UNIVERSITY OF GEORGIA
Center for Undergraduate Research Opportunities

2023 CURO Symposium

highlighting UGA's undergraduate research

April 3-4 • Classic Center • Athens, GA

Program

2023 CURO Symposium

highlighting UGA's undergraduate research

Welcome to the 2023 CURO Symposium! Hosted by the Center for Undergraduate Research Opportunities, this two-day event highlights exceptional undergraduate research at the University of Georgia. Across campus, administrators, faculty and staff members, and graduate and undergraduate students have collaborated to make this an invaluable academic event.

This year's CURO Symposium features 498 undergraduates communicating their substantial research accomplishments. The presenters are pursuing 92 different majors from 15 schools and colleges and are conducting research with 245 faculty members from 69 departments in 17 colleges, schools, and divisions.

The CURO Symposium is a celebration of our students' hard work and engagement in research as well as the commitment of their faculty mentors to their success, which would not be possible without UGA's broad and substantial investment in outstanding experiential learning opportunities.

Thank you for your continued support of undergraduate research and the Center for Undergraduate Research Opportunities.

Dorothy Kozlowski

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Monday / April 3, 2023

All oral sessions on Monday are in Athena Breakout Rooms A, B, C, D, G, and H.

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Oral Session 2

12:40-1:30 p.m.
Oral Session 3

1:50-2:40 p.m.
Oral Session 4

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Awards and Keynote Session
Athena Room E

4-6 p.m.
Poster Session
Grand Hall South

Tuesday / April 4, 2023

All oral sessions on Tuesday are in Athena Breakout Rooms A, B, C, D, G, and H.

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Oral Session 5

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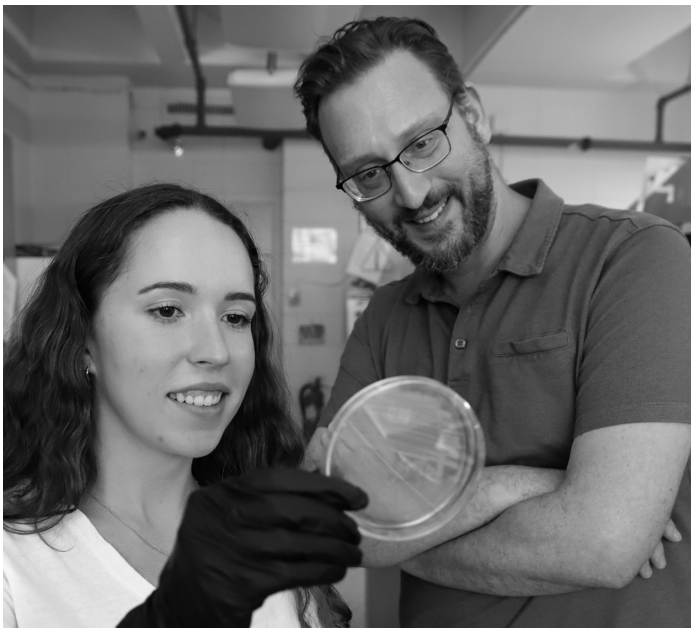
CURO Research Mentoring Awards

The Office of the Senior Vice President for Academic Affairs and Provost and the Jere W. Morehead Honors College established the CURO Research Mentoring Awards to recognize outstanding faculty who consistently engage undergraduate researchers through CURO programming (courses, Symposium, summer fellows, theses, etc.) and also enhance the learning experience of undergraduate researchers at the University of Georgia. Award recipients have provided superior research opportunities and mentoring and have collaborated with undergraduate researchers on publications and presentations at professional conferences.

The 2023 recipients are **Dr. Brandon Rotavera**, left, *Associate Professor, School of Environmental, Civil, Agricultural, and Mechanical Engineering, College of Engineering, and Department of Chemistry, Franklin College of Arts and Sciences*, and **Dr. Vincent Starai**, right, *Associate Professor, Department of Microbiology, Franklin College of Arts and Sciences,* pictured with Honors student Sophia Gavalas, who was a CURO Summer Research Fellow in 2022. Previous recipients and their years are listed below.



2022 recipients
- **Dr. Xiaoqin Ye**, *Professor, Department of Physiology and Pharmacology, College of Veterinary Medicine*
- **Dr. Puneet Dwivedi**, *Associate Professor of Sustainability Sciences, Warnell School of Forestry and Natural Resources*

2021 recipients
- **Dr. Cheryl T. Gomillion**, *Assistant Professor, School of Chemical, Materials, and Biomedical Engineering, College of Engineering*
- **Dr. Walter K. Schmidt**, *Georgia Cancer Coalition Distinguished Cancer Scholar, Department of Biochemistry and Molecular Biology, Franklin College of Arts and Sciences*

2020 recipients
- **Dr. Jamie Cooper**, *Associate Professor, Department of Foods and Nutrition, College of Family and Consumer Sciences*
- **Dr. David Cotten**, *Research Scientist, Department of Geography, Franklin College of Arts and Sciences*

2019 recipients
- **Dr. Vanessa Ezenwa**, *Professor, Odum School of Ecology, and Infectious Diseases, College of Veterinary Medicine*
- **Dr. Michelle vanDellen**, *Associate Professor, Psychology, Franklin College of Arts and Sciences*

CURO Symposium Best Paper Awards

CURO Symposium Best Paper Awards recognize excellence in papers developed from work being presented at this year's Symposium.

Applicants may submit in one or more of the following categories: Arts, Humanities, and Media; Business; Life Sciences; Physical and Environmental Sciences; Public and International Affairs; Social Sciences; and Technology, Engineering, and Math.

Each recipient is recognized at the Symposium's Awards and Keynote Session, and each award carries $100 in financial support. Recipients for the 2023 CURO Symposium are listed below, along with their research topics and faculty mentors.

Arts, Humanities, and Media

Katherine Alice Yarbrough

"As far as I now perceive it": Landscape Construction in the Ode to Psyche

Faculty Mentor: Roxanne Eberle

Business

Jacob Reinhart

Triboelectric Edge Computing Sensors and their Application in the IS Supply Chain

Faculty Mentor: Richard Thomas Watson

Life Sciences

Amelia Marie Snyder

Mosquito Cell Adaptation Confers Replication Advantages to Zika Virus at an Expanded Temperature Range

Faculty Mentor: Melinda Ann Brindley

Physical and Environmental Sciences

Uyen Ta

Pound-Drever-Hall Technique for Cavity-Enhanced Transient Absorption

Faculty Mentor: Melanie Reber

Public and International Affairs

Sophia DeLuca

Securitizing Periods: The Case for Incorporating Menstrual Hygiene Management into Women, Peace, and Security National Action Plans as a Mechanism to Improve Women's Security

Faculty Mentor: Maryann Gallagher

Social Sciences

Regina Metz

Agreement Between Diary and Actigraphy Assessed Sleep in Women with Post-Traumatic Stress Symptoms (PTSS)

Faculty Mentor: Patrick O'Connor

Libraries Undergraduate Research Awards

Since 2007, the UGA Libraries has sponsored the Undergraduate Research Awards, which provide cash prizes for excellence in research and academic inquiry. All UGA undergraduates conducting research are eligible.

Whether an undergraduate is creating a historical thesis, policy paper, composition for piano or a scientific study, they are eligible to apply for the award. The criteria include meeting with a librarian for a research consultation, writing a three- to five-page essay describing and reflecting upon the research process and project; and including a bibliography of sources used in the paper, among others. Prizes range from $200-$300.

Recipients for the 2023 CURO Symposium are listed below, along with their research topic, their librarian, and their faculty mentor.

Vanshika Singisetti
First Place Senior Award, for research on "Testing the Effects of Bisphenol Exposure on Meiotic Spindle Organization in Control and Pericentrin-depleted Oocytes"
Librarian: Diane Hartle
Faculty Mentor: Dr. Maria M. Viveiros

Yeongseo Son
First Place 1st-3rd Year Award, for research on "Inhibition of Neutrophil Elastase by the Bacterial Protease Inhibitor Ecotin"
Librarian: Ian Thomas
Faculty Mentor: Dr. Balazs Rada

Kiana Bussa
Honorable Mention, for research on "United Nations Human Rights Council Membership and Domestic Respect for Human Rights"
Librarian: Elizabeth White
Faculty Mentor: Dr. K. Chad Clay

Erin O'Keefe
Honorable Mention, for research on "The Sentimental Side of Mary Wollstonecraft: Her Painful, Pleasurable, and Eternal Sublime"
Librarian: Kristin Nielsen
Faculty Mentor: Dr. David Diamond

Jacob Reinhart
Juror's Choice award, for research on "Triboelectric Edge Computing Sensors and their Application in the IS Supply Chain"
Librarian: Colleen Gardina
Faculty Mentor: Dr. Rick Watson

Vybhavi Kotireddy
One-Time Award for Most Promising 1st Year Student Paper, on "Social Polarization and Parent Support for Child Physical Activity and Cardiovascular Health"
Librarian: Jessica Varsa
Faculty Mentor: Dr. Allan Tate

Oral Session 1

Monday,
10:20-11:10 a.m.
Athena Breakout Rooms

Room A	**Zainub Rushna Ali**	Made in America: Implications for Dual-Use Export Controls as the U.S. Brings Supply Chains Home	*Dr. Justin Conrad*
	Faith Price	Priorities of the U.S. Presidency: Insights from Bureaucratic Appointments	*Dr. Jamie L. Carson*
	Brock Schultz	Comfort in Chaos: The Electoral Benefits of Dysfunctional Governance	*Dr. Jamie L. Carson*
Room B	**Adam Starks**	The Hidden Costs of Private Probation	*Dr. Sarah Shannon*
	Sarah Ayomide Olatidoye	Rapping Resistance: The Evolution of Hip-Hop Music in the Black Communities of Brazil and the United States	*Dr. Cecilia Rodrigues*
	Christopher Rosselot	Scapegoats of Crisis in Ecuador? Narratives of Migrants During Times of Social Unrest	*Dr. Jorge C. Derpic*
Room C	**Sophia Theodora Gavalas**	Characterization of *M. tuberculosis* Protein PE17 and its Effect on Host Lipid Droplets	*Dr. Vincent Joseph Starai*
	Bhavini Singh	Relationship Between Margin of Stability and Joint Kinematics During Gait in Children with Cerebral Palsy	*Dr. Christopher Modlesky*
	Regina Metz	Agreement Between Diary and Actigraphy Assessed Sleep in Women with Post-Traumatic Stress Symptoms (PTSS)	*Dr. Patrick O'Connor*
Room D	**Arjun Kumar Kotapalli**	Development of an In Vitro Bone Metastatic Niche for Assessing Early-Stage Interactions of Osteoblasts and Metastatic Breast Cancer Cells	*Dr. Karen J.L. Burg*
	Areeba Hashmi	Bisphenol Exposure Disrupts Meiotic Spindle Organization and a Unique Liquid-Like Spindle Domain in Oocytes	*Dr. Maria M. Viveiros*
	Imrie Ross, Jodie Stone	Evaluation of a Molecular Tool to Measure the RNA Sequence-Dependent Translation Efficiency	*Dr. Branson W. Ritchie*

Monday, April 3, 2023

Oral Session 2

Monday, 11:30 a.m. to 12:20 p.m.

Athena Breakout Rooms

Room G	**Caroline Beuscher**	Freezing Tolerance Across Elevation and Ontogeny in *Boechera stricta*	*Dr. Jill Anderson*
	Gia Hy Do	The Single-Cell Expression Patterns of FADS1 and FADS2 Across Developmental Stages and Species	*Dr. Kaixiong Ye*
	Bryn Robinson, Cloe Reynolds	Effect of Time Dedicated to Teaching on Student Learning	*Dr. Tessa C. Andrews*
Room A	**Benjamin Lindsay Frick**	*Sarracenia purpurea* as an Indicator for Climate Change Based Range Shifts in the Genus *Sarracenia*	*Dr. Jacqueline E. Mohan*
	Kate Moore	The Effects of Boring Sponge (*Cliona celata*) Infection on Eastern Oyster (*Crassostrea virginica*) Engineering Function	*Dr. James E. Byers*
	Birkley Heynen	Tracking and Understanding Migration Patterns in Asian Needle Ants	*Dr. Takao Sasaki*
Room B	**Venkata Atluri**	The Effects of Influenza A Infection on Early Pregnancy in Mice	*Dr. Xiaoqin Ye*
	Elizabeth Lane	Developing a Series of Intrabodies to Selectively Inhibit Atypical p38 MAPK Signaling	*Dr. Neil J. Grimsey*
	Karly Kallish	Uterine Epithelial Estrogen Receptor α Conditional Knockout Mice Have Defective Uterine Fluid Regulation During Early Pregnancy	*Dr. Xiaoqin Ye*
Room C	**Bryce Sawyer**	Evaluating Fitness Contributions of RidA in *S. enterica*	*Dr. Diana M. Downs*
	Meredith Wessel	College Students and Caffeine	*Dr. Jennifer L. Gay*
	Nathan Kleber	Predicting Cis-Regulatory Interactions in the Human Kinome Through Structural Prediction Models	*Dr. Natarajan Kannan*

Oral Session 3
Monday,
12:40-1:30 p.m.
Athena Breakout Rooms

Room D	**Rachel Dukarski**	Renal Regulation of Calcium and Phosphorus Homeostasis During Early and Mid-Peak Egg Production in Laying Hens	*Dr. Laura Ellestad*
	Grant Gaines Bennett	The Function of Chicken Yolk Sac Tissue in Regulating Thyroid Hormone Metabolism and Availability During Early Embryogenesis	*Dr. Laura Ellestad*
	Graham Spires	Changes in Expression Patterns of Genes Related to Cyclic Eggshell Mineralization in the Shell Gland of Laying Hens at Early and Peak Egg Production	*Dr. Laura Ellestad*
Room G	**Hannah Lim**	Assessing Coastal Inundation around the Caribbean Islands	*Dr. Felix Luis Santiago Collazo*
	Shruti Milind Kumthekar	Nitric Oxide Release from S-Nitroso-N-acetylpenicillamine through Cerium Oxide Nanoparticles	*Dr. Elizabeth Brisbois*
	Bob Deng	Modeling Urban Canopy Cover and its Effectiveness on Flood Resilience for Coastal Communities Under a Changing Climate	*Dr. Felix Luis Santiago Collazo*
Room A	**Victoria Pagano**	Evaluating the Effects of Environmental Variation on American Alligator Telomere Length	*Dr. Benjamin Parrott*
	Seamus O'Brien	Population Ecology of the Common Musk Turtle (*Sternotherus odoratus*) in a Georgia Piedmont Ecosystem	*Dr. John Maerz*
	William T. Ellis	Do Hungry Predators Prefer Bored Prey? The Interactive Effects of Starvation Time and Boring Sponge Infection on Prey Selection by the Atlantic Oyster Drill	*Dr. James E. Byers*
Room B	**Tara Marie Kehoe**	*Venturia canescens* and Virus-Like Particles	*Dr. Gaelen Burke*
	Aaron Dino	A Theoretical Evaluation of Measles-Unvaccinated Children Thresholds for Targeted Interventions	*Dr. Amy Winter*
	Lily Metsker	The Detection and Quantification of Mpox Virus in Wastewater in Athens, Georgia	*Dr. Erin K. Lipp*

Monday, April 3, 2023

Room C	**Jamie Kaiser**	Transcription Factor GATA4 Acts as a Regulator of Heparan Sulfate Biosynthesis in Hepatocellular Carcinoma Cells	*Dr. Ryan Weiss*
	Madison Intemann	Drug Discovery for Mucopolysaccharidosis Type IIIA	*Dr. Ryan Weiss*
	Haruki Takeuchi	Bioengineering Heparan Sulfate to Create a Safe and Effective Heparin Alternative	*Dr. Ryan Weiss*
Room D	**Emily Armstrong**	Using Heat Maps to Assess Food Selection Behaviors to Inform Food-Access Interventions with Rural Georgia Residents	*Dr. Alexa Lamm*
	Max White	Wind Disaster Strikes: Mapping 30 Years of Georgia's Severe Wind Events	*Dr. Michelle Ritchie*
	Ansley Grace Groen	Burden of Mental, Behavioral and Neurodevelopmental Disorders Among Children Exposed to Adverse Childhood Experiences in the U.S.	*Dr. Janani Rajbhandari-Thapa*
Room G	**Maddie Packard**	Dynamic Changes of Uterine Immune Function Facilitate Early Pregnancy Events	*Dr. Xiaoqin Ye*
	Hope Grismer	Hormonally Mediated Functions of Ras Homolog Family Member A (RhoA) in Uterus of Ovariectomized Mice	*Dr. Xiaoqin Ye*
	Addie Laurel Smith	Investigating the Functional Role of Thyroid Hormones on Insulin-Like Growth Factor Binding Protein Expression During Avian Muscle Development	*Dr. Laura Ellestad*
Room H	**Jacob Reinhart**	Triboelectric Edge Computing Sensors and Their Application in the IS Supply Chain	*Dr. Richard Thomas Watson*
	Brennan Fravert	Antitrust Political Economy: The Law and Economics of Market Power	*Dr. Laura Phillips-Sawyer*
	Akhila Yellapragada, Vedika Ghildyal	Optimizing the Efficiency of Command-Execution Testing Procedures	*Dr. Deepak R. Mishra*

Oral Session 4

Monday,
1:50-2:40 p.m.
Athena Breakout Rooms

Room A	**Anderson Smith**	Abomasal Parasites in White-Tailed Deer (*Odocoileus virginianus*) in West Virginia	*Dr. Michael Yabsley*
	Taylor Pearson	Prevalence and Diversity of Rickettsia Species in Ixodid Ticks from Baird's Tapirs (*Tapirus bairdii*) from Costa Rica	*Dr. Michael Yabsley*
	Josiah Lavender	Effects of Habitat on Painted Bunting (*Passerina ciris*) Abundance and Space Use on a Southeastern Barrier Island	*Dr. Clark Rushing*
Room B	**Sydney Arin Mance**	Sweet Taste Exposure in Adults with Obesity Leads to Differential Cephalic Phase Responses	*Dr. Jamie Cooper*
	Davia E Allen	Postprandial Cognitive Performance in Response to an Acute Pecan-Enriched Meal Challenge	*Dr. Jamie Cooper*
	Isabella Morris	The Effect of Microbiota Transplantation on Weight Gain	*Dr. Claire de La Serre*
Room C	**Kimberly Cisneros**	High Throughput Drug Discovery for Multiple Hereditary Exostoses	*Dr. Ryan Weiss*
	Temiloluwa Ogunsanya	Visualizing the Plasmodium Food Vacuole for PRC1590 Co-localization Experiments	*Dr. Maria Belen Cassera*
	Maliha Rythme Hasan, Raj Shah	Bordetella Glycans Involved in Infection	*Dr. Maor Bar-Peled*
Room D	**Emma Sorckoff**	Exploring Young Children's Recovery Rates in Academic, Social, and Behavioral Skills Following COVID-19-initiated Disruptions to In-Person Learning	*Dr. Kristen Bub*
	Ryan Belfi	An Autoethnography Account: The Impact of Research on Identity	*Dr. Doris Acheme*
	Casey Jokay	Correlations between Parent Affect, Autonomy-Supportive and Controlling Behaviors in Elementary Math Learning	*Dr. Michael Barger*
Room G	**Christina James**	Next Generation Organoids: Root Vascularization and Accurate Organ Shape	*Dr. Nadja Zeltner*
	Rayna J. Carter	Metacognitive Development in Life Science Majors: Insights from Year One of a Longitudinal Study	*Dr. Julie Dangremond Stanton*
	Andres Villalobos	Investigating the Role of Neuropeptide Signaling in Planarian Stem Cell Differentiation and Function	*Dr. Rachel Roberts-Galbraith*

Monday, April 3, 2023

Awards and Keynote Session

Monday, 3 to 4 p.m.
Athena Room E

Welcome and Introductions

Meg Amstutz
Dean of the Jere W. Morehead Honors College

Remarks

Jere W. Morehead
UGA President

Awards Introduction

Patricia Hunt-Hurst
Interim Associate Dean of the Jere W. Morehead Honors College; Professor Emerita, Textiles, Merchandising, and Interiors, College of Family and Consumer Sciences

CURO Research Mentoring Awards

Karen J.L. Burg
Vice President for Research

CURO Symposium Best Paper Awards

S. Jack Hu
Senior Vice President for Academic Affairs and Provost; UGA Foundation Distinguished Professor in the School of Environmental, Civil, Agricultural, and Mechanical Engineering, College of Engineering

UGA Libraries' Undergraduate Research Awards

M. Kathleen Kern
Director of the Miller Learning Center Library Commons, UGA Libraries

Introduction of the Keynote Speaker

Maisy Hufford, *Undergraduate Student, Political Science, School of Public and International Affairs*
Mallory Plunkett, *Graduate Student, Epidemiology, College of Public Health; BS Biology, Class of 2022*

Keynote Address

Marisa A. Pagnattaro
Vice President for Instruction; Josiah Meigs Distinguished Teaching Professor, Terry College of Business

Closing Comments

Meg Amstutz

Audience adjourns to Poster Session and Symposium Reception, held in Grand Hall South.

Poster Session, Monday, 4 to 6 p.m., *Grand Hall South*

Poster 1	**Christopher Oluwafemi Romiluyi**	Foraging Rate Across Resources and Temperature Gradient in *Daphnia dentifera*	*Dr. Alexander Strauss*	*Ecology*
Poster 2	**Gabe Sullivan-Brugger**	Eating for Several Thousand: How Interactions Between Temperature and Resource Concentration Influence the Assimilation of Energy in a Host (*Daphnia dentifera*) - Parasite (*Metschnikowia bicuspidata*) Relationship	*Dr. Alexander Strauss*	*Ecology*
Poster 3	**Amitesh Vikram Anerao**	Physiological Effects of Auditory Stressors on the Horned Passalus Beetle	*Dr. Andy Davis*	*Ecology*
Poster 4	**Jesse Freeze**	Diver-held and Stationary Camera as Tools to Observe Bluestreak Cleaner Wrasse (*Labroides dimidiatus*) Mutualisms and Cheating	*Dr. Craig W. Osenberg*	*Ecology*
Poster 5	**Caitlin Lyons**	Understanding Animal Responses to Invasive Species Using Wildlife Camera Traps	*Dr. Lizzie King*	*Ecology*
Poster 6	**Hanna Lena Demmler**	The Effect of Wrack on Rodent Activity in a Salt Marsh	*Dr. James E. Byers*	*Ecology*
Poster 7	**Isabella E. Pellicano**	Investigating Colonization and Enzyme Activity of Ectomycorrhizal Fungi Through White Oak Inoculation	*Dr. Nina Wurzburger*	*Ecology*
Poster 8	**Samantha Jane Dilley**	Social Determinants of Adaptation in Agricultural Communities	*Dr. Sechindra Vallury*	*Ecology*
Poster 9	**Skyler DeWitt**	Testing Color Calibration of Mammalian Fur Images in *Peromyscus polionotus* (Oldfield Mice) as a Case Study	*Dr. Sonia Altizer*	*Ecology*
Poster 10	**Jess Moczulski**	Appalachian Salamander-Parasite Interactions Respond to Forest Treatment for the Control of Invasive Tree Pests	*Dr. Sonia Altizer*	*Ecology*
Poster 11	**Logan Lane Owens**	Plastic Ingestion by an Omnivorous Mammal, the Ringtail (*Bassariscus astutus*), in a National Park	*Dr. Sonia Altizer*	*Ecology*
Poster 12	**Jayce Marino**	Effects of Salinity on the Feeding and Development of the Rhizostome Jellyfish *Cassiopea xamachana*	*Dr. William Fitt*	*Ecology*
Poster 13	**Sahana Parker**	Evaluating Strategies to Increase Client Participation in Campus Compost Program	*Tyra Byers*	*Ecology*
Poster 14	**Jay Mrazek**	Rock-Water Interactions in Tumbling Rock Cave, Alabama, USA: Geochemical Analysis of an Underground Stream System	*Dr. Todd C. Rasmussen*	*Forestry & Natural Resources*

Poster 15	**Jordan Nicole Smith**	Assessing Carbon Benefits and Economics of Wood Pellet-Based Sustainable Aviation Fuel Production in the Southern United States	*Dr. Puneet Dwivedi*	*Forestry & Natural Resources*
Poster 16	**Victoria Pagano**	Creating a Novel Technique to Model Populations of Pond-Breeding Amphibians	*Dr. John Maerz*	*Forestry & Natural Resources*
Poster 17	**Taylor Sabato**	The Impact of COVID-19 on Substance Use Disorder Treatment	*Dr. Lydia Aletraris*	*Social Work*
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Poster 30	**Amanda Childs**	The Relationship Between Adolescent Cannabis Use and White Matter Structure in Psychosis	*Dr. Jennifer McDowell*	*Psychology*
Poster 31	**Alex Parker**	Factor Analysis of Pre-Quit Minnesota Nicotine Withdrawal Scale Scores Among Smokers Seeking Treatment	*Dr. Lawrence Sweet*	*Psychology*
Poster 32	**Cora Romick, Lexie Goldman, Angela Vo, Rithvick Kumar, Faaris Rashid, Danyal Ahmad**	A Meta-Analysis of Workaholism and Negative Health Outcomes	*Dr. Malissa Clark*	*Psychology*
Poster 33	**Kate Margaret Glennon**	A Meta-Analytic Investigation of the Associations Between Partner Support and Smoking Cessation	*Dr. Michelle R. vanDellen*	*Psychology*
Poster 34	**Kat Tanaka, Lily Boothby, Zhaojie Yan**	Increase in Perceived Efforts When Goal Pursuit is Successful	*Dr. Michelle R. vanDellen*	*Psychology*
Poster 35	**Reese Caillet Giddens**	The Impact of Perceived Self-Control Failures on Food Choices and Eating Justifications	*Dr. Michelle R. vanDellen*	*Psychology*
Poster 36	**Hailey Maxwell**	Ghost Goals	*Dr. Michelle R. vanDellen*	*Psychology*
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Poster 44	**Srisneha Vallabhajosyula**	Curation and Analyses of Drug-Distribution Across Tissues	*Dr. Eugene Douglass*	*Pharmaceutical & Biomedical Sciences*

Poster 45	**Fareena Hisamuddin**	Ecological Factors Influencing Chagas Disease Infection in Domestic Dogs from Rural Communities in Panama	*Dr. Nicole Gottdenker*	*Pathology*
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Poster 214	**Natalia Mia Jimenez, Margaret Hill, Madeline Franz, Mary Elizabeth David**	Overview of Variables Affecting Loss to Follow-Up in the Newborn Hearing Screening Process	*Dr. Sandie Bass-Ringdahl*	*Communication Sciences & Special Education*
Poster 215	**Anna Camille Burnett, Zina Robbins, Addie Lee, Ashlyn Roe**	Language Outcomes in Children Who Are Deaf or Hard of Hearing and Use the Auditory-Verbal Therapy Approach	*Dr. Sandie Bass-Ringdahl*	*Communication Sciences & Special Education*
Poster 216	**Joshua Rysiew**	A Case Study of the Degrees of Racial Equity in Jenkins City Schools Gifted Education, AP Programs, and High School Math and Science Classes	*Dr. Tarek C. Grantham*	*Educational Psychology*
Poster 217	**Prisha Nanda Kumar**	Assessing International Health Practioners' Autism Knowledge in Various Subscales	*Dr. Ashley J. Harrison*	*Educational Psychology*
Poster 218	**Carter Jordan Horvath**	Examining Predictors of Educational Accommodation Attitudes Among College Peers	*Dr. Ashley J. Harrison*	*Educational Psychology*
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Poster 220	**Paula Salazar**	Examining Global Perspectives in Middle Grades Teacher Education	*Dr. Gayle Andrews*	*Educational Theory & Practice*
Poster 221	**Krithi Ariga**	Studying Cognitive Control in the Spatial Stroop Task: Is it Possible to Learn over Time?	*Dr. Deborah A. Barany*	*Kinesiology*
Poster 222	**Asher Riaz Khan**	Effects of Different Eye Movements on Motion Perception and Interceptive Timing	*Dr. Deborah A. Barany*	*Kinesiology*
Poster 223	**Madison Elizabeth Lowe**	The Role of Exercise on Cognitive-Motor Control in a Spatial Stroop Task	*Dr. Deborah A. Barany*	*Kinesiology*
Poster 224	**Ria Doshi**	Investigating Brainsight Neuronavigation Methods for Transcranial Magnetic Stimulation	*Dr. Deborah A. Barany*	*Kinesiology*
Poster 225	**Aryan Arora**	Integrating Real-Time Accelerometer Data to Quantify Extraneous Movement During Mock fMRI Scans	*Dr. Deborah A. Barany*	*Kinesiology*
Poster 226	**Ayoub Abubaker, Robel Yohannes**	Evaluating the Physiological Effects of High-Intensity Interval Training on Skeletal Muscle Function in Healthy, Wildtype Mice	*Dr. Jarrