nitrate levels. The team determined that

non-woven geotextile fabric would provide the necessary water flow through the bioreactor and maintain structural integrity while underwater. Amendments to the construction of the device were made to combat buoyancy and fully submerge the device in the water. Local woodchips made of mixed hardwood sourced from Elon University Physical Plant were used to mimic natural carbon food sources found in the local environment. A scaled prototype of the new BMP will be installed and monitored in a local retention pond, with an expectation of decreasing nitrate in the pond water. Widespread implementation of an effective treatment like this could lead to great reduction in excess nutrient levels in surface water bodies, drinking water, and both recreation and aquatic ecosystems throughout North Carolina.

Drug Diffusion Through Swellable Polymers

Tori Duenkel (Dr. Jonathan T. Su) Department of Physics, Engineering Programs

Reservoir implants for long-acting drug delivery devices typically involve a drug encapsulated within a polymer membrane. Reservoir devices have been developed for multiple applications where adherence is a challenge, including for HIV preexposure prophylaxis (PrEP) as an alternative to a daily oral pill. Development of these implants typically requires testing in vitro under ‘sink conditions’ whereby implants are placed in test media at 37°C so that the surroundings are 5 – 20 times the solubility limit. Because of the limited solubility of some drugs, this could require large amounts of test media. Therefore, surfactants or water/alcohol mixtures are often used to overcome this limitation. Our ongoing research addresses an important consideration, the presence of surfactants and their effect on drug diffusion through polymer membranes. In our work caffeine transport through 82A Shore A polyether thermoplastic polyurethane film (DT-2001-S Natural) was evaluated at 37°C under different solvent conditions: (i) PBS solution, 8mM SDS in PBS, (ii) 100mM SDS in PBS, (iii) 2%wt Koliphor ® HS15 (solutol) in PBS, and (iv) 10%wt Koliphor ® HS15 (solutol) in PBS. We have employed a PermeGear, Inc side-by-side cell to measure the rate of diffusion of the caffeine through the polymer membrane and a Nanodrop 2000 UV-vis spectrometer to test the concentration of caffeine in the acceptor chamber. We have observed that the presence of surfactant changes the rate at which drug diffuses through a polymer membrane, but the extent is currently unknown and will require further testing, potentially with HPLC.

Helicoil Detection within an Aluminum Core

Colleen Egan, Alex Hebert, Orlanzel Washington, & Jimmy Warren (Dr. Jonathan Su & Prof. Matthew Banks) Department of Physics, Engineering Programs

Through an ongoing partnership, the team has been working with AKG of America to determine a feasible and operational solution to an on-going quality control problem. AKG produces and distributes cast aluminum heat exchangers, which requires the crucial reinforcement of threaded holes through the placement of stainless steel helicoils.⁽¹⁾ The helicoils operate as a casing, within a drilled hole, that allows screws to securely fasten to a body during installation. Due to the lightweight construction of the helicoils, once inserted manually, it becomes difficult to detect these visually. Our task was to increase visibility by determining a way to track the installation of each individual helicoil. Extensive evaluation of potential solutions was conducted, while considering a predetermined list of criteria that should be considered in this process. After narrowing down our list, one solution was determined to be the best solution; however, determining a device is a small part of our solution. Our ongoing work involves the design and implementation of a workstation inside AKG’s factory demonstration of the manufacturing instrument that was chosen to ensure helicoil insertion. The strides

our team have made have provided the foundation for a successful project conclusion. This experience has also provided the team with business communication and problem-solving skills, highly relevant to our engineering careers.

Comparison Between Men and Women's Foot Force Distribution During a Pole Vault Approach

Madison K. George (Dr. Scott Wolter) Department of Physics, Engineering Programs and (Dr. Shefali Christopher) Department of Physical Therapy Education

Despite evidence that women's and men's feet react differently in dynamic loading such as jumping and landing, sports shoes are still designed without attention to women's specific foot kinetics. When specifically investigating the sport of pole vaulting, gender differentiating studies are limited to kinematic data and no research has measured foot forces during a pole vault approach. Therefore, the purpose of this case control study was to compare men and women's kinetics during a pole vault approach to provide kinetic information relevant to the design of women's pole vaulting shoes (a.k.a. "spikes"). The participants (n=11) performed a pole vault approach while wearing inserts in their shoes that recorded forces. Average force percentages of women and men applied at the heel, midfoot, and forefoot over the approach were compared via an ANOVA analysis to determine significant differences between sexes. This study provides a methodology for determining user-specific shoe designs based on foot force allocation and contributes gender differentiable data to the footwear industry.

Materials Analysis and Energy Return of Pole Vault Spikes

Madison K. George (Dr. Scott Wolter) Department of Physics, Engineering Programs and (Dr. Shefali Christopher) Department of Physical Therapy Education

For the sport of pole vaulting, specific shoes (a.k.a. "spikes") are used to promote greater velocity and heighten performance. Existing studies have measured running shoe performance characteristics such as energy return, flexion, and hardness, but such research has not been pursued with pole vaulting spikes. This project included a materials analysis and an impact test of three pairs of modern pole vault spikes (Nike, Under Armour, and Adidas models) to provide comparisons of performance and construction for future design. Materials analyses were completed using an X-Ray imaging system to determine the internal structure of the shoes and density characteristics of materials. An impact test was completed on the heel cushion and the exterior shoe ball to compare energy return as a performance metric, with greater energy return corresponding to greater performance. This study provides material density information, internal structural design, and compares the energy return of current pole vault shoes to aid construction of future pole vault spikes.

Constructed Floating Wetlands for Extreme Temperature Conditions

Madison K. George, Mallory R. Poff, Alexa D. Roveri, & D. Haydn Stucker (Dr. Jonathan Su & Dr. Bethany Brinkman) Department of Physics, Engineering Programs

Agricultural runoff, industrial runoff, and wastewater have caused an influx of harmful nutrients into wetland habitats, causing eutrophication, algae blooms, unintended death of native wildlife, and other forms of ecosystem destruction. The design and fabrication of Constructed Floating Wetlands (CFWs) have become a solution to reducing the effects of harmful chemicals in these affected bodies of water through natural reabsorption of harmful chemicals found in pesticides by the wetland plant species.

Few works demonstrate the precise material needs of floating wetlands stationed in various climatic environments. In this study, multiple materials (high porosity polyethylene, polyvinyl chloride, and polyurethane) were tested for mechanical decay using a stress-strain compression system and microscopic visual analysis was also done: before and after being placed in water and exposed to repeated freeze-thaw cycles, melting temperatures, and UV radiation, each for 14 days. Mass was measured before and after exposures to evaluate the caliber of absorption. Less change in stress/strain characteristics corresponded to better performance under the given conditions and less change in mass corresponded to greater long-term buoyancy potential. The most efficient material for CFWs out of the tested samples under each condition was determined. This project investigated longer-lasting materials for CFWs, contributed to the field of environmental engineering, and advanced current pollution prevention strategies.

Development of a Hands-On Statics Project for Large Student Enrollments

Alex J. Hebert II (Dr. Sirena Hargrove-Leak) Department of Physics, Engineering Programs

One learning objective in Engineering Mechanics: Statics is to calculate the center of gravity of composite bodies. Conducting these calculations is traditionally a difficult task for Static students. Therefore, a project has been developed for students to design and build a balance sculpture to complement the center of gravity and composite bodies lessons. Project submissions also include analytical calculations to accompany the physical artifacts with theoretical evidence that they work. The project has been successfully piloted in small classes (20-25 students). To broaden the potential audience for the project, this work aims to modify the project for implementation in larger classes by 1) shifting to a series of simple homework assignments to scaffold the design and build phase, and 2) implementing an electronic solution generator to make grading more efficient. Preliminary results show that a step-by-step design and build phase and Microsoft Excel spreadsheet can work well.

Methods for Characterizing Near Surface Defects on SiC Wafers

Harry Masker, Stratton Bacogorge, & William Tunis (Dr. Scott Wolter) Department of Physics, Engineering Programs and (Dr. Anthony Rizzuto) Department of Chemistry

Defects in the near surface (<100 nm) of semiconductor wafers can impact the performance and reliability of solid-state devices. The devices that are manufactured on these wafers rely on low defect concentrations as crystalline abnormalities can adversely affect the quality of epitaxial layers which can in-turn affect device electrical characteristics. Methods to characterize defects in the near surface should be non-destructive, non-contact, and automated to provide high throughput production capability. Further, candidate characterization methods should provide high spatial resolution to accurately determine defect location and size. In this presentation, we will report on the application of Raman Spectroscopy for characterizing the crystallinity in the near surface of silicon carbide wafers. This characterization technique exploits vibrational modes of scattered light to provide information regarding crystalline structure and associated defects. Typical Raman spectroscopy systems are capable of 1-micron spatial resolution while depth resolution can be adjusted by the incident angle of the laser source. Combined with the application of a motorized stepper stage, we will report on accurate location and quantitative measurement of the size and depth of subsurface damage. This is possible through studying variations in the sampling dwell time and incident laser spot size. The findings from this research will contribute to the development of characterization methods towards improving wafer surface characterization.

Digging Deeper into the Science Behind Skill Position Football Cleats

Caleb Ogunmola (Dr. Jonathan Su) Department of Physics, Engineering Programs

Research conducted in high school settings has shown that skill position athletes within the football realm are more likely to suffer lower extremity injuries compared to their counterparts, line athletes. Lower extremity injuries are occurring more frequently in youth and professional sports, putting athletes out of the game for extended periods. The literature also explores the effectiveness of different cleats and what features contribute to their efficacy. This study dives deeper into the roles certain types of cleats play in these factors. Are cleats being put on the market producing the desired need of the consumer by creating safe and effective cleats? Throughout this study, I examine and differentiate the different spikes and cleats that popular sports equipment companies use on their products. Edge cleats are the most popular throughout the football realm as they are considered as most effective for peak performance. But according to a study done at Texas Panhandle High School, of 3119 athletes who were injured, 2231 were using edge cleats. That is close to 72 percent. Furthermore, of the 42 athletes that suffered ACL injuries, 38 used edge cleats. This study challenges the efficacy of the most popular edge cleats and will investigate if these cleats increase performance enough to warrant the increased potential for injury. Throughout the spring semester at Elon, athletes will conduct drills such as the broad jump, vertical jump, 10-yard dash, and 5-10-5 agility drills to examine the effectiveness of three types of Under Armour edge cleats. Each trial is reproduced at least three times in randomized order to remove the influence of fatigue. Early research shows there is an opportunity for cleats (specifically edge) to be improved to maximize their effectiveness and the safety of athletes.

What is an Efficient Solar-Panel Design to Power a Mobile Cooling Unit and Meet Agricultural Standards for Small Farms?

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

The agriculture industry heavily contributes to greenhouse gas emissions, and in 2018, the EPA stated that U.S. agriculture contributed 9.9% of the country's total greenhouse gas emissions. However, agriculture does not only include the production of crops and raising of livestock. The farming and agriculture sector also rely heavily on transportation for products to go from "the farm to table." In addition, significant energy is required to store and refrigerate foods, to ensure food quality, longevity, and safety. Therefore, it would be beneficial to utilize renewable energy for the production, storage, and transportation of crops. By combining the need of a cleaner energy source and method to power refrigerated storage and transportation units, this study focuses on the design and construction of a solar-powered mobile cooling unit, specifically for small-scale farming. A survey was conducted December 2021 through February 2022 with 10 small farmers in the local Alamance County region to gather current information on how they currently store, refrigerate, and transport agricultural products. The majority stated that their product quality, diversity, and volume would all increase from accessible refrigeration. Early design work focused on the Internal Cooling System of the unit, previously designed by an engineering student a few years ago, which will be tested through a temperature and airflow study. Using this information, in addition to theoretical analysis of solar battery power sources, multiple solar-panel designs will undergo a series of tests to identify an effective configuration for a small trailer. The final design will be installed and housed at Loy Farm and a manual created, allowing for use by the Elon community, and future use in small farming communities.

Concrete Water Filtration

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According to the most recent publication on global access to clean water, more than 884 million people do not have access to safe drinking water. Therefore, it is necessary to invent an affordable, accessible, and renewable means of generating clean drinking water. Team CASA took it upon themselves to create a physical method of filtration that would fulfill this niche. After proper research, the utilization of concrete as a medium of filtration proved to be the best material to construct an inexpensive, efficient, and effective filtration device. These filtration devices have the ability for secondary and tertiary accomplishments useful in our everyday lives such as using concrete mixtures to make parking lots, walking paths, and designing runoff locations to prevent contaminated water from spreading to vulnerable locations. In the perusal of the most accurate results, we created several different cured mixtures varying in their composition of aggregate, concrete, and water. The mixture components were measured by a weight ratio with the goal of easy reproduction to aid the most demographically poor regions of the world. Each mixture was tested and the duration for the first drops of water to permeate through the concrete mixtures and the turbidity of the water was recorded. Given the observational results from the experiments, the most efficient results were recorded from the two different concrete mixtures. The first mixture was composed of 20% water, 20% aggregate, and 60% concrete and took 15 minutes and 33 seconds to filter through the first drop of water, the rate of which increased afterwards. The second was composed of 15% aggregate, 25% water, and 60% concrete, which took only 2 minutes and 31 seconds until the earliest drop fell. According to our current research there is a clear connection between the length of time of the first drop of water being filtered and the filtration efficiency. This connection will be explored in depth in future experiments. These results will be used to develop a larger, full-scale concrete water filter to help provide clean filtered water to struggling populations across the globe.

Universal Design: Integrating Empathy, Ethics, and Human-Centered Design Approaches in an Elon Engineering Course to Define Student Learning Goals

Emma F. Walker (Dr. Sirena Hargrove-Leak) Department of Physics

Engineering Design for Service (EGR 2210) is a required course in the Elon Engineering B.S. program. EGR 2210 aims to teach students about formal engineering design techniques so they can apply the design process to build helpful devices for clients in the local community. The present research focuses on enhancing the course by examining the following factors that affect student learning: 1) alignment of professional goals among students and the course, 2) alignment of project goals between students and teams, 3) instruction on the concept of universal design, and 4) the presence of an actual versus imagined client. By assessing the impact of these factors over the past three fall semesters (2019-2021), the learning experiences of students in Design for Service can be better understood by the researchers. It is important to ensure that the course Goals, Activities, Products, and Assessments align with each other, which are components that comprise the GAPA framework commonly used in assessments of learning outcomes. This framework was used to explore the extent to which students integrate universal design in their work, as evidenced by building empathy, ethical considerations, and human-centered design approaches. The researcher conducted a series of surveys and interviews with student participants and developed concept maps. These products show there is strong evidence that students have high team motivation and collaboration when professional and project goals align, universal design is taught, and teams get to work with an actual

client. This research demonstrates the utility of a project goals framework to define student-centered learning goals for an improved learning experience.

Simulating Gaseous Clouds in Galaxies Harboring Active Intermediate Mass Black Holes

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Information about intermediate mass black holes (IMBHs) can be used to gain a deeper insight into the early stages of our universe and how black holes evolve. Intermediate black holes are between one hundred and ten thousand times the mass of the sun. Dwarf galaxies, which are around 100 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 the early universe they are of interest to astronomers who try to understand universe evolution. These IMBHs serve as a test bed for understanding how IMBHs evolve into the supermassive variety found at the heart of massive galaxies. The RESolved Spectroscopy of a Local Volume (RESOLVE) survey is a dwarf dominated galaxy survey for which we have large amounts of emission line data. Emission line data consists of the intensity of unique wavelengths of light from specific elements, similar to an element's own fingerprint. Using ratios of different emission line strengths, diagnostic diagrams can be constructed to find actively-growing IMBHs. By comparing different ratios, we identified diagrams that are suitable for this purpose and present our findings. Having gained an understanding of diagnostic diagrams from observed data we have started taking a preliminary look at simulated data. Simulations of actively accreting black holes in galaxies are useful to understanding them, but many assumptions are often made, and physical parameters used in different simulations often lack observational constraints. These parameters include information about the black hole (e.g., mass) but also its surrounding environment (e.g., gas density). By understanding relationships between these physical parameters, the process of looking for IMBHs will become significantly easier. We also present preliminary results in understanding how emission line ratios predicted by changing these physical parameters manifest themselves on our diagnostic diagrams against the observational data in the RESOLVE survey.

Political Science & Policy Studies

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

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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. Our pre-analysis is pre-registered at <https://osf.io/hdex8/> and follows the PRISMA-P protocol for meta-analysis by Moher et al (2015). The pre-analysis plan lays out several key questions we hope to answer with this meta-analysis: 1) How has the use of each scale changed over time? 2) Does effect size vary based on type of pro-environmental behavior? 3) Which measure shows stronger correlation with behavior across cultures? 4) How has each measure's efficacy changed over time? 5) Are the measures sample-dependent? The pre-analysis plan also presents several hypotheses, when supported by the literature. H1: The NEP will be the weakest predictor of pro-

environmental behavior. H2: NEP and CNS will be weaker than EID in collectivist cultures based on work by Eom et al (2016). H3: 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. H4: All three have become weaker predictors over time as item language becomes less relevant or obsolete.

Juicio y Castigo: The Impact of the 2001 Argentine Financial Crisis on the National Justice and Reconciliation Agenda

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The last military dictatorship of Argentina – *El Proceso de Reorganización Nacional*, the National Reorganization Process – was in power from 1976 to 1983, during which the people of Argentina experienced a multitude of human rights violations. Thousands of families were affected, spending time during and after the dictatorship participating in social movements that called for the recognition of the atrocities committed by the military dictatorship. The slogan became “*juicio y castigo a todos los culpables*,” trials and punishment for all those guilty of human rights violations, for social movements, nongovernmental organizations, and the people of Argentina as a whole (Sikkink 2008). The reconciliation of human rights violations was at the top of Argentina’s political agenda throughout the 1980s and into the 2000s in order to gain back the trust that had been lost between the government and the people. Economic factors that started in the 1980s contributed to the financial crisis that unfolded in 2001, including the combination of defaulting on foreign debts and the backing of the peso to the United States dollar, which led to a prolonged period of recession in Argentina (Hornbeck 2002). Argentina experienced two significant events within 20 to 25 years of each other – the military dictatorship of 1976 and the financial crisis of 2001. This work seeks to demonstrate how Argentina’s political agenda was constrained by the financial crisis of 2001, given that the focus since the 1980s and 1990s had been on the national human rights reconciliation process after the conclusion of the last military dictatorship. Using both bottom-up and top-down approaches established by Alison Brysk (1993), this research examines the timeline of presidential administrations in Argentina, both by the governmental policies put in place and the interactions of states on an international level and by the work done by non-governmental organizations, social movements, and civil society to influence the agenda set out by the government at each point in time.

Gender Mainstreaming and Policy Framing: An Analysis of Spanish Labor Market Policy in the European Semester

Kara L. Friske (Dr. Joel Shelton) Department of Political Science & Policy Studies

Spanish labor market policies have not provided women access to employment opportunities that afford security and create equality. Existing literature shows that labor market policies view women in relation to the traditional gender norms and expectations they either do or do not satisfy. One helpful framework to understand policy framing is gender mainstreaming. Gender mainstreaming is a tool for policy transformation, one that focuses on deeper structural relationships between gender and other issues of inequality. The inclusion of gender mainstreaming in labor market policy has the potential to significantly impact what employment opportunities and conditions exist for Spanish women. The European Union has claimed they are prioritizing gender mainstreaming within policy development, a claim that is strongly critiqued within the literature. This research seeks to further evaluate this claim through content analysis, assessing the discussion and incorporation of gender mainstreaming in the European Union’s European Semester documents on Spanish labor market policies from 2013-2020.

The European Semester publishes five documents each year recommending social and economic policy for each member state. This unique combination of documents from the European Commission, the European Council, and the Kingdom of Spain allows for a deep scope of analysis. Ultimately, this research will assess the truth of the European Union's actual commitment to the implementation of gender mainstreaming and the transformation of Spanish gender relations.

Portraits of Extreme Wealth in Partisan Cable News Media

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In recent decades, scholars of political science have raised the alarm about the danger extreme wealth poses for democracy, accountability, and representation in the United States, yet the general public's understanding and attitudes towards extreme wealth do not reflect this reality. We argue that mass media, in particular, cable news media, is an important source of frames about the extremely wealthy, and that the frames present in cable news media are unlikely to shift the public's understanding of extreme wealth. Based on a systematic content analysis of Fox News and CNN's most highly-rated programming from 2010-2020, we present evidence that billionaires are frequently discussed in a negative light, on both channels. However, the negative frames favored by both channels do little to inform their audience of the effects of extreme wealth on elections, policy making, and society more broadly. Instead, the messages favored by both channels are more likely to foment affective polarization and resentment towards those with extreme wealth who hold opposing ideological or partisan attachments. The present study raises important questions about the responsibility of mass media to inform the public on extreme wealth, and about where substantive critiques of extreme wealth are likely to originate from, if not mass media.

Allow Me to Introduce Myself: Analysis of Senatorial Announcement Videos in the 2020 Election

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The advent of new technologies brings creative and groundbreaking shifts to political campaign strategy. A form of multimedia with minimal research is the creation of YouTube announcement videos, a resource-consuming endeavor. However, benefits can be great; perhaps the best example is Alexandria Occasio-Cortez's *The Courage to Change* video, which went viral with 1.48 million views as of May 2021. This project asks who makes announcement videos, what content they include, and whether announcement videos help yield a better electoral outcome through a joint quantitative and qualitative study. First, I run a content code of the announcement videos uploaded to YouTube for senatorial candidates running for office in 2020 under three lenses: appeals to gender, partisanship, and biography. My gender lens is reflected in the work performed by Carpinella and Bauer (2019), while my biography lens is designed around the work by Arbour and McGowen (2017), and my partisan appeals lens is established through research from Ridout and Fowler (2012). Then, I collect qualitative information about each individual race and candidate, such as the outcome of the election, controversy in the race, the age, race and gender of the candidate, etc. Using linear regression analyses, my research answers a variety of questions about announcement videos; appeals are often used multi-dimensionally and differently depending on gender and political party, visuals are used more frequently than audio appeals, and while the presence of a video does not correlate to successful electoral outcomes, they likely help candidates raise more money early on in a race. In a critical analysis of this data, this research contributes to a greater conversation regarding the future of strategic political campaigns and the use of complex, appeal-based narratives.

Democratic Backsliding in Hungary and the United States: The Role of Political Elite Strategic Narratives

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This project examines the extent to which political elite strategic narratives contribute to or exacerbate episodes of democratic backsliding across different political systems. Informed by the strategic narratives theoretical framework, this paper performs a qualitative content analysis of Hungarian Prime Minister Viktor Orban's and former US President Donald Trump's political discourse. By examining two political leaders who have drawn strong criticism for their illiberal rhetoric and practice, this project identifies the formation, projection, and reception of recurring strategic narratives. It then assesses the effects of these narratives on liberal democracy by way of process-tracing and examining changes in approval ratings, media coverage, policymaking, and public opinion. This project aids in the understanding of how and why both recent democracies and even longstanding, established democracies can weaken and regress backwards. Furthermore, it seeks to bridge gaps between the fields of political communication and comparative politics, asking questions of how actors are shaped by narratives in their cultural and social environment, and equally how actors can shape political order through narrative projection.

Presentation, the Media, and Perception: The Impact of Female Stereotypes on the Presidential Candidacies of Clinton, Fiorina, Warren, and Klobuchar

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Women obtained the right to vote in the United States just over one hundred years ago. Despite this and other improvements made in favor of women since the establishment of women's suffrage, there has yet to be a female president. There is also a vast underrepresentation of women in the United States Congress. Currently, one hundred twenty-seven women make up approximately twenty-four percent of the five hundred thirty-five seats in the 116th U.S. Congress. While thirty-five of the forty-five male presidents have served in Congress, not one woman from the same government body has been elected to the presidency. Given that the proportion of women is slightly higher than men in the United States, the underrepresentation of females in the national government is clear. While scholars have examined the ways female politicians present themselves according to gender stereotypes, there has been little to no research examining the broader picture of how the media may skew the candidates' own messaging regarding female stereotypes, therefore affecting voter perception. This project investigates the impact of female gender stereotypes on women running to be elected president by studying the candidate presentations, media demonstrations, and voter perceptions of Hillary Clinton, Carly Fiorina, Elizabeth Warren, and Amy Klobuchar in their campaigns. The researcher conducts this research through the use of qualitative content coding of various campaign, news, and talk-show media programming by analyzing and comparing the data on each candidate to reach a conclusion. Comprehensively, this project aims to discover if and how female stereotypes are addressed differently by candidates and the media, and if this phenomenon affects voting patterns for female primary presidential candidates.

Child Protective Services as Political Socialization: Investigating the Political Consequences of an Early Life Experience with Government*

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Intervention by social services should ideally be a positive moment in a child's life, improving the circumstances they grow up in. However, in practice, social services intervention has been used as a racist tool of control over poor families of color, targeting single black women, in particular (Roberts, 2017). For children that are removed from the home or who otherwise face social services interventions in their lives, what lessons about government are learned? We argue that for most of these children, contact with social services is a socializing experience that causes political distrust and alienation in young adulthood. We use the National Longitudinal Study of Adolescent Health (Add Health) dataset to investigate this possibility, applying coarsened exact matching to estimate the effect of early life contact with social services.

The Courts Through an Intersectional Lens: A Look at Experiences, Attitudes, and Roles*

Sara J. Moretti (Dr. Elisha Savchak-Trogdon) Department of Political Science & Policy Studies

President Biden's historic decision to nominate the first black woman to the Supreme Court of the United States represents only one of many steps that the President has taken to further diversify the bench, both under the current administration and in previous ones, all the way back to the Carter administration. Indeed, who judges are— what identities they possess—is important for scholars to understand in relation to their effects on decision-making, the institutional legitimacy of the courts, and opinion writing, among other things. Yet, such effects are irrelevant unless one understands the complexity of experiences, roles, and pathways that intersectional judges have undergone and fulfilled prior to becoming a judge. In other words, the personal experiences and attitudes of these diverse judges must first be explored in order to even begin to establish what this difference in perspective, if it exists, may actually encompass. This paper intends to focus on the gap in previous literature concerning the diversity of experiences, opinion, and attitudes intersectional judges have. To do so, I will expand upon a 1990 study by Martin on Carter era appointees and the way gender identity has shaped judges' perspectives and experiences. However, I intend to utilize an intersectional lens, one that studies the effects of both race and gender, to examine how the intersection of race and gender has shaped the various experiences, attitudes, roles, and pathways that intersectional judges have undergone prior to their judicial appointments. Such research is key to understanding the complex interaction between identities that inform the nature of intersectionality as the intersection of identities and not just the examination of discrete categories. By conducting a survey of all federal judges and a series of interviews with state and local judges, I will consider the experiences, attitudes, and roles of diverse judges as notable and worthy of inquiry in and for themselves.

The Messaging of Italy's Lega Nord: Regional Difference in Political Attitudes Towards Migrants

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While there has been much research done on the rise in the far-right, Italy's Northern League (LN) is a unique case that has not been examined fully with regards to their growth in Southern Italy. Their increase in popularity in the macro-region, though slow, is notable given the party's previous anti-Southern stance and rhetoric. Therefore, this research will focus on analyzing what methods of strategic messaging the LN utilizes, if and how that messaging differs between the regions, and if those differences are based off the differences in political attitudes between North and South. This will be done by means of a qualitative content analysis examining the Facebook and Twitter posts made by members of the Regional Councils (from their respective legislatures in place between 2015 and 2018)

for a regional analysis. This will be compared to posts made by the Chamber of Deputies and the Senate (both from Legislature XVII) for a deeper analysis of regional and national differences. Given the importance of immigration and migration policy to the Italian public, this study also will look specifically at social media posts regarding migration, migrants, and refugees to investigate if and how the LN's appeals differ based on geopolitical region. I hypothesize that there will be differences in messaging between the macro-regions and that those will be reflective of differences in political attitudes possessed by the domestic populations of each. Based on the analyses made, I hope to shed light on how far-right and populist parties target specific audiences in their messaging.

Repatriation Culture Today-Refugees, States and International Actors in Myanmar's Rohingya Refugee Crisis

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Repatriation culture, a term coined by Barnett and Finnemore, represented a shift in priorities by the United Nations High Commissioner for Refugees (UNHCR), to make the return to one's home country the most important focus for refugee resettlement. This change reflected not only internal organizational dynamics at UNHCR, but especially the interests from states seeking to control their own borders - not only the world's most powerful states, but states like Bangladesh. This paper explores if repatriation culture is still prevalent today in UNHCR's work on behalf of the Rohingya people of Myanmar. It also explores whether a policy preference for repatriation reflects UNHCR's priorities, the interests of Bangladesh and Myanmar, or a combination of organization and state influences. Repatriation has often been involuntarily forced upon refugees when conditions in their home country are not safe, violating nonrefoulement, the principle that no contracting member state of the 1951 Convention and 1967 Protocol should return a refugee to a country where they feel threatened. A case study is presented through the Rohingya minority in Myanmar, many of whom have fled into bordering Bangladesh to avoid genocide by their military. The Rohingya case is a decades-long example of a minority group facing violence at the hands of the state, whose identity has been stripped from them, rendering them stateless. Barnett and Finnemore find that repatriation culture within the UNHCR was a key driver of repatriation efforts in the 1990s. By comparison, in the contemporary phase of the Rohingya crisis (since 2017), while repatriation remains a key priority for Bangladesh and a focus of its bilateral relations with Myanmar, the UNHCR has played a less direct role. Multiple factors have limited UNHCR's involvement, including a harder position taken by Myanmar and the rise of new non-state actors whose interests do not align with repatriation. By its own sensitivity to past failures, the international community has become increasingly aware of the situation in Myanmar. The 2021 military coup that overthrew the quasi-democratic government has complicated negotiations further, leading to a one-year suspension of repatriation dialogues between Myanmar and Bangladesh, which resumed in February 2022.

The Effects of Stereotyping on Racial Disparities in Judicial System Outcomes and Public Policy Development*

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Significant racial disparities exist within the U.S. criminal justice system: Black Americans make up only 12% of the population, but represent over 40% of the correctional population (Criminal Justice Fact Sheet n.d.). Black people do not overwhelmingly commit crimes at higher rates; instead, implicit biases influence outcomes in the enforcement of the law and outcomes in the judicial system (Goff et al. 2014; Levinson, Smith, and Young 2013; National Research Council 2014; Young, Levinson, and

Sinnett 2014). United States law centers on the principle that defendants are innocent until proven guilty; however, studies have found that jurors have implicit associations of Black defendants with guilt before trial even begins (Eberhardt et al. 2004; Levinson, Cai, and Young 2010; Levinson, Smith, and Young 2013; Young, Levinson, and Sinnett 2014). Prior research has found that implicit biases and stereotypes can influence trial outcomes (Goff et al. 2014; Levinson, Smith, and Young 2013; National Research Council 2014; Young, Levinson, and Sinnett 2014). Some research has shown that racialized language, at times, has taken the place of direct, negative speech in reference to the race of defendants. Racialized language is language that calls upon and triggers race-based stereotyping without directly referencing race. This research analyzes the degree to which language used in trial could prime negative racial stereotypes, thus potentially influencing outcomes and sentencing. In order to examine this issue, I conducted a survey experiment with Elon University undergraduate students and had them participate in a mock trial to mimic how racialized language being used in trial and the race of the defendant influence trial outcomes. To determine the degree to which racialized language in trials influences juror decision-making, I utilized a control (Group 1) and a treatment group (Group 2) with and without racialized language. Additionally, I developed treatment groups that included photo-based racial primes to examine juror decision-making based upon differences in the race of the defendant (Groups 3 and 4). The surveying process is ongoing and results and empirical analysis are forthcoming.

The Securitization of Outer Space: How Presidential Narratives Explain Outer Space Security

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This research project examines the role of presidential narratives in American outer space security policy. The method of structured, focused comparison is utilized to evaluate how President Ronald Reagan and President George W. Bush developed narratives to introduce, explain, and promote their outer space policies. By focusing on these two presidential administrations, this project investigates how presidents within the same political party, who served two terms in office, differed based on international and domestic factors, their definition of American values, and their relationship with the media. Additionally, this project uses these two administrations to test the initial hypotheses that presidents during and after the Cold War will have different space policies and utilize different narratives because the international system will have changed from bipolar to multipolar. Initial findings suggest that President Reagan deployed narratives centered upon American exceptionalism, highlighting the notion that Americans surmount adversity because that is who they are as a people and nation. President Reagan used this narrative to garner support for his outer space policies including the Strategic Defense Initiative, the International Space Station, and the space shuttle program. President Bush, conversely, used strong faith-based language to discuss his space policies, according to initial findings. This Christian narrative was enacted while Bush enacted his space policies, from the years following the September 11 attacks to the Columbia explosion to the introduction of his space initiative to get a man to Mars.

Rise of Nationalism in Italy and Germany: Lega Nord and Alternative for Deutschland

Anna Van Jura (Dr. Safia Swimelar) Department of Political Science & Policy Studies and International & Global Studies Program

This research investigates the factors that best explain the rise of two far-right nationalist political parties, Alternative für Deutschland (AfD) in Germany and the Lega Nord (LN) in Italy. The project specifically examines the role of elite agency, specifically their public rhetoric, and immigration as

possible non-competing explanations for the rise of these parties. There have been several events that illustrate a nationalist and sometimes populist trend in European liberal democracies such as the coming to power of a nationalist-populist coalition in Italy, a far-right party winning seats in the German parliament for the first time in 60 years, and the backlash to increased refugee flows across Europe during and since 2015. These events may reflect real or perceived shifts in the role nationalist political parties play in addressing various issues within their discourse. These allow nationalist and xenophobic attitudes and policies to flourish and the ability of these savvy nationalist political parties and their elites to influence public opinion and gain electoral power. Overall, these trends indicate a need for specific case study research delving deeper into the causes of rising nationalism; this research thus examines the rise of these political parties as one key indicator of nationalism. This research utilizes a qualitative approach of discourse and content analysis and interpretive analysis of speeches and immigration trends in order to best assess the factors that explain the electoral success of these parties. In using this methodology, my hypotheses are as follows: 1.) The AfD and LN have been able to gain electoral success due to their discourse, which reflects a strong lack of trust in their respective federal governments and the European Union, as well as due to the securitization of immigration; and 2.) As immigration trends move upwards—the number of refugees and number of asylum seekers rises—so does the electoral success of the AfD and LN.

Psychology

Be Your Selfie: A Qualitative Content Analysis Exploring How Young Adults Evaluate Their Instagram Profiles

Courtney E. Abruzzo & Sophia DeMelo (Dr. Ilyssa Salomon) Department of Psychology

A growing body of research suggests that social media use is associated with negative body-related outcomes (e.g., Holland & Tiggemann, 2016). Social media platforms popular among young adults (i.e., Instagram) are based on viewing and sharing photos and videos. Existing evidence suggests that people post on social media with their audience in mind, which may represent a form of self-objectification (Manago et al., 2008; Salomon & Brown, 2020). Self-objectification occurs when people internalize an outside, evaluative perspective toward themselves, which can lead to body dissatisfaction and appearance anxiety (APA, 2007, Fredrickson & Roberts, 1997). It is likely that social media users encounter objectifying content that reinforces the importance of physical appearance and increases self-objectification (Feltman & Szymanski, 2021; Meier & Gray, 2014). Our study explores how young adults described their own Instagram profiles when asked to evaluate them from the perspective of outsiders: the board members of a company searching for someone to represent their brand. Specifically, we are conducting a qualitative content analysis to explore how often young adults referenced their physical appearance when evaluating their Instagram profiles and whether references to their physical appearance were positive, negative, or neutral in valence. All coding will occur independently across the spring semester and Krippendorff's alpha will be used to calculate inter-rater reliability. Participants were a sample of college students (N = 383; M age = 19.38, SD age = 1.64; 90 men, 287 women, 6 missing/preferred not to say) from a public university located in Kentucky. As part of a larger study, participants opened Instagram on their phones and answered an open-ended prompt asking them to evaluate their profile from an outside perspective. The findings of the qualitative content analysis will shed light on the experiences of young adults on image-focused social media platforms like Instagram. Preliminary results of the qualitative content analysis and potential implications will be presented.

Cross-Cultural Relations of Positive Parenting with Child Emotion Regulation, Self-Efficacy Beliefs about Emotion Regulation, and Prosocial Behaviors

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Positive parenting has been linked to beneficial child outcomes including prosocial behaviors, positive adjustment to new situations, and decreases in severity of behavioral problems. Despite these known benefits, there is relatively little research on positive parenting across cultures. One study found a reciprocal relation between positive parenting and child prosocial behavior in children from eight countries (Pastorelli et al., 2015). The current study expands on this literature by examining the relation between positive parenting and adolescent emotion regulation, self-efficacy about emotion regulation, and prosocial behaviors. Our sample includes 569 mother-child dyads from three countries and six subgroups—Italy (Napoletano, Roman), United States (White, Black, Latinx), and Colombia. These countries were selected because of diverse socio-demographical features expected to impact parenting practices and child well-being (Di Giunta et al., 2018). Approximately 45 percent of the youth sample was female and their average age was 13 years ($SD = 4.37$). The relations between (1) positive parenting and child emotion regulation of positive emotions ranged from $r_s = -0.18$ to 0.20 , (2) positive parenting and self-efficacy beliefs about positive emotion regulation ranged from $r_s = -0.09$ to 0.18 , and (3) positive parenting and prosocial behaviors ranged from $r_s = 0.22$ to 0.46 . Stronger correlations occurred for positive parenting and prosocial behavior in U.S. White and U.S. Latinx participants, while stronger correlations between positive parenting and emotion regulation of positive emotions occurred in Napoletano and Colombian participants. Correlations between positive parenting and child emotion regulation of positive emotions were statistically different between Colombian and Napoletano as well as between Colombian and U.S. White participants. The correlation between positive parenting and child emotion regulation of positive emotions was small and negative in Colombian participants whereas the relation was small to moderately positive in Napoletano and U.S. White participants. To better understand these relations, we gathered quantitative and qualitative data from parenting experts from three countries ($n = 26$ U.S.; $n = 5$ Italy; $n = 1$ Colombia) regarding the normativeness of positive parenting, positive emotions, and positive relationships in each country. This expert data will be used to interpret our findings in culturally informed ways.

Body Image Disorders in Relation to Perfectionism

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This study draws attention to meaningful connections between body image disorders and individuals with an obsessive-compulsive personality type, a trait often referred to as perfectionism. Past literature has highlighted the comorbidity between a negative view of physical self and perfectionism, but most has focused on the self-critical, rigid and ruminating aspects of perfectionism. Our study adds to the literature by incorporating the narcissistic element of perfectionism, a component we believe is essential for the full understanding of this construct. In our study, we use Q methodology, a method that mixes quantitative and qualitative elements of analysis and is particularly well-designed for the study of personality patterns and extracting subjective viewpoints. The sample consisted of 29 female undergraduate students from Elon University. Participants filled out two surveys, one about demographics and the Body Appreciation Scale survey, then completed both parts of the Q-sort. They first placed 66 statements about perfectionism into three general categories: like, unlike, or neutral. Then, they placed each statement on a scale from -5 (least like me) to $+5$ (most like me). This process was followed by a one-on-one discussion with each participant to have them explain why they put certain statements on the extreme ends. Our results indicate two distinct factors that different

participants endorsed. Factor 1 shows a pattern of perfectionist responses in participants with low Body Appreciation Scale scores. Factor 2 shows a pattern of non-perfectionist responses in participants with high Body Appreciation Scale Scores. Those who have high Body Appreciation Scale scores can still have perfectionist tendencies, however it is extremely rare for someone with a low Body Appreciation Scale score to not have perfectionist tendencies. The current study confirms the findings of previous studies while adding value to the added construct of narcissism as well.

The Roles of Religious Beliefs and Coping Mechanisms on Beliefs Surrounding the COVID-19 Pandemic

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Currently, research is very limited on COVID-19 and the strong opinions that people hold about the restrictions and ideologies that surround it, since both the pandemic and its associated guidelines are still relatively new. Americans across the country have had a wide variety of reactions to these restrictions. One possible reason for these differing responses is religiosity. In the current study, it was hypothesized that religion would be negatively related to one's stance, or how accepting one is towards the pandemic regulations, as well as positively related to better mental health. It was also hypothesized that more positive and accepting stances towards the COVID-19 restrictions would be correlated with better mental health outcomes, better mood, and lower levels of neuroticism. For the purpose of this study, level of religiosity was defined by the frequency of attendance at religious events prior to the pandemic. Depression levels, anxiety levels, and neuroticism were also assessed. A sample consisting of 888 adults completed an online Qualtrics survey, administered during April-May of 2020, while many Americans were in the height of quarantine. The sample was comprised of 84.5% women and 89.8% White respondents. Additionally, over 80% of the participants identified as heterosexual. Results showed that participants' religiosity levels were not correlated with stance on pandemic restrictions as predicted. Results did suggest that more positive stances towards the pandemic were related to lower neuroticism levels and lower anxiety and depression levels. Higher levels of religiosity were found to be related to higher age, higher levels of education, lower levels of same-sex attraction, and lower levels of depression. These findings are important – understanding the relationship between religious backgrounds, stance on the pandemic, and mental health during quarantine could potentially expand options for treatments and therapies relating to mental health problems that are exacerbated by isolation.

Evidence for Stress-Induced Grooming in Ants

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In vertebrates (animals with backbones, such as mammals), uncomfortable or unpleasant situations cause stress, which elicits self-grooming behavior. This type of grooming is referred to as displacement grooming. Invertebrates (animals without backbones, such as insects) also show self-grooming behavior, although it is unclear whether this reflects a response to stress (suggesting cognitive abilities) or a reflexive cleaning response. This study examined displacement grooming in western harvester ants (*Pogonomyrmex occidentalis*) following exposure to an acute stressor: a vortex, which is an instrument typically used for mixing liquids that rapidly shakes objects. We hypothesized that ants that underwent 60 sec. of vigorous shaking in a plastic container would be more likely to participate in extended bouts of displacement grooming relative to animals that were undisturbed or handled without shaking. Individual animals were placed in a "testing container" and recorded for 310 sec. Animals were then removed from the testing container and given 60 sec of exposure to a vortex with shaking (group

“vortexed”) or without shaking (group “handled”), after which they were returned to their testing containers and recorded for an additional 310 sec. Other animals (group “undisturbed”) were left in the testing container for a total of 780 sec and were not removed. Videos were then analyzed for the presence of grooming behavior and scored as either showing “no” grooming, “brief” grooming (all bouts < 5 sec), or “extended” grooming (any bout \geq 5 sec). Undisturbed animals mostly showed “brief” ($n = 8$) or “no” ($n = 7$) grooming, and rarely “extended” grooming ($n = 1$). Handled animals mostly showed “brief” ($n = 9$) grooming, and less often showed “extended” behavior ($n = 4$), or “no” ($n = 3$) grooming. Vortexed animals mostly showed “extended” grooming ($n = 12$), and less often showed “brief” ($n = 3$) or “no” ($n = 3$) grooming. These findings suggest that placement in a novel context (the “testing container”) is sufficient to provoke displacement grooming, however exposure to an acute stressor generates more extensive grooming behavior than exposure to a novel context alone. This suggests that invertebrates demonstrate similar responses to acute stressors as vertebrates.

Caffeine and Anxiety on a College Campus During the COVID-19 Pandemic

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Caffeine is the most widely consumed psychoactive substance (Agoston et al., 2018). Caffeinated beverages, namely coffee and energy drinks, are widespread on college campuses (Mahoney et al., 2019), as students have been shown to consume caffeine for a variety of reasons (e.g., to increase perceived academic performance, for social engagement, and a likeness for taste). More broadly, the academic and social demands of a college environment introduce pressures to perform well and connect with new people. In response to COVID-19, undergraduate institutions transitioned to a combination of in-person, hybrid, and online instruction during the 2020-2021 academic year, raising questions regarding how the pandemic complicated learning. The primary aim of the present study was to examine differences in caffeine consumption among a private university’s student population. It was hypothesized that caffeine consumed to increase academic alertness would look different across different learning modalities. Additionally, it was hypothesized that caffeine consumed for social engagement purposes would be different as well. To accomplish a secondary, more exploratory aim, connections between caffeine and self-reported anxiety were also investigated. 371 students were recruited through convenience sampling, snowball recruitment, and an online participant pool within the University’s psychology department. Participants completed a series of four online questionnaires to measure caffeine consumption, motivations for caffeine consumption, and self-reported anxiety. No significant differences between caffeine consumption and the number of online [$F(5,362) = 0.79$, $p = 0.56$], hybrid [$F(5,363) = 0.37$, $p = 0.87$], or in-person [$F(5,364) = 0.23$, $p = 0.95$] classes were found. Therefore, hypotheses regarding different learning modalities as a response to the pandemic were unsupported. However, the results do suggest a positive linear relationship between anxiety and caffeine consumption [$F(1,352) = 12.58$, $p < 0.01$], association also demonstrated within pre-existing literature (Jerome & Hire, 1978; Richards & Smith, 2015; Velebar & Templer, 1984). The implications of this study are twofold: results confirm a previously supported link between caffeine consumption and anxiety, and a lack of significant differences in caffeine consumption across learning modalities in the context of COVID-19 suggests a non-effect the pandemic had on college students.

Self-Compassion, Perceived Organizational Support, and Psychological Responses to Sport Injury in Collegiate Student-Athletes

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This study examined how self-compassion and perceived organizational support affect psychological responses to sport injury in collegiate student-athletes. One hundred and six NCAA student-athletes (35 male, 71 female) who suffered an injury during their collegiate career participated. Self-report data on self-compassion, perceived organizational support (POS), and psychological responses to sport injury (such as feeling isolated when injured) were collected via an online survey on the Qualtrics platform. It was predicted that student-athletes who reported higher levels of self-compassion would have more positive psychological responses to sport injury (Hypothesis 1) and that student-athletes who reported having higher POS of their athletic department would have more positive psychological responses to sport injury (Hypothesis 2). Although neither hypothesis was supported, exploratory follow-up analyses found significant correlations between recovery time and psychological difficulty of injury, severity of injury, and time to return to sport. Limitations of the study and suggestions for future research are discussed.

Impression Updating: The Role of Change Detection and Recollection in Associative Memory for Face-Adjective Pairs

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Some types of memory become poorer, even in healthy aging, including associative memory—the ability to link pieces of information together. This negatively affects daily living, and may affect social interactions, such as impression formation and updating. This could lead to consequences ranging from mild discomfort to vulnerability to manipulation. This study investigated young and older adults' memory for changed associations between faces and adjectives. Participants were presented pictures of faces paired with adjectives that described positively- or negatively-valenced attributes (e.g., honest, cowardly). In Phase 1, participants studied 36 face-adjective pairs for 8 seconds each and provided initial impressions of the face-adjective association on a 6-point scale from very negative (1) to very positive (6). In Phase 2, participants were shown 48 face-adjective pairs and reported whether each face-adjective pair was the same as in Phase 1, changed from Phase 1 (in which case they were asked to recall the original adjective), or new. 'Same' pairs = a face presented with the same adjective again, 'changed' pairs = a previously seen face paired with a new adjective, and 'new' pairs = previously unseen faces and unseen adjectives. In the test phase, participants viewed each face and attempted to recall the Phase 2 adjective. They then reported whether they remembered a change in the adjective across Phases 1 and 2, and provided another impression rating on the 6-point scale. Results indicate that age differences in change detection and impression ratings depended on the valence of the updated adjective: when the second adjective was negative (and had previously been positive), older adults detected the adjective change more often than when the second adjective changed from negative to positive, yet their impression ratings for those faces changed more positively than younger adults'. Findings suggest that older adults may misremember past attributes as positive, regardless of actual valence. These findings provide insight on the role of associative memory in social interactions, particularly regarding the extent to which individuals have the capability to update first impressions of the people they meet, and how older adults may show an impaired ability to update impressions accurately.

Alibi Believability and Judicial Instructions: The Role of Inculpatory and Exculpatory Evidence

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

Alibi claims can be supported by exculpatory evidence that suggests the defendant did not commit the crime. Exculpatory evidence that is difficult to fabricate, like videos, can increase alibi believability ratings (Olson & Wells, 2004). Inculpatory evidence like eyewitness (Culhane & Hosch, 2004) or DNA evidence (Ribeiro et al., 2020) that suggests the defendant was the perpetrator tends to increase guilty verdicts. Another factor that may affect views of alibis is the judge's instructions to the jury. Jurors typically find judges' instructions difficult to understand and do not follow the instructions appropriately (Pickel, 1995). To date, no researchers have studied judicial instructions related to alibis. Alibi instructions inform jurors that the onus is on the prosecution to disprove the defendant's alibi (Connecticut Judicial Branch, 2019). Further, if jurors have reasonable doubt that the defendant was the perpetrator, then they are instructed to find that person not guilty. In this study, we examined three independent variables in a 2 x 2 x 2 between-subjects design. Participants read a description of an arson, subsequent police investigation, and trial and were randomly assigned to one of eight conditions. First, we examined how the presence of exculpatory physical alibi evidence influenced juror decisions. In the crime description, half of the participants read that the defendant had videotaped footage from a store to support his alibi (exculpatory evidence present) and half did not read about the footage (exculpatory evidence absent). Second, we examined the effect of inculpatory evidence. Half of the participants read that investigators found empty gasoline containers in the defendant's car (inculpatory evidence present) and half read that nothing incriminating was found (inculpatory evidence absent). Finally, we examined judicial instructions. Half of the participants read the judge's instructions on alibi evidence (instructions present) and half did not (instructions absent). We hypothesized that the alibis would be more believable (on a 0-10 scale) when inculpatory evidence was absent and exculpatory evidence and instructions were present. We will recruit U.S. participants from CloudResearch to take part in an online survey.

Korean American Parents' Support of Early Childhood Numeracy

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Children's engagement in math-related activities at home, known as the home numeracy environment (HNE), is associated with increased numeracy knowledge, and later academic achievement. Research has shown that Korean-American parents are very involved in and have high expectations for their children's academic achievements. However, little research has examined the HNE. This exploratory study examines Korean-American parental beliefs about the importance of numeracy, and how parents encourage mathematical skills, during parent-child interactions at home with their preschool-aged children. Twenty-two Korean-American parents with 3 to 5 year-olds were recruited through newsletters and an online platform (Cloud Research). Survey questions were constructed based on prior research and included frequency of math and literacy activities (e.g., "How often does your child count objects"), parent beliefs (e.g., "Mathematics is important for daily living"), parent's HNE experience (e.g., "When I was in school, I enjoyed mathematics), and the impact of the pandemic, and cultural beliefs (e.g., "When thinking about the cultural values, beliefs and attitudes that influence your parenting, do they align closely with USA or Korean values?"). Follow-up interviews were also conducted with four parents via video-conferencing software (Zoom) to elaborate on survey responses. Descriptive analyses of the surveys indicated that 90.91% of parents agreed that mathematics is important for daily living, but most also reported being more comfortable teaching literacy than numeracy. Parents reported counting objects and numbers, doing puzzles, baking, playing board games and online games as math activities their child enjoys. Qualitative analyses of the follow-up interviews offer insight into parents' comfort levels with math and literacy activities, cultural beliefs and how these beliefs drive the parent's interactions with their child, and the influence of the pandemic on parent-child interactions and child's numeracy levels. Overall, Korean-American parents view the

HNE as important and actively support their children's early numeracy knowledge. Parents described being comfortable teaching their children rudimentary math and literacy skills at home. They also mentioned implementing a strengths-based approach, where they support their children's preferences for literacy or numeracy activities. Further analyses will focus on the interactions between parents' beliefs and behaviors, and comparisons between families.

Strong, Black, and Self-Compassionate: Exploring the Correlates and Self-Care Behavior of Collegiate Black American Women*

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Black American women are only 13% of the US population, however they experience some of the largest inequities among racial groups. These various inequities highlight the contributing role of gendered racism (Longmire-Avital & Robinson, 2018). Research on how women cope with gendered racism has identified the Strong Black Woman (SBW) persona (Abrams, 2019). However, the SBW persona has been characterized as a form of high effort coping that appears to be maladaptive overtime for psychosocial wellbeing (Carter & Rossi, 2019; Diggins, 2015; Green, 2019). The purpose of this study was to examine the degree to which Black collegiate women endorse the SBW persona, and how this endorsement is related to self-care behaviors, self-compassionate beliefs, and self-contemplative practices during the COVID pandemic and the endemic of anti-Black violence. Seventy-three self-identified Black American collegiate women between the ages of 18 – 23 completed this mixed-data (i.e., Likert scales and open-ended questions) anonymous online survey. A series of Pearson's product moment correlations revealed that greater endorsement of SBW persona was related to lower levels of self-compassionate beliefs, including self-kindness ($r = -0.28$); common humanity ($r = -0.40$); and mindfulness ($r = -0.34$). Greater prioritization of self-care was also associated with higher self-reported self-kindness ($r = 0.67$) and mindfulness ($r = 0.43$). Using a grounded theory approach in combination with content analysis, two themes emerged from participants' responses to why they engage in self-care and what self-care means to them: (1) Sustained well-being; and (2) health maintenance. Additionally, women described what Black Girl magic, a potential reimaging of SBW is to them. These responses reflected an association with goddesses and a Black Wonder Woman. Results also suggest that increasing self-compassionate beliefs could be an effective intervention. In response to initial findings, an 8-week virtual intervention was created and implemented. Twenty-eight Black American collegiate women between the ages of 18 – 23 completed the intervention that included original curated videos focusing on self-care, self-compassion, and developing habits around self-contemplative practices. A cursory review of the preliminary post-intervention data indicates that the women can identify self-care behaviors; are reporting self-compassionate thoughts; and have developed sustainable plans for self-contemplative practices.

The Moderating Effect of Mindset and Patient Interaction on Burnout in Healthcare Professionals

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Burnout is a response to chronic stressors and results in the development of emotional exhaustion, depersonalization, and a reduction in personal achievement. Studies have found that the rates of burnout in medical professions are consistently higher than other professions, which may result from experiencing demanding patient interactions. The ability to protect against burnout may in part be related to the mindset that the individual holds. Mindsets organize the assumptions individuals have about the malleability of their abilities and exist on a continuum from fixed (unmalleable) to growth

(malleable). Our current study examined four main hypotheses: Perceptions of demanding patient interactions would be positively related to burnout (H1); Fixed mindset would be positively related to burnout (H2); Growth mindset would be negatively related to burnout (H3); Mindset would moderate the relationship between demanding patient interactions and burnout (H4), such that higher levels of a growth mindset would buffer (i.e., weaken) the relationship (H4a), whereas higher levels of a fixed mindset would exacerbate the relationship (H4b). Participants (n=125) were recruited through Cloud Research (Amazon Mechanical Turk Toolkit) which enabled the researchers to target individuals working within healthcare. Participants completed an online survey (Qualtrics platform) consisting of previously validated self-report measures and a measure of patient interaction created by the researchers. SPSS was used to run correlational and regression analyses of the hypotheses. As hypothesized, demanding patient interaction (H1) and fixed mindset (H2) were positively related to burnout ($r=.26, p=.002$; $r=.27, p=.001$) and growth mindset (H3) was negatively related to burnout ($r=-.20, p=.012$). Neither growth or fixed mindset significantly moderated the relationship between perceptions of difficult patient interactions and burnout (H4a & H4b). While it was not significant, the direction of burnout levels recorded with high growth mindset was consistent with our prediction (H4a). This research may have practical implications for preventing burnout in healthcare professionals. Growth mindset may be fostered through targeted interventions, which may reduce burnout in general. Even without a significant moderating effect of growth mindset on the perceptions of difficult patient interactions, the presence of the predicted pattern may be useful in developing future studies.

Neural Representations of Memory in Older and Younger Adults

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Age differences in memory are typically greater for associations between items than for individual items, partially attributable to an age-related reduction in the ability to integrate new information and update prior associations. To investigate this explanation, this in-progress study uses functional MRI to examine the neural representations that correspond to the formation and modification of word-picture memory associations in young and older adults. Participants were asked to memorize and recall pairings of abstract words (e.g. maturity) with pictures of faces, scenes, and objects. In each functional MRI session, each learning-retrieval period (5 total) had 3 phases. Phase 1: Participants were instructed to learn presented word-picture pairs. Phase 2: Participants were presented with each word viewed in Phase 1 and were instructed to imagine the picture that was previously paired with it. Participants were then presented with a new picture and were instructed to associate the new picture with the word (update the association). Phase 3: participants viewed the words again and were instructed to imagine the paired picture from Phase 2. During post-test, outside the fMRI, participants were presented each word again and were shown three picture choices: a) the Phase 1 picture, b) the Phase 2 picture, c) a previously unseen picture. Participants were instructed to select the Phase 2 picture paired with each word, which relies on an updated association in memory. A computer algorithm will be trained to identify patterns of brain activation associated with viewing each of the 3 picture types during Phase 1 and 2 learning trials and Phase 2 and 3 retrieval trials. Neural patterns associated with the pictures will be used to determine the degree of similarity in brain activity at the learning and retrieval stages. We predict that reactivation of neural patterns at retrieval will be associated with memory performance, and that older adults will have less pattern reactivation than younger adults. Preliminary results from a subset of young adult participants will be presented. Outcomes from this experiment will contribute to our understanding of differences between healthy aging, mild cognitive impairment, and early signs of dementia in the older adult population.

Attention Please: The Effects of Linguistic Framing Variables on Donation Behavior Towards Nonprofit Organizations

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Nonprofit organizations rely heavily on donations from individuals to stay afloat, but encouraging donations is not always as straight-forward as it may seem. Many components can influence donation rates, including linguistic frames used in various components of donation requests. Linguistic framing utilizes language to structure the presentation of a concept in a way that triggers previously conceived ideas in order to evoke a specific response (Lakoff, 2006, Lakoff, 2014). To determine if framing components used in donation requests from charitable organizations had an effect on donation size and frequency, this study mimicked an in-person donation opportunity at a nonprofit animal welfare organization. In order to amass a larger participant pool, this experiment was conducted on the online platform Amazon Mechanical Turk and gathered responses from 500 mTurk workers. Participants were allotted “money” to donate as they wished to a grid of sixteen donation requests. Prior to the donation opportunity, participants saw 1 of 5 signs encouraging them to donate by demonstrating need. This attention-grabbing sign (IV1, between subjects) provided context of the need at the nonprofit such as cost of electricity per day or cost of food per year. Additionally, the wording on the tags manipulated 2 within-subject variables: the name of the fund (IV2) and the level of explanation (IV3). There were 3 fund name options - Animal Care Fund, Veterinary Fund, and General Operating Fund - and 2 levels of explanation. These levels were Category and Overview explanations. Mixed ANOVA tests showed that although the context sign did not significantly impact donation choice or amount, both Fund Name and Explanation Level had a significant impact on the donation amount. Specifically, participants reliably donated significantly less to the General Operating Funds compared to Animal Care and Veterinary Funds, which did not differ. Similarly, higher amounts were donated to donation opportunities with more categorical, detailed descriptions of what donations would be used for, as opposed to opportunities with broader, overview explanations. This information, coupled with the findings from further analysis, will provide recommendations for the animal welfare organization in this study and other nonprofit organizations on how to leverage linguistic framing elements to increase donations.

Intimate Relationship Changes During the COVID-19 Pandemic

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The COVID-19 pandemic has been a major stressor on relationships between partners over the past two years due to job loss, being confined to one’s home, and new parenting challenges. The current research is a qualitative examination of how the pandemic has affected relationships between two partners living in the same household. Data was collected through an online survey administered in Qualtrics, initially in April 2020, with three additional time points. The current project focuses on data collected in April 2020, with a total of 593 participants (89% white, 85% female) describing their relationship changes. The specific question that participants responded to is, “What changes have you noticed in your relationship over the last few months as a result of the pandemic?” Responses were analyzed to explore the major themes of changes between partners that share a household. Initial analysis of the responses found frequent words that convey emotion such as stress, anxiety and exhaustion, difficulties in daily communication and a rise in conflict. Many partners indicated they had experienced changes in time spent with their partner, work/responsibility load, and sharing of space within the household. Notably, while most of these responses were negative in tone (i.e. frustration about partner’s involvement in parenting) many were positive (i.e. enjoyment of spending more leisure

time together). Results suggest that changes in relationships were largely negative in response to the pandemic, with a particular emphasis on unequal sharing of responsibility (house work, parenting, work). Attention to relational issues that have resulted from the pandemic will be an important area of concern as we focus on recovering from the wide-ranging effects of the pandemic. Future directions for this project will include comparing the responses over time to see how relationship patterns evolved as the pandemic progressed.

Relationship Functioning During the COVID-19 Pandemic: Examining Marital Satisfaction and Verbal Aggression

Marli Siciliano (Dr. CJ Fleming) Department of Psychology

Relationship factors such as aggression and overall marital satisfaction can be largely impacted by major life stressors. The COVID-19 pandemic quickly became one such stressor in the United States as many individuals lost their jobs and their loved ones while being restricted to their homes. Pandemic conditions are similar to economic recessions and natural disasters, giving researchers a look into how COVID-19 may affect interpersonal relationships. The current research will examine how pandemic conditions have affected marital satisfaction and verbal aggression and other contributing factors. The current study evaluated people who reported living at home with a romantic partner during the pandemic to analyze how variables such as financial state, thoughts of separation, a change in power dynamics, and more impacted marital satisfaction and verbal aggression. The sample was made up of 84.5% women, and was 90.5% Caucasian, with 89.7% of the sample having a household income between \$100-120,000. Data was analyzed using correlation and linear multiple regression. A regression evaluating marital satisfaction was significant and yielded the following results: parental status ($p < .001$), money/money stress ($p = .001$), a discussion of power ($p < .001$), as well as relationship attention ($p < .001$), relationship invalidation ($p < .001$), and a fulfilling sexual relationship ($p < .001$). The overall regression evaluating verbal aggression was also significant, and multiple factors showed significant relationships including partner's employment ($p = .015$), higher thoughts of separation ($p < .001$), a change in power ($p = .040$), and a discussion of this power ($p < .001$). These results suggest that the pandemic created changes in everyday relationship factors that had significant effects on relationships as a whole. Understanding these relationship changes during COVID-19 could help prevent future violence and inform programs that may be needed to help address declines in relationship satisfaction due to the pandemic.

Exploring the Impact of Social Media and Exercise Motivations on the Relationship Between Physical Activity and Body Dissatisfaction

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Sociocultural theories of body image suggest that body dissatisfaction results from a failure to achieve idealized, unrealistic cultural body standards communicated by mass media (Thompson et al., 1999; Tiggemann, 2012). Evidence suggests that body dissatisfaction is associated with negative consequences for mental health including the development of disordered eating behaviors (Arendt et al., 2017; Rohde, et al., 2014). While physical activity is associated with positive outcomes for mental health, evidence suggests that external motivation to exercise (e.g. exercising to change your body or lose weight) is associated with negative outcomes for body image (Carraça & Panão, 2019). Consistent with sociocultural theories of body image, research also suggests that social media plays a role in establishing unrealistic cultural body standards and reinforcing the overall importance of physical appearance (Slater & Tiggemann, 2016). The present study explores the impact of image-focused

social media use (e.g., TikTok and Instagram) and external motivations to exercise on the relationship between physical activity and body dissatisfaction among young adults. Participants will be undergraduate students from the psychology subject pool at Elon University. Participants will complete an online questionnaire assessing their physical activity over the past three months (Davis, Brewer, & Ratusny, 1995), motivations to exercise (Reasons for Exercise Inventory; Silberstein et al., 1988), body satisfaction (visual analog scales; Heinberg & Thomas, 1995), and frequency of image-focused social media use (screen time data from personal devices). It is hypothesized that the relationship between physical activity and body dissatisfaction will be stronger among young adults with higher external motivation to exercise than their peers. It is also hypothesized that the moderating role of external motivation to exercise will be stronger among young adults who use image-focused social media more frequently than their peers. Hypotheses will be tested using the PROCESS macro for SPSS (Hayes, 2021). Progress of the present study and preliminary results will be presented.

Examining Habituation in Harvester Ants

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Habituation learning occurs when an animal is exposed to a stimulus repeatedly, causing a decrease in the response to the stimulus over time. The purpose of this research project was to examine a portion of the literature on habituation learning in ants ($n = 11$ manuscripts) to identify (a) some of the existing knowledge gaps and (b) potential neural mechanisms of habituation. Research conducted across several species of ants has demonstrated prior exposure decreases aggressive behaviors measured during subsequent encounters, representing habituation learning. Ants respond to alarm pheromones released by other ants by showing increased frequency of movements such as antennation, gaster flexion, mandible flaring, biting, and formic acid spraying; however, short- and long-term exposure to pheromones causes response levels to decrease in magnitude. Habituation has been demonstrated in laboratory studies featuring controlled exposure of ants to synthetic pheromones and non-nestmates, as well as in field studies that measure aggression among ant populations located at different distances from one another, finding that overlapping colonies (within one square meter) habituate to one another. Regarding objective (a), we found that currently there is limited research examining the duration of habituation learning, with the longest measured observation of learning being 24 hours. Additionally, there is no universal standard scoring scheme for analyzing aggressive behavior, making comparisons of results across studies difficult. Regarding objective (b), the current understanding of the biological mechanisms of habituation is that it occurs from changes in antennal lobe output (olfactory projection neurons) rather than input (olfactory sensory neurons). Consistent with the prior literature suggesting that antennal lobe activity alone cannot account for colonial odor discrimination in ants, we suggest that habituation may involve parallel processing among brain regions outside of the antennal lobe in addition to the sensory tract compartments of the antennal lobe. Future research should examine pheromone-elicited neuronal activity across the entire ant brain, including the mushroom body, calyx, and lateral horn. Additionally, habituation should be examined using methods that allow for controlled stimulus exposures, such as harness immobilization protocols.

Associative Learning in Ants

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Associative learning occurs when an animal has an experience that causes them to link previously unrelated stimuli together which can be identified through changes in behavior. The foraging lifestyle of *Pogonomyrmex occidentalis*, the western harvester ant, suggests a capacity for associative learning

that was missing from the scientific literature. The purpose of this laboratory experiment was to demonstrate associative learning in *P. occidentalis* using a simple and novel method that can be easily reproduced across laboratories. We exposed one colony of *P. occidentalis* in a between-subjects design to dried cilantro in an artificial habitat (group “paired”) and to a habitat without cilantro (group “unpaired”) for one week prior to testing. The habitats were a plastic container filled with sucrose gel that were held in a temperature-controlled incubator prior to testing. Testing consisted of running 40 animals (20 “paired,” 20 “unpaired”) for a five-minute stimulus discrimination test on an upright T-maze, which was recorded and analyzed for the animal’s initial choice (parsley, cilantro, or no choice). The study found that all (n=20) of the “paired” group chose to interact with either parsley or cilantro while more than half (n=11) of the “unpaired” group did not interact with the dried herbs. This difference in behavior between the “paired” and “unpaired” groups suggest that associative learning occurred to odorant stimuli generally.

Public Health Studies

The Value of Authenticity in Comprehensive Sex Education: Understanding the Role Authenticity Plays in the Wise Guys Educators Delivery of the Curriculum

Madeline K. Attianese (Prof. Amanda Tapler) Department of Public Health Studies

The Wise Guys program, founded in North Carolina, is an evidence-based program epitomizing the power of dedication and authenticity in delivering Comprehensive Sexuality Education. Wise Guys educators engage adolescent males aged 11-18 years, in an interactive and participatory process to examine their values and goals for the future, creating the foundation for making healthy relationship choices. Sexuality education programs are often assessed based solely on students’ knowledge and attitudes associated with program objectives, missing an opportunity to understand the important relational impacts between educators, students, and program success. The purpose of this study was to understand whether or not authenticity, inclusivity, and the use of engaged pedagogy utilized by the Wise Guys educators is a value-added component of the learning environment and participants' overall experience. Additionally, this study investigated the impact of authentic delivery of the curriculum on participant perception of the program, perception and value of the educational experience, and intention to engage in healthy behaviors (e.g., safer sex practices). This study employed a mixed methods approach to the research. The qualitative data collection included semi-structured interviews with seven Wise Guys educators in North Carolina. The interviews were thematically coded using the four dimensions of authenticity (expertise, passion, unicity, and distance) and characteristics of engaged pedagogy to determine the extent authenticity is used in the educator's delivery of the program. Analyses revealed that engaged pedagogy and authenticity are key components that the educators utilize in their delivery of the curriculum. The quantitative component of this study included seven questions added to the Wise Guys feedback survey. Two hundred seventy one adolescent participants completed the survey questions. The results show that a majority of participants saw characteristics in their educators that align with the four dimensions of authenticity, which positively impacted their experience. This study may be used to establish best practices in the delivery of comprehensive sexuality education. Additionally, the results can help guide and inform both training and implementation of the Wise Guys program in the future by honing in on the value-added components of authenticity and engaged pedagogy in practice.

“To Us, We’re Different, to Them, We’re the Same”: Dimensions of Diversity and Health in the Latinx Communities*

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Alamance County, North Carolina is home to many diverse Latinx communities, yet most social programs and reproductive health resources do not address the heterogeneity of the population. assume uniformity. This research aims to understand how negative assumptions associated with ethnicity and migration affect the reproductive health experience of the many Latinx communities. Researchers worked in partnership with a community advisory board made up of local stakeholders including community activists, people from various healthcare services, and Elon faculty to address poor reproductive health experiences in Alamance County. Five focus groups of 5-7 women aged 18-35 of Latinx origin in Alamance County were conducted in-person and via Zoom. Participants joined two focus groups that focused on reproductive health, decision making, resource access, and healthcare systems engagement. Audio recordings were transcribed and analyzed using the Sort and Sift, Think and Shift methodology developed by ResearchTalk. Preliminary results suggest that there are important similarities and differences between Latinx communities in Alamance County. Nearly all participants, regardless of background, shared negative experiences with healthcare providers including assumptions about language, socioeconomic status, and immigration status. Some results, however, depended on the background of the participant. Results suggest that 1) diverse backgrounds and experiences impact the amount of religious shame and stigma associated with accessing reproductive health resources; 2) negative health experiences are intergenerational; 3) negative stereotypes and assumptions from providers can impact engagement; 4) assumptions about the availability of community resources can affect engagement; 5) participants experienced varying levels of anxiety about communicating with family members about reproductive health topics; and 6) gender norms and stereotypes impacted engagement with healthcare services. Treatment of Latinx communities based on assumptions of uniformity are harmful and negatively impact reproductive health experiences. It is critical to understand diversity within the Latinx community so that stakeholders and healthcare providers can create more culturally responsive standards of care that consider the heterogeneity within the many Latinx communities.

“I Feel Like We're Approaching a Cliff”: Perspectives on Health Care Transition among Parents of Internationally Adopted Children with HIV

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The transition of youth with HIV from pediatric to adult care is associated with adverse health outcomes, including poor medication and appointment adherence. However, little is known about the experience of internationally adopted children living with HIV (IACH), a growing population. This qualitative project explores parents’ perspectives on health care transition. Twenty parents of IACH in the United States completed hour-long semi-structured phone interviews focused on healthcare transition. The purposive sample was recruited from two pediatric infectious disease clinics and social media sites. Interview transcripts were coded for emerging themes using standard qualitative methods. Most parents identified as white, female, and Christian (n=19). All 27 of the IACH were virally suppressed (mean age 13.48; 2 had transitioned to adult care). Twenty did not have a transition plan with their provider. Many parents expressed apprehension regarding the transition to adult care. One parent noted, “I feel like we’re approaching a cliff.” Anxiety over the ability to communicate with their child’s health provider and lack of comprehensive planning were expressed. Parents also felt their child may feel out of place in the adult infectious disease clinic and emphasized the trusting

relationship with pediatric providers due to longstanding care. Participants acknowledged that transition to another provider could be challenging for their child as adult providers may be less aware of adoption-related trauma. Health care transition is an important process in the lives of IACH and not often discussed. The transition represents not only a loss of access to pediatric care, but also a shift in the parent-child relationship. It is vital that physicians consider trauma-informed care throughout the transition process with IACH. Providers should scaffold health management-related independence of both IACH and their parents prior to transition. Coordination and communication with adult care providers is key to a successful health care transition.

Digital Storytelling: A Tool for Intercultural and Transformational Learning in Public Health

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This study investigates the effectiveness of digital storytelling in a short-term study abroad course as a method of promoting and measuring intercultural competence and sensitivity in the health fields. As the number of students studying abroad continues to increase alongside the use of Information and Communication Technologies (ICT), it has become abundantly clear that intercultural awareness and communication skills must be actively developed among students in order to live and work ethically in the technology-driven context of our world and health systems. Digital storytelling, the creation of 3–5-minute visual narratives to relay compelling accounts of experiences, has been identified as one method of promoting this type of intercultural literacy due to its ability to foster student engagement and reflection for deeper learning (Gubriam, 2009). This study utilized a mixed-methods approach to analyze 48 digital stories created by Elon University Public Health practicum students, who engaged in a three-week, immersive course in rural India between January 2018 and January 2020. By assessing each video according to three vetted digital storytelling assignment rubrics as well as independently coding them for themes, specific indicators of intercultural, self-reflective, and transformational learning were identified and evaluated. The findings reveal that the digital storytelling project was an effective and appropriate tool for students learning in this unfamiliar, international, and cross-cultural setting. Five themes (and 18 subthemes) are especially present and indicative of transformational learning experiences: Increased understanding of comprehensive public health approaches; Increased cross-cultural communication skills; Improved appreciation of individuality and diversity; Improved appreciation of education as a means of social change; and Expressed desire to implement changes in one's own life or culture. Over the course of this investigation, it became clear that the three vetted rubrics did not apply seamlessly to the data set and each contained their own imperfections, which is consistent with existing literature on digital storytelling as an academic tool. The findings are being incorporated into a revised digital storytelling project assignment and a new assessment rubric to be used in future iterations of the practicum experience.

Patient-Provider Decision Making and Risk-Perception of Antidepressants in Pregnancy

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This study explores women's decision-making around antidepressant use in pregnancy. Depression in pregnancy affects approximately 10-25% of individuals in the United States. Less than 20% of pregnant women with depressive symptoms seek treatment during the prenatal period, which can have negative consequences to both the mother and fetus. Those who are already on antidepressants before pregnancy are faced with the difficult decision of whether to continue or discontinue this treatment in the prenatal period. This decision is often made in partnership with the pregnant woman's healthcare provider. While some research has examined the impact of risk-perception on patients and providers

separately, no study has combined this aspect with patient-provider decision-making. A qualitative analysis was conducted to better understand the ways in which the risk perception impacts patient-provider discussions and decision-making related to antidepressant use during pregnancy. Semi-structured, recorded interviews were conducted with postpartum women who were taking antidepressants before pregnancy ($n=10$) and healthcare providers working with pregnant patients ($n=5$). Of the seven participants who described depressive symptoms in pregnancy exceeding the cutoff score of the Edinburgh Postnatal Depression Scale, only one continued their antidepressants for the entire pregnancy, with the other six discontinuing their medication for at least a portion of the prenatal period. Interviews were transcribed and coded, and inductive analysis revealed several primary themes guiding patient decision-making, including balancing risks and rewards, determining need, caring for myself to care for my baby, prior experiences, social support, and social and cultural norms. Participants described varying levels of support, empowerment, congruence of perspectives, and input into decision-making in their patient-provider relationships. Providers also used balancing risks and rewards and determining need as they worked with pregnant patients. They emphasized the value of collaborative decision-making, accessing and communicating accurate information on medications, and mental health expertise. Findings suggest that patients and providers alike are generally amenable to antidepressant use in pregnancy, and view collaboration, education, and communication as crucial relationship features for making these decisions. Opportunities for future research include the influence of power in the patient-provider relationship and the role of collaboration between providers on this decision.

A Qualitative Study of the Biopsychosocial Needs Among North American Families with Adopted Children Living with Perinatally-Acquired HIV

Arianna M. Wolgin (Dr. Cynthia Fair) Department of Public Health Studies

This project sheds light on the experiences of families with adopted children living with perinatally-acquired HIV (CLPHIV). CLPHIV now survive well into adulthood, and nearly half live with non-biological parents. The biopsychosocial model conceptualizes interactions between biological, psychological, interpersonal, and contextual factors on health outcomes. The utilization of this model creates a comprehensive view of health and can facilitate the development of specific interventions designed to support this unique population as they mature into adolescence. This study utilized the purposive snowball technique to recruit participants from two pediatric infectious disease clinics and social media sites. Twenty-two caregivers raising CLPHIV completed hour-long semi-structured audio recorded interviews. Questions focused on the perceived medical, psychological, and social needs of CLPHIV. Interview transcripts were coded for emerging themes using standard qualitative methods. Most caregivers adopted their children internationally ($n=19$), were mothers ($n=21$), and identified as Christian ($n=20$). Mean age of adoptees at study enrollment was ($M = 13.1$; range: 1 – 19). Only three parents reported severe medical conditions of CLPHIV including seizure disorder, fetal alcohol syndrome, and cerebral palsy. All parents reported their child was virally suppressed. Findings indicate significant trauma from the adoption experience, encounters with HIV-related stigma, and racial discrimination in schools and communities. Participants discussed the struggle of wanting to be an advocate for their CLPHIV without disclosing their child's status. Due to successful medication adherence, no parent described HIV as a pressing healthcare issue for their child. Families may need assistance in finding mental health services for their child due to adoption-related trauma as they transition to young adulthood and explore their identity.

Religious Studies

Mythmaking and the NOI: Writing Their Own Story*

JoyceLyn Bentley (Dr. Ariela Marcus-Sells) Department of Religious Studies

The Ar-Razzaq masjid was founded in the early 1960's in Durham, North Carolina as Nation of Islam Temple #34. Although it is the oldest masjid in North Carolina, its significance as part of the wider history of Islam in the US, and the contributions of Black Muslims in particular, have gone unacknowledged. I conducted six oral history interviews with elder and founding members of the mosque in the summer and fall of 2021 and this paper uses those oral histories to examine the intersection between scholarly approaches to mythology and the personal histories of mosque members. Specifically, my analysis draws on Jeffery Kripal's framework of mythological themes of alienation and self-authorization to argue that a collective mythology emerges from these individual histories. This collective mythology imbues the history of this community with themes of self-determination in education, dignity in economic freedom, and pride in community growth. These mythologies provide a beautiful legacy for the community of Black Muslims in Durham, the state of North Carolina, and the south.

Gods, Gurus, and Ghouls: Jain and Hindu Devotion in Medieval Tamil Literature

Nicholas Hom (Dr. Amy Allocco) Department of Religious Studies and International & Global Studies Program

Scholars have traditionally approached Jain devotional practices, or *bhakti*, as a "borrowing" from Hindu traditions. John E. Cort (2002) argues that this formulation of *bhakti* limits our understanding of Jainism's role in the early development of *bhakti* within Indian religions. As the birthplace of *bhakti*, the Tamil-speaking region of South India is a fertile site for the investigation of developments in devotional movements across various contemporaneous religious and philosophical traditions. Medieval Tamil literature offers evidence of interreligious interactions between Jains and Hindus as well as of how thinkers from each of these communities put their distinctive stamps on the emerging devotional landscape. Both Jains and Hindus utilized indigenous conceptions of feminine sacred power to serve their own agendas, whether to heighten the glory of the Hindu god Shiva or to validate aspects of Jain doctrine. This paper compares the role of *bhakti* in Tamil Jain and Hindu literature and highlights the role of women and goddesses in Tamil intellectual and religious life. More specifically, it surveys the fifth-century Jain narrative epic poems *Cilappatikaram* and *Nilakeci* as well as the sixth-century poetry of the Hindu poet-saint Karaikkal Ammaiyar. Drawing on the theoretical insights of Catherine Bell (1998), I take a performance-centered approach to interpret the devotional ritual practices described in these texts. Bell's performance-centered approach to religious phenomena stresses the agency of ritual performers as active agents in cultural change rather than passive inheritors of a system. These three literary works center on the ritual performances of women and demonstrate the convergences and divergences of *bhakti* in Jain and Hindu traditions. In my analysis of the role of *bhakti* in these texts, I argue that the Jain authors of *Cilappatikaram* and *Nilakeci* stress complex ritualistic actions as the correct performance of *bhakti*, while the poetry of Karaikkal Ammaiyar emphasizes a form of spontaneous and ecstatic devotion towards Shiva.

Jewish Identity and Wall Street: Challenging and Legitimizing Capitalist Systems

Hallie Milstein (Dr. Geoffrey Claussen) Department of Religious Studies

This project examines Jewish values within the context of the New York financial industry, also known as Wall Street. This financial sector is notoriously controversial, and its ethics and practice have been long disputed, including by movements such as Occupy Wall Street exactly a decade ago. This project canvasses the opinions and values of Jewish people at the heart of the controversy—Wall Street critics and insiders—and speaks to how they consider their Jewish identities and values as shaping their understanding of the financial industry. Engaging biblical and rabbinic texts on economic practice, as well as different approaches to concepts like capitalism, globalism, and finance, this project connects the fields of Jewish ethics and economics centered around this one controversy as a case study in religion, late-stage capitalism, and economic justice. This study uses a qualitative methodology including the responses of 26 participants (13 insiders and 13 critics) in semi-structured interviews regarding their personal and career values, money and economic philosophies, and spirituality. Participants were also asked about the potential for changing current financial systems including the impact of Occupy Wall Street, and many critics were able to share their activist experiences. Findings focus on how participants' Jewish identities related to their views of economic systems, with an emphasis on what they considered “natural.” Whereas critics saw themselves as drawing on Jewish tradition to disrupt capitalist economic systems, insiders were more likely to see those systems as natural and not in tension with their Jewish identities.

Apprehending the Goddess: Cybele's Transition to Romanhood*

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In 204 BCE, amid the second Punic War between Rome and Carthage, the goddess Cybele was “apprehended” from Anatolia (ancient Turkey) by Romans looking for victory and strength. Inscribed upon the Roman goddess are adjustments to her image drawn up to create an icon of the colonial state, but vestiges of her past iterations still haunt her figure. To analyze her story, I use a combination of critical lenses including trans, feminist, and anticolonial philosophies. These critical theories are useful for understanding analogous structures within her cultural, geographical, and gender transitions. This paper, most importantly, is a reflexive look at what it means to be “doing queer history,” as I explore what it means for the Roman Cybele to transition into My Cybele by offering a retelling of her story, and I approach the very real possibility of retelling in a “right way.” Through this dilemma I am guided by the recently late bell hooks, to whom I owe so much, Audre Lorde, who helps me imagine a poetry that illuminates, and Saidiya Hartman, who provides critical fabulation as the “how.” What I want to do is be careful, to tell My Cybele in a way that is right. This “right way” is articulated in this project as a critical fabulation of the goddess intended not to speak for her or fill the gaps, but to take and spin from what words we have of her. Queer historiography has a longing for the stories that we have lost that could be seen as analogous to ours, but we can only speak from our present position. This text presents a realm of possibility of expression that is internally focused, that assumes nothing of the fact of the past, but looks to imagine with care, and to speak with caution.

Negotiating Religion, Tradition, and Modernity in Post-19th Century Korean Seungmu Dance

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My research explores socio-cultural and religious themes surrounding *seungmu* (“Monk’s Dance”), a dance tradition with roots in Korean Buddhism. This dance form, once exclusively performed by Buddhist monks in temple rituals, is performed today largely for entertainment, and is formally designated a secular folk dance. My research draws from historical sources and ethnographic fieldwork to analyze *seungmu*’s transition from religious ritual to a secular dance, as well as emphasize how current *seungmu* practitioners perceive its status in contemporary Korea. What this research revealed was that, contrary to official modern descriptions, *seungmu* still retains its connection to Buddhism. My fieldwork involved semi-structured interviews with professional *seungmu* dancers and participant observation in *seungmu* classes in Busan, South Korea in the summer of 2021. Using this qualitative data, I analyze how modern *seungmu* dancers acknowledge the impact of the Japanese colonial period on *seungmu*’s re/invention and note my embodied encounters with *seungmu* as a student of the form. *Seungmu* radically transformed during the twentieth century due to Western concepts of modernity and the Japanese colonial occupation of Korea from 1910-1945. I argue that *seungmu* became an important site for Korea’s national identity construction following this colonial oppression and the trauma of the Korean War (1950-1953). As a part of its contribution to nation-building, the decision to distance *seungmu* from Buddhism was intentional; it isolated the dance as a cultural practice and elevated it from the social stigma associated with Buddhism in Korea since the start of the Joseon Dynasty (1398-1910). This research reveals that *seungmu* is unable to fully escape its Buddhist origins and can still function as a personal spiritual exercise for individuals. For the dancers I interviewed, it was a tool for catharsis, meditation, and spiritual connection, even though this is no longer an inherent part of the form. I assert that the present-day form of *seungmu* challenges the potential binary categorizations of authentic versus contemporary and secular versus religious; ultimately, *seungmu* encompasses a complex modern identity. This contributes a dimension of *seungmu* that lies at the intersection of Korean Buddhism, nationalism, and the secularizing discourse of modernity.

Sociology & Anthropology

Yoga as a Spiritual Practice or a Good Workout? A Conceptual Evaluation about Who Practices Yoga, Perceptions of Accessibility, and Motivations for Practice*

Katarina M. Aulbach (Dr. Alexis Franzese) Department of Sociology & Anthropology

Although yoga is often conceptualized as a form of physical exercise, yoga is an ancient spiritual practice rooted in Indian religion and philosophy composed of physical poses (*asana*), breathwork (*pranayama*), mental attention, spirituality, inward attention, self-knowledge and meditation. Research indicates that yoga is associated with a myriad of mental and physical health benefits, including but not limited to reducing symptoms of depression, anxiety, and post-traumatic stress disorder, as well as demonstrated beneficial effects for musculoskeletal, nervous, and cardiopulmonary systems. Yet, the factors that account for these benefits are not fully understood, nor are the spiritual aspects of yoga and diversity of its practitioners, which can provide insights into understanding the mechanisms through which yoga may benefit well-being. Despite its many benefits, across multiple studies about yoga within US contexts, yoga is found to be disproportionately used by certain peoples, particularly affluent, white, middle-aged women, thus potentially resulting in yoga practice feeling inaccessible for many. Overall, what are the factors that limit or facilitate access to yoga, both in perception and via social structural forces, and as such affect attaining its many benefits? This study explores the conceptual linkages among spirituality, accessibility, and diversity within yoga, particularly in terms of the mental health and well-being benefits of yoga practices. Relevant literatures and frameworks are linked to address four overarching questions: (1) who practices yoga, (2) do existing religious or

spiritual beliefs impact one's yoga practice, (3) what benefits does yoga yield (and why), and (4) what factors inhibit or facilitate yoga practice? Ultimately, it is our hope that the insights gained can contribute to efforts to create diversity within a certain newer and hybrid cultural context of which yoga has become a part, and as part of mental health care overall. Empirical investigation of the topics that are addressed here conceptually has the potential to yield findings that promote greater accessibility and sense of authenticity within both yoga and mental health care, as well as strategies on how to integrate spirituality into mental health services so individuals may attain the greatest benefits.

Fear for the Future: Youth Climate Activism

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Climate change disproportionately affects younger generations and their futures, thus motivating many to participate in climate activism. Previous research has focused on material resources as a motivation for social movements, insufficiently theorizing the importance of emotion as an impetus to act. Dipesh Chakrabarty provides a theoretical lens for understanding the emotional aspect of mobilization in his discussion of young people's struggle to conceptualize climate-change-affected futures and the anxiety this produces. This study expands upon Chakrabarty's perspective, investigating how young people's imaginations of and emotional responses to a climate-change-affected future shape their activism today. Findings support the incorporation of imagination and emotion into existing mobilization theories. Data collection was conducted through two means: semi-structured interviews with young climate activists ages 18-25 about their involvement, and art activities with young adults ages 18-22 on Elon's campus investigating emotions less easily expressed with words. Analysis shows that young people experience juxtapositions of seemingly contradictory emotions when thinking about their climate change-impacted future: they feel afraid and optimistic, exhausted and empowered. These nuanced emotional responses are revealed within personal stories of the impacts of climate change and what has motivated them to mobilize, alongside poignant artistic representations of their personal experiences. Young adults' unique insights provide novel solutions for the climate crisis, including education, social media exposure, and production innovation. This research promotes a more holistic approach to understanding social movements while also demonstrating the necessity of supporting young climate activists in their efforts to create a sustainable future.

The New Normal: The Effects of the Covid-19 Pandemic on United States and New Zealand College Students

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Over the last two years, the Covid-19 pandemic has had intense life changing consequences for many people and groups, including university students. The experience of college students during this pandemic has not been universal as seen in the United States versus those in New Zealand. The purpose of this study was to explore and compare the experiences of college students in the United States and New Zealand, focusing on the challenges that students may have faced and how they responded to them. This study utilized a mixed-methods methodology consisting of a series of semi-structured interviews with students from the US and New Zealand and a quantitative survey. The survey sample consisted of 106 participants, with 13 of those participants taking part in semi-structured interviews. The interviews and survey examine topics, such as the impact of Covid-19 on students' lives and how students navigate various aspects of college life, like socializing, in the shadow of Covid-19. The Covid-19 pandemic offers an opportunity to understand how people respond when faced with a global crisis that challenges people to weigh individual choice versus the expectations or

rules of the group. Through cross-cultural comparison between the US and New Zealand, this study explores the possible role that culture plays in how people make decisions in respect to public health and Covid-19. The pandemic raises many questions around collective consciousness and individual agency. The researcher found that New Zealand and American college students generally appeared to have similar experiences of the pandemic and identified having faced similar challenges over the course of the pandemic. The many pandemic challenges identified by participants were focused on mental health and stress, financial hardship, academic struggles, navigating Covid-19 rules, and impacts to social life. Even though American and New Zealand students expressed similar perceptions of public health measures related to Covid-19, some differences were evident in cultural perceptions of compliance and stigma. The study contributes to our understanding of the interplay between culture, disease, and public health policies during a pandemic.

Effects of Abortion Clinic Closures on Births and Abortions in Texas: A Focus on Teenage Outcomes

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Restricting abortion access in Texas has led to the closures of many clinics providing these services. In 2013, Texas House Bill 2 (HB2) was passed which banned abortions post 20 weeks fertilization and required medical practitioners providing abortions to have admitting privileges at nearby hospitals. The passage of HB2 caused many abortion providers in Texas to close. Previous studies demonstrate the impact of HB2 on total abortion and birth rates in Texas. The present research measures the impact of abortion clinic closures on teen birth rates and teen abortion rates. Using Texas county-level data from 2009-2016, this analysis estimates the causal impact of clinic closures using difference-in-difference analysis. Specifically, this research assesses how increased distance to the nearest abortion provider contributes to changes in teen birth rates and teen abortion rates. County-level data on outcome measures were collected from multiple publicly available sources. Distance-to-clinic calculations were performed using geoNear in Stata. Preliminary findings indicate a 57.14% decrease in the number of clinics in Texas from 2009 to 2016. In this same time period, the median distance from population-weighted county centers to the nearest abortion clinic increased from 54.34 miles to 88.98 miles. The average distance increased from 60.27 miles to 111.09 miles. Results from a difference-in-difference analysis indicate a statistically significant ($p < 0.05$) difference in teen abortion rates following increased distance to the nearest abortion clinic.

Stereotypes and Perceptions of Humanitarian Workers

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Humanitarian workers respond to crises generated by both human conflict and natural disasters, engaging in relief and development work to provide support for those who have been compromised and marginalized. This project sheds light on an abundance of stereotypes surrounding humanitarian workers and the work that they do. Various manifestations of the white savior complex (e.g., mission trips, voluntourism, and aid-based gap years) have allowed for the formation of these misperceptions about the work of humanitarians. These assumptions include, for example, that anyone can be a humanitarian; humanitarian workers are mostly from the Global North; and are all young, white, and Western. No studies to date have examined this specific phenomena, and no one academic field has previously staked a claim in humanitarian research, thus an interdisciplinary lens will be used with a heightened focus through the lens of sociology. Information gathered from an online survey given to

Elon University students has been used to examine the prevalence of these stereotypes and assumptions among college-aged individuals living in the United States. The utilization of both qualitative and quantitative analysis on participant survey responses, as well as an exploratory approach to analyze correlations and relationships, will be used. This study, made up of 52 participant responses, found that female students from the Global North have a distorted perception of humanitarian workers, including where most humanitarians come from, the type of work that they do on a day-to-day basis, the skill level necessary to work in the humanitarian field, and a lack of general knowledge surrounding the humanitarian sector as a whole. Further data collection on the stereotypes of humanitarian workers has the potential to help those who work in the humanitarian sector to effectively combat these false assumptions and misperceptions and provide a safer environment for humanitarian workers to do their job.

Childhood Expectations and Decisions for Family Completion

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This study examines whether childhood expectations of family completion are followed, and if not, what factors contributed. Family completion is the decision or realization that parent(s) might make to stop adding children to their families. Preceding parenthood, as children are developing, individuals may think about what their future family life might be. Sometimes, these expectations may shift over time. This study utilized a subset of participants from the mentor's pre-existing dataset to investigate the connections between childhood expectation factors and decision-making pertaining to family completion. This interview-based Family Choices study included 114 participants ranging from ages 23-62 years old. The sample used was majority women, White, and heterosexual, and all participants resided in the Southeastern United States and voluntarily participated. Results indicated that among the nearly three dozen participants who expected to have a larger family (of three or more children), about two thirds had one or two children. Conversely, of those sixteen who expected to have no children, a majority ultimately had one child. Of the almost sixty participants that expected to have a family of one or two children, about one quarter had more than expected. Recurring themes and justifications emerged for all of those that had more children than originally desired, including marriage and an unexpected love for children. In contrast, the most common reasons for having fewer children than expected included changes in maturity levels over time, aims to either duplicate or stray away from one's own family of origin structure, and changes in marital status or relationship status. This research is significant due to its implications for mental wellness as the cognitive dissonance that can result from being unable to match an intention with a family outcome may impact an individual's sense of life satisfaction. Varying reasons for the change in family size outcome may impact the level of dissatisfaction experienced, such as an increased maturity and growth overtime vs. challenges related to infertility or having children with greater needs than anticipated.

Understanding How Those in Scientific Fields Create Ethical Determinations about Human Genetic Editing

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Medical anthropology often focuses on ways in which biomedicine and technology have impacted the body ethically. With the advent of new technology, such as clustered regularly interspaced short palindromic repeats, or CRISPR, editing DNA sequences has become relatively easy, and as gene editing technology and as research progresses, ethical debates have sprung up in the biomedical field about how and when genetic editing should be used. The purpose of this study is to understand

different ways in which ethical frameworks are applied to such ethical quandaries regarding human genetic editing. This research study aims to investigate how the scientific community perceives the ethics of genetic editing. In order to interrogate the question, three semi-structured qualitative interviews with professionals in the field of genetics were conducted. In addition, eight of those with general knowledge of genetics but less specific knowledge of the bioethics of emerging genetic editing technologies were also interviewed. Interview data suggests that those who have been working in genetics longer have a deeper grasp of the ethical quandaries of genetic editing and are less prepared to entertain the use of it for anything other than preventing severe diseases. Those with less specific experience are more willing to consider the use of genetic editing technologies for broader purposes other than preventing single gene genetic diseases such as sickle cell anemia. Even though the perspectives between the two groups are generally still against the use of genetic editing for more cosmetic reasons, there are some important differences that can be addressed culturally and theoretically. The results of this study contribute to our understanding of how ethics in technology and biomedicine are situated culturally and can inform further research into the ethics of genetic editing and the way we create ethical frameworks.

Disney Parks and their Controlled Themed Environments as an Example of a New Type of Erving Goffman's Total Institution

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As the tourism industry has evolved to adhere to the modern consumer, corporations have taken on more control and a total resort destination model, where everything from food, sleep, and entertainment is sold and operated by a singular institution. This falls in line with Erving Goffman's idea of total institutions, which are spaces where a social system is organized and operated by a singular authority. Disney Parks and other tourist destinations fit this definition but differ from the prisons and mental hospitals that Goffman based his work on because the individual chooses to be formally regulated. This research looks to expand on Goffman's ideas by examining Disney theme parks and environments including Disneyland (California), Walt Disney World (Florida), and the Magic Kingdom and by suggesting an addition to the five types of total institutions Goffman outlines. This new sixth type works purely to promote capitalism by entertaining and amusing guests and letting them choose to consent to the rules of the institution by giving them a retreat from the outside world. The sociological concepts and frameworks stemming from the symbolic interactionist tradition, like impression management and the frontstage/backstage concept will be incorporated as a way of better understanding Walt Disney's efforts to control the tourism industry. Goffman's Asylums was analyzed for this research along with archival and historical documents created by the Walt Disney Company, along with scholarly sources that are affiliated with the Walt Disney Company. As the tourism industry continues to change and grow, and more resorts and institutions choose to move towards the Disney model, it is more important than ever to try and understand the sociological effect that highly themed environments and all controlling organizations have on the individual.

Policy vs Contextual Factors: Minimizing Geographic Mental Health Disparities*

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Mental health parity legislation has the capacity to reduce rural-urban health disparities because it improves access to care, and importantly, some studies have found significant decreases in state-wide suicide rates after implementation. This paper aims to further this line of research by analyzing national suicide rates broken down into six geographical classifications following the implementation

of a key piece of legislation passed in 2008, The Paul Wellstone and Pete Domenici Mental Health Parity and Addictions Equity Act (MHPAEA). MHPAEA was implemented in 2010, with the goal of making health insurance more equitable for over 140 million people covered by employer-sponsored or state and local government insurance plans and included a federal mental health parity mandate. We hypothesize that suicide rates declined following the implementation of the Act because of better access to mental healthcare for millions of Americans. Our analysis of 20 years (2000-2019) of national suicide data broken out to six geographic categories ranging from low population rural areas to very large metropolitan spaces sourced from the CDC, reveals that parity legislation alone is ineffective in reducing these disparities. Indeed, contrary to our hypothesis, suicide rates among all groups increased, with rural rates increasing at the highest rates, further worsening existing disparities. As such, suicide needs to be viewed as a multi-factor phenomenon, and scholars need to address other determinants of health in rural areas such as economic distress, low social capital, gender inequity and drug addiction in their studies. Broader conclusions are limited due to a lack of granularity in the data, but clear trends are evident in this large national dataset, highlighting continued, troubling rates of suicide in rural spaces. Future research is needed to determine the role parity legislation may be having on other populations, and how economic downturns and the COVID-19 pandemic effect spatial disparities of suicide in America.

Sexual Orientation Identity and Authenticity Development Through Young Adulthood*

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Authentic behavior can be defined as behavior that is in alignment with the truest self. Sexual orientation is one of many facets of identity and an aspect of identity with which individuals may grapple. Stress around one's sexuality comes in large part from struggle with authenticity (Levitt et al., 2016). This research project examines the overlapping developmental trajectories between sexual orientation identity formation and how authenticity levels fluctuate through young adulthood. Stories of coming out and sexual orientation development display the intersections between these trajectories of development. Examining scholarship on the developmental trajectories of sexual orientation and on trajectories of authenticity reveals that the two aspects of self may be co-occurring during adolescence into early adulthood. Processes of sexual orientation development and of authenticity development are analyzed within a sample of approximately two dozen college-aged adults. The constant comparative method is used to analyze interviews with individuals identifying as heterosexual, bisexual, lesbian, or gay. Results indicate that questions of sexual orientation are deeply tied to questions of authenticity. This is compelling research because it provides important insights into processes of identity development. The research addresses the implications of recognizing that the developmental period in which authenticity begins to feel at stake is the same time in which individuals are exploring and developing their sexual orientation.

Sport Management

Middle Level Engagement in Central North Carolina Classroom

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Engagement in middle school classrooms is essential for students to retain content taught in various course subjects. Student engagement refers to the level of interest students demonstrate in their learning and their connection to the class and one another (Axelson & Flick, 2011). Educators can

often find themselves in passive learning situations; the teacher is transferring knowledge to the student, thereby restricting interaction with course content. This passive learning can come in many forms, but the most widely used is lecturing. This method of teaching is often adapted slightly into guided notes-taking but still lacks active learning from students. Multiple researchers have identified that students achieve greater in classrooms when they are actively—rather than passively—engaged (Callaghan, et al., 2019). The purpose of this study was to explore diverse and alternate teaching methods to foster student engagement. Using a mixed methods design, data were collected through surveys and focus groups (Creswell & Clark, 2017). Four weeks of daily exit surveys for 120 students in an eighth-grade science classroom were used to assess students' engagement. Each exit survey asked two Likert style questions about their classroom learning. Additionally, students had an opportunity to answer an open-ended question about the instruction they found most engaging. Students could identify what teaching practice assisted their learning for a specific day. Focus groups were conducted with subsets of five to seven students from four sections to explore their experiences over four weeks. A final survey was distributed to students to reflect on which lessons they perceived to learn best from and which teaching practices engaged them most over the four weeks. Included in this survey were eight Likert style questions about their thoughts on what helps them to be engaged in class. Preliminary results provided information for understanding students' engagement and their assessment of their own learning. The findings provide insights for engaging students in an eighth-grade science classroom. Implications for future research and practice are shared. Administrators and educators in middle level education will be able to use the findings to enrich the learning environment for students in various middle schools.

Examining the Impacts of a Mentoring Program on Female Sport Management Students' Career Advancement*

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Over the last 50 years since the passage of Title IX, opportunities for women to participate in sport has increased. According to Staurowsky and colleagues (2020), sport participation for women in college has grown almost four times from 50,000 in 1971 to 200,000 in 2017. Despite the increases in participation, the sport industry is still recognized as one of the least progressive and innovative industries in terms of diversity and equality. Another area that women are largely underrepresented is in the sport management programs at colleges and universities. Less than 25% of students majoring in sport management are women and there has been a call to recruit and mentor more female students (Chen et al., 2013). Barriers to working in the sport industry for women are a lack of support and mentoring, which can impact students' career choices (Harris et al., 2019). The Women Influencers in Sport (WINS) initiative was created to answer the call and recruit female high school students to major in sport management while also providing educational, networking, and mentoring opportunities for current students. In 2018, WINS had eight members. Currently, WINS has 29 members. This growth has led to a need to develop a more formalized mentoring structure. Therefore, the purpose of this study is to examine the impacts of the WINS mentoring program on female sport management students' career advancement to create a more formalized mentoring program on campus. The first part of this study was creating a conceptualized framework of the mentoring program. Methodology included reviewing secondary research, building a mentor database, and developing a survey for data collection. With a goal of implementation in Fall 2022, further development is underway and will include quantitative data collection through an online survey, where both mentors and mentees will share their experiences in the WINS mentoring program and provide feedback for improvements. Understanding how the current mentoring program has shaped students' experiences can enhance the

formalized mentoring program and improve the WINS program, with hopes to set the standard for female mentorship programs across the country.

Strategic Communications

Communicating Depression in India and China: An International Comparison of Mental Health Frames in English-language News Sources

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According to the 2017 World Health Organization's Depression and Other Common Mental Disorders: Global Health Estimates, more than 322 million people worldwide are affected by depression. As the world's most populous countries, India and China merit special attention. This paper explores the communications about depression by the leading English-language news sources in India and China, Times of India and China Daily. Through the examination of these two news sources within a six-month time period, communication messages and frequency of news source communication are studied to identify frames surrounding depression. The support, resources, and treatment for depression within India and China are also considered. The purpose of this project is to understand how culture affects the ways in which India and China's news sources address mental health and how news sources frame their communication around depression. This mixed-method study analyzes how both news sources frame depression in terms of causal and problem-solving responsibilities at individual, organizational, and societal levels. It also identifies central themes for each country by article category. Additionally, Hofstede's Cultural Dimensions Theory is used to create two stigma profiles, one for India and one for China, that discuss how information about depression is communicated as well as the cultural characteristics that contribute to the national dialogue surrounding depression. Findings for each country are compared to each other to gain a better understanding of the ways in which Indian and Chinese media resemble and/or differ in their mental health communications.

Beauty Beyond Borders: How American Cosmetic Brands Use Cultural Ideals of Beauty to Develop Social Media Posts Targeted to the US and Singapore

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Byzantine women dyed their eyebrows to appear more youthful. Glam-rock men of the 80s piled on black eyeliner to appear smoldering and sexy. Gen Z applies light-reflecting creams to accentuate bone structure. Whether it is 1622 or 2022, cosmetics have consistently taken a prominent place within the learned rituals of society (Cartwright, 2019). However, what differs from culture to culture is how and where the makeup is applied. Although cosmetic brands have become global companies that distribute the same products to multiple regions, the usage of products changes from market to market based on cultural trends and beauty aesthetics. This research uses social media marketing of cosmetic products in the two largest global markets, America and Singapore, to analyze and understand how posts promoting the same product differ cross-culturally. One eye product was chosen from three global cosmetic brands: MAC Cosmetics, Benefit Cosmetics, and Bobbi Brown Cosmetics. Qualitative content analysis was used to study Instagram posts, revealing trends particular to a region or brand. This research specifically looked at descriptions of models used, facial features of the models, and color story/placement of makeup application. This study is important because it examines how cosmetic companies leverage the advertising principle of cultural representation to differentiate advertisements for the same campaign, providing insights on how cosmetic companies promote an

image of beauty to their consumer and how that image changes depending on the market. Additionally, on a more interdisciplinary level, this study speaks to how society has been taught to see beauty. Results found that both regions favored models with lighter complexions, although there was slight variety in regional preferences for undertone of complexion, ethnicity of the model, and structure of facial features. All three brands altered application style and product placement between the two regions. The differences were found to correspond to cultural beauty trends, aesthetic preferences, and physical differences between populations.

Persuasion Strategies in the 2020 Campaign Discourse on Facebook: A Content Analysis of Donald J. Trump's and Joe Biden's Presidential Campaign Ads

Lindsay Gelman (Dr. Qian Xu) Department of Strategic Communications

As the most expensive election in history, the 2020 Presidential Election sets a record for social media ad spending (Leigh, 2020). Among different social media, Facebook has increasingly become the focus of presidential political campaigns and been considered crucial to winning an election (Graham & Rodriguez, 2020). In order to compare how these two candidates have adopted different political campaign functions, such as attacking, acclaiming, and defending (Benoit, 2001), and persuasion strategies in their social media ads, this study adopts a content analysis to examine a total of 939 randomly selected Facebook ads posted during the three months prior to the 2020 Presidential Election. Overall, we found that Trump adopted more attacking Facebook ads whereas Biden used more acclaiming Facebook ads both in August and October, 2020. However, they did not significantly differ from each other for ad functions in September. Trump's ads included more comparisons between the two candidates in October whereas Biden's ads used more comparisons in August. We also found that there was no significant difference between the two candidates for the mention of policies across this three-month period. In contrast, Trump referred to the characters of either candidate more frequently than Biden. Significantly more references to characters were mentioned by Trump than by Biden in August and October. Also, Trump used more pathos whereas Biden used more logos in the ads across these three months. But they did not significantly differ in the use of ethos. Another integral finding is that Biden's ads made more call-to-actions on mail-in ballots than Trump's in August and October. Lastly, we found that Trump used more filters in his ads in August and October than Biden. The implications of the findings shed light on the strategies for developing effective political campaign ads on social media for communication professionals.

Living in the Background: Analyzing the Representation of Marginalized Identities in Predominantly White TV Shows*

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Television show producers and outlets have strived to engage and promote content that is more inclusive and diverse, specifically focusing on promoting shows that feature a racially diverse lead cast. Framing theory, which is an extension of the agenda-setting theory, focuses on the way the media presents certain aspects of reality and how these depictions can affect the public's perceived knowledge of this reality (Scheufele, 1999). This study analyzed the representation of marginalized identities in predominantly Caucasian television shows during the prime time line-up. By conducting this research, this study compared the representation of marginalized racial groups in television from 1996 with television from 2016. This research highlights the importance of proper representation in communication and media fields, which can provide media companies better insight into the benefits

of reaching diverse audiences. By replicating the method of previous studies and comparing the results, this study indicated that there had been major progress in the overall representation of marginalized racial identities. Through a quantitative content analysis, this study found that there was some growth in the number of racial minorities that were represented on sitcoms during the prime time television syndication. Three shows from the 1996 television syndication and three shows from the 2016 television syndication were chosen and categorized. Each of the characters were recorded by their perceived race: Caucasian, African American, Asian, Latino, Middle Eastern, or Biracial. These characters were further categorized for different demographics: age, gender, perceived income level, and role prominence. Caucasian characters amounted to 90% (79) of the 88 characters recorded from 1996 content analysis. Caucasian characters only amounted to 56% (46) of the 81 characters recorded from the 2016 content analysis. Through this study, it was shown that there was a significant increase of marginalized identities that were represented in the 2016 television shows however, there were still some demographics that were rarely represented and some demographics that were stereotypically represented.

Campaigning on Twitter: A Content Analysis of the 2020 Georgia U.S. Senate Candidates' Twitter Feeds

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This study examines the topics and tones of Twitter messages in the two Georgia 2020 U.S. Senate races to expand knowledge about political campaign strategies and how candidates' agendas shift during a campaign. Notably, each of these races was undetermined after election day on November 3, 2020, sending each into a run-off election between the top two vote-getters. In each race, the two candidates were a Republican incumbent and a Democratic challenger. The results of the November 3 election revealed that control of the U.S. Senate hinged on these two runoff races, making both closely followed contests. This study uses content analysis to examine the Twitter comments of the four candidates from September 5 to January 5, 2021, the day of the runoff election, to expand knowledge of how political candidates use Twitter. A random sample of 600 tweets was analyzed using qualitative content analysis. The topics coded for include those based on previous literature and topics unique to 2020, such as COVID-19. The results revealed several themes. First, all four candidates frequently used Twitter to request donations and provide updates on campaign events. Second, more than a quarter of all tweets had a negative tone, and Republican candidates used negative tones more frequently than their Democratic counterparts. Most negative tweets were aimed at the candidate's opponent, but the Republicans also frequently took aim at the opposing party at large. Other dominant topics for the Republicans included support for Donald Trump, voting, the dangers of socialism, and the Supreme Court. Frequent topics for Democrats included voting, health care, COVID, and civil rights. After the general election on November 3, the issue of the U.S. Senate majority control became a dominant topic across both races. Lastly, the Republican candidates mentioned their counterpart in the other race significantly more than the Democrats did. The Republicans also connected their two campaigns by framing the elections as having existential consequences. After the general election, the two Republicans referred to themselves as the last line of defense against radical change in America, specifically the implementation of socialism. Other findings and their implications are discussed.

Black, Biracial or Other? An Analysis of Tweets concerning Meghan Markle's Race after the Airing of the 2021 TV Special, *Oprah with Meghan and Harry**

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After the airing of the CBS TV special, "Oprah with Meghan and Harry", many took to Twitter to voice their opinions about the exclusive interview. Meghan Markle, who is Black and white, talked about race and racism with Oprah, leading to increased commentary about her race on social media. Markle's race has been central to the coverage around her ever since she became widely known to the public. This study uses a qualitative content analysis to analyze patterns in how Markle's race is discussed for three weeks on Twitter after the airing of the special. The question of how Markle's race is discussed is important because many Americans are mystified by mixed-race individuals (Dagbovie, 2007) as racial categories in the U.S. have historically been rigid. Biracial Black-white identity is shaped by the history of the one-drop rule: that anyone with any amount of Black ancestry is Black. Using Twitter Advanced Search, tweets about Markle's race were identified for three weeks after the interview. Themes and categories were extracted from the sample of 127 tweets that fit the criteria and were charted and analyzed. Results show that commentary on Markle's race can be split into four categories: appearance, Markle as a representative of larger issues on race, Markle as an embodiment of others' experiences and critique. Most tweets were about her appearance. Some saw her as Black but to others she passed as white. Users also tweeted about how Markle's experience was what people of color go through daily. Particularly, people saw her experience as representative of Black women's struggles. Users also compared their experiences to hers as a mixed-race person or as a person of color dating or marrying a white person. The critique about Markle was mainly that she was "using the race card" and users questioning why people say Markle is Black when she does not clearly identify as Black. The research shows that even though she identifies as biracial and there is substantial commentary referring to or talking about her as mixed-race, she is primarily seen as Black.

It's Not All Black and White: The Portrayals of Black and White Mass Shooters Before and After the 2020 Black Lives Matter Movement*

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This research examines questions of racial framing of two topics that are increasingly prevalent in news media: mental health and mass shootings. Research has shown that it is not uncommon for media sites to have implicit biases and subliminal messages of racism, contain inaccurate coverage of mass shootings, and inaccurately imply causation when discussing mental illness and mass shootings. Previous research has not analyzed the immediate influence of social and racial justice movements on media reports of mass shootings. Therefore, this research fills that gap by analyzing the framing of and identifying thematic components in online news coverage of Black and White mass shooters and whether the portrayal of these perpetrators changed after the 2020 Black Lives Matter movement. A qualitative content analysis of 36 articles about 12 perpetrators showed that the portrayal of mass shooters is mostly dependent on the circumstances of the crime. Further, sources consistently grouped and generalized perpetrators based on previous behavioral patterns which highlights the substantial influence placed on the perpetrators themselves when framing these articles. Additionally, there were two key differences in the ways Black perpetrators were portrayed compared to White perpetrators. Consistent with previous research, articles referencing Black mass shooters were less likely to include coverage about mental health and more likely to include personal background about the perpetrator that was irrelevant to the case. However, all of the coverage of White perpetrators connected their crimes to possible mental health challenges. Finally, the Black Lives Matter movement of 2020 did lead to increased reporting about mental health in Black perpetrators, but only among more "newsworthy" events. The analysis showed that the way reports of mass shootings were framed depended heavily on perpetrator attributes making them the focus of the report, not the crime. This suggests that racial biases are present in articles about mass shootings shown due to the selective inclusion of mental health conversations and the framing of perpetrator background information. This

study's results indicate that there are implicit biases conveyed in these reports, because articles are often subjective and framed differently depending on the perpetrators background, personality, or race.

Political Communications Analysis of the Two Final Costa Rican Presidential Candidates during the Months of January and March 2022

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Costa Rica is amidst a Presidential election year unlike any in the past due to a high number of differing political parties, leading to only the third runoff cycle in 60 years. This research looks to study the differences in campaign tactics from the two final candidates who received the most votes in the general election. Social media platforms, specifically Instagram and Facebook, were chosen to be analyzed as they are a direct reflection of communication from each candidate. Costa Rica does not allow for campaigning to occur three days ahead of an election, so this research looks at posts from the months leading up to the February 6 general and April 3 runoff elections. A content analysis of all posts was conducted to find what key themes were mentioned most often and which types of posts received the most online engagement. Politicians have never been able to access their voter base easier than in today's day and age because of technological advancements. There is no need to rely as heavily on traditional media outlets to get their message out into the public. Also, with only one other competitor each candidate can better differentiate and promote their proposals. Costa Rica is seen as an exception of Central America as it has maintained a long history of stable democracy and abolished the military system in 1949.

World Languages and Cultures

“Une histoire tue est une histoire tuée”: Unsilencing Haitian History in Marie-Célie Agnant's works

(This presentation will be in French.)

Aniyah S. Adams (Dr. Olivia Choplin) Department of World Languages & Cultures

In the aftermath of the Duvalier regime in Haiti, there has been a lack of written historical record about the tragedies that occurred during that period, making it difficult for the country to reckon with and move past the dark history. Examining Marie-Célie Agnant's works *Le Silence comme le sang* (1997), *Un Alligator nommé Rosa* (2007), and *Femmes au temps des carnassiers* (2015), which follow characters who live through or deal with the impact of the dictatorship, I analyze the augmentation of an action orientation over time throughout Agnant's works through a close-reading methodology. As seen when comparing the grieving mother-daughter duo in *Le Silence comme le sang* to Junon in *Femmes au temps des carnassiers*, over time the characters are less resigned, and they begin to take action towards justice with urgency. Past research has examined both trauma and the transmission of memory in Agnant's works, but there have been no studies that explicitly examine the evolution of her writings. Decades after the Duvalier regime has ended, impunity still reigns in Haiti, which has repercussions on society. In “Transgenerational Transmission of Trauma in Haitian Families,” Jessica Yanick Pierre argues that there is a “sense of agency” in second-generation Haitian-American children to seek narratives about the past; they tend to breach the silence of older generations who experience unresolved mourning with the lack of resolution in Haiti. This suggests the message that even though time has passed, there is use in seeking official recognition of the atrocities that occurred for Haiti and

its people to advance. I argue that Agnant's works manifest this process of mourning evolving into truth-seeking via a series of protagonists who get progressively more determined to reveal the truth and fight impunity. The works themselves also serve as an investment in the truth and participate in the fight against impunity by calling out perpetrators and unsilencing stories that the historical record has neglected.

Roots and Rootlessness: Sense(s) of Self in the Autobiographical Novels *Ru* by Kim Thuy and *Garçon manqué* by Nina Bouraoui

(This presentation will be in French.)

Molly A. Armstrong (Dr. Sophie Adamson) Department of World Languages & Cultures

This project examines two autobiographical novels, *Ru* (2009), by Kim Thuy, and *Garçon manqué* (2000), by Nina Bouraoui, both of which were originally published in French. The first-person narrators explore questions around their “outsider” identities as refugee in Canada (Thuy) and immigrant in France (Bouraoui) through stories in which familial relationships, roots, and rootlessness are integral to their self-identification. In *Ru*, the main character, Nguyen an Tinh, represents Thuy's experiences as a Vietnamese refugee who flees to Malaysia then Canada during the time of the Vietnam War. In *Garçon manqué*, Franco-Algerian Nina Bouraoui describes complex summer experiences in France during visits with her French grandparents. This research is unique in its pairing of these two very distinctive but complementary novels. Both authors, through their narrators, ask the important question, “Who am I?”, while navigating languages, cultures, and familial pressures. Through a close-reading methodology and, more specifically, literary analysis of the narrators' references to their hybrid identities, this project examines how Thuy and Bouraoui use writing to honor their roots and rootlessness.

Children of the Disappeared: Film Portrayals of Intergenerational Trauma in Post-Dictatorship Argentina

Madeleine Dauenhauer (Dr. Federico Pous) Department of World Languages & Cultures

The last military dictatorship that took place in Argentina from 1976-1983 left the country in political turmoil as it tried to move on from a regime that disappeared and killed more than 30,000 people. Since the end of the dictatorship, there have been many groups hoping to achieve justice and reconciliation from the government in many different ways. Scholars have been particularly interested in the concept of collective memory in the country. In the decades since the end of the regime, there have been several different frameworks of memory that have been dominant. The regular shifting of these frameworks has made it difficult for many citizens to effectively process what they experienced. When this trauma is not processed it is passed down to the next generation creating a cycle of intergenerational trauma. This research project analyzes two films about the military dictatorship, *La historia oficial* (Puenzo 1985) and *Cautiva* (Biraben 2003), produced in Argentina 20 years apart from each other. In doing so, my goal is to understand how the frameworks of memory that have prevailed through time have impacted portrayals of intergenerational trauma, especially as they relate to children of the disappeared. Since the regime 130 of the estimated 500 children born in prison to individuals disappeared by the state and adopted by military officials have been located. Efforts to reunite them with their biological families have varied widely in terms of success due to the cultural narratives prevailing at the time. These children have a unique lived experience and one that has been important in both the cultural narratives regarding the regime and movies portraying it. Through the analysis of these movies as well as secondary sources, this research demonstrates the ways that dominant cultural

narratives and cultural products represent a singular way of remembering that affects the new generations both in their own lives and in their perspective on past events. I explore the ways in which each movie fits within the framework of memory dominant in Argentina at the time of the film's production and how films can impact a cultural conversation about collective trauma.

Cut, Copy, and Paste: The Examination of Gender Inequality through the Lens of Punk Rock*

Carson O. Davis-Tinnell (Dr. Sarah Glasco) Department of World Languages & Cultures and International & Global Studies Program

Since the 1970s, punk has been an aggressive, politically charged cultural force. Although punk seeks to deconstruct social injustices rooted in racial, gender, age-based, and class discrimination, it still perpetuates systemic inequalities at times. Through the development of an anti-authority ethic, cutting edge music, fashion, and mentality, punk both presents and challenges the hegemonic male perspectives that have dominated for centuries. Music within the punk scene was not the only thing that was produced by punks, it was also literature in the form of zines. Throughout punk's history, zines (and more specifically feminist zines) have served as creative outlets that give voice to the individuality, collective opinions, and actions of female-identifying punks exploring their identities. In-depth exploration of historical punk movements such as the Do-It-Yourself Girl Power and Riot Grrrl movements and the oppression of minorities therein provided evidence of combating gender inequality in mainstream, patriarchal culture via zines. I analyze scholarly articles as well as song lyrics, film, music videos, and zines to inform the creation of an original feminist zine titled, "How to Fuck the Patriarchy," a project that intends to make this gained knowledge accessible to both punk and non-punk audiences. Inspired by my own identity as a woman, I designed and produced this zine to critique the sexist cultural norms that society forces on women. This study reveals the gained knowledge by studying musical subcultures, DIY practices, and responses to cultural hegemony to understand the various political, social, and economic modes of resistance within the punk culture. Ultimately, the goal of this research is to show that punk's claims that society is equal and safe for all have ironically left some wondering if this subculture is yet another false hope of equality and instead, a space for cis white men to continue to hold all the power.

500 Years: An Analysis of Past Violence Against Indigenous People and Contemporary Environmental Issues in Guatemala*

(This presentation will be in Spanish.)

Madison H. Eaton (Dr. Juan Leal-Ugalde) Department of World Languages & Cultures

The Guatemalan Civil War officially took place from 1960-1996. During this armed conflict, a genocide of indigenous people occurred: more than 200,000 people were killed and an additional 45,000 disappeared or went missing. The majority of the victims of the genocide were people of Mayan descent. During the 36-year-long Civil War, the Guatemalan government and military forces committed horrific human rights abuses against Mayan communities, especially against their women. In those dark years, the military carried out over 600 massacres, destroying villages and devastating families and communities. Of those who survived, it is estimated that up to 1.5 million people were displaced and forced to seek refuge. Many of these massacre sites are now the locations of modern day extractivist projects like mining operations. The documentary *500 Years: Life in Resistance* directed by Pamela Yates (2017) tells the story of indigenous resistance in the aftermaths of the war. This presentation will explore the documentary to examine contemporary implications of the Civil War. The approach to the film will be complemented by considering the testimony of Rigoberta Menchú (*I,*

Rigoberta Menchú, an Indian Woman in Guatemala), a recognized Mayan-Quiché woman who won the Nobel Peace Prize in 1992 for her activist work protecting indigenous rights and keeping the memory of the armed conflict alive. This study will consider race, gender, and environmental issues to explore the ways in which the forced displacement of indigenous people in Guatemala allowed corporations to develop neo-extractivist projects on their lands.

Werner Herzog's *Stroszek* and Luis Trenker's *Der verlorene Sohn* in the Context of Heimatfilms
(This presentation will be in German.)

Ella K. Gatermann (Dr. Martin Kley) Department of World Languages & Cultures

Seeing America as the land of freedom is a notion that has existed since the European 'discovery' of America. The migration of Germans to America in the 19th century strongly influenced German art and culture. Prominent authors, including Goethe, Kafka, and Brecht, or filmmakers including Fassbinder, Wenders, and Reitz grappled with this idea. These authors repeatedly addressed mass poverty, the Vietnam War, and political discrimination against marginalized groups. *Stroszek*, a film by Werner Herzog (1976/77) tells the story of an emigration that begins with great hopes of fulfilling the American dream, but presumably ends in suicide for the protagonist. My contribution lies in seeing Herzog's *Stroszek* in the context of the Heimat film genre. In particular in comparison to Luis Trenker's *The Prodigal Son* (1934). Werner Herzog (a Bavarian director) has a strong affinity for homeland and mountain films, which is also reflected in his other works, such as *Heart of Glass* (1976), *Gasherbrum-The Shining Mountain* (1985) and *Scream of Stone* (1991). Intertextual references to *The Prodigal Son* can be found throughout *Stroszek*. They stand for the connection between the two films and that hidden meanings can be found in Herzog's *Stroszek*. Compared to *Stroszek*, it is remarkable how extensive the research literature on *The Prodigal Son* is. This literature, which analyzes Trenker's film in the context of the mountain and Heimat film genre and Nazi ideology, is also relevant to *Stroszek*. Luis Trenker belongs to an intensively researched group of film directors such as Arnold Fanck, Leni Riefenstahl and Harald Reinl. The various intertextual references between *Stroszek* and *The Prodigal Son* reveal clear differences, especially in the perception of America. Werner Herzog and Luis Trenker are also unable to accept America as the 'Land of the Free', but the motivation behind their portrayal of America is quite different. German cinema's significant development from the early Third Reich to the 1970s New German Cinema plays a significant role. The image and perception of America in the eyes of Germans developed enormously during this time. My proposal deepens the understanding that *Stroszek* exists as a kind of answer to Trenker's Heimatfilm.

Punk's Not Dead: Vivienne Westwood, Gender Equality, and the Staying Power of Punk Subculture

Maeve S. McCaffrey (Dr. Sarah Glasco) Department of World Languages & Cultures

For my project, I created a magazine informed by the practices of a revolutionary movement, punk, that started with a proclamation of anti-capitalist rebellion and an expression of discord. Its avant-garde attitude embodied political and stylistic upheaval, and fashion designer Vivienne Westwood was one of its pioneers. To create the magazine, my research investigates the do-it-yourself culture of Westwood's proto-punk fashion. Her signature style manifested a contested cultural space that rebooted and rejuvenated contemporary youth culture through provocative expressions of pleasure and protest. With political shifts, high unemployment, and extreme economic disparities in the 1980s, Britain's increasingly frustrated and angry working class found punk's manifesto of socio-political

anarchy appealing. Westwood's aesthetic of rips, fractures, and tensions perfectly embodied the bleak outlook of the era. Her designs shocked the public, but also created thought-provoking conversation and inspired change. Although punk is often defined by its music, described as loud and aggressive, punk subculture includes diverse ideologies, fashion, art, dance, literature, and film. Using her geographical roots to Britain to express her identity, Westwood forged a brand that embodied high-end art, a sort of punk haute couture. This research shows that although punk lost momentum as a counterculture in the 80s and 90s due to its rise in popularity (thus the phrase "punk is dead"), its need and influence are still evident today through the staying power of DIY practices first forged by Westwood that elevated marginalized voices. I argue that punk is very alive, and Westwood's legacy constitutes a catalyst for its staying power today. Through analysis of songs, video footage, zines, an interview with Geoff Travis, founder of Rough Trade Records, and conversations with punks who lived punk in real-time in the 80s, I created a magazine that embodies Westwood's punk ideologies of self-expression, activism, and DIY designs. Inspired by Westwood, readers witness my promotion of individuality and anti-establishment values as I seek to shock and contest cultural stereotypes.

The Sociocultural Revelations of HIV Narratives in France: *On n'est pas sérieux quand on a 17 ans* (1996) by Barbara Samson and *J'ai 20 ans et le VIH: Ma vie presque comme les autres* (2020) by Lucie Hovhannessian

(This presentation will be in French.)

Arianna M. Wolgin (Dr. Sophie Adamson) Department of World Languages & Cultures

Although the prevalence of HIV has declined in France since the onset of the epidemic in the 1980s, it is estimated that there were 59,5444 new cases of HIV between 2009-2019 (Statista, 2022). Despite these numbers, there are very few autobiographies published in France by people living with HIV. This has likely contributed to the popularity of two first-person publications by young women who contracted HIV in their teens: *On n'est pas sérieux quand on a 17 ans* (1996) by Barbara Samson, and *J'ai 20 ans et le VIH: Ma vie presque comme les autres* (2020) by Lucie Hovhannessian. Published fourteen years apart, the books offer insights into how French attitudes toward HIV have evolved over the past twenty-five years. This research is unique in that it uses literary analysis to examine these two autobiographical works by young French authors living with HIV. In addition, it compares and contrasts the texts to language used in public health announcements, laws, and media coverage in France. Through close readings of a wide variety of language around HIV infection, this study reveals particularities about the evolution of French feelings around illness, stigma, shame, and hope/resilience.

Cinematic and Literary Representations of Jewish-Muslim Relations in France: *La Haine* (1995) by Matthew Kassovitz and *Avant la Haine* (2015) by Thierry Cohen

(This presentation will be in French.)

Ari Yaron (Dr. Sophie Adamson) Department of World Languages & Cultures

The first article of the French Constitution of the Third Republic states that the republic must be indivisible, *laïque*, and democratic. *Laïcité*, translated in English as a form of secularism, is not only at the core of the French social framework, but the foundation of the nation itself. The practice of *laïcité* expresses a freedom to practice religion so long as it is separate from public affairs. For instance, the presence of religious symbols in government affiliated spaces, most notably schools, is prohibited. Such a framework has grand implications and challenges for French society. In 2020, the French government reported upwards of 6.8 million immigrants as residents of the country. An estimated 64%

of those living in France identify as Christian, 23% religiously unaffiliated, 8.8 % as Muslim, and just 1% percent as Jewish. In fact, France is home to the third largest Jewish population in the world; the first in Europe. With a robust history of both Jewish rejection and evolving integration, the exploration of Jewish identity in France is integral to the discussion surrounding religion and *laïcité*. In this study, I analyze the novel, *Avant la Haine (Before the Hatred)* (2015), by Thierry Cohen, that tells the story of an inter-religious friendship between two childhood friends, Jewish and Muslim, in a so-called secular country. In my analysis, I focus primarily on Cohen's portrayal of France through the friends' references to religious intolerance and its impact on their friendship. I also examine the 1995 film, *La Haine (Hate)*, by Matthew Kassovitz, as a cinematic text that offers context to Cohen's novel. In addition, I rely on supporting secondary sources, including the 2020 PhD dissertation by Adi S. Bharat titled, "Representations of Jewish-Muslim Relations in France." In his research, Bharat examines representations of interactions between Jews and Muslims in France. He dissects *Avant la Haine*, as well as other forms of expression like state media, contemporary art, and film. Through my project, I seek to further understand the successes and challenges of Jewish assimilation and Jewish-Muslim relations in a secular republic.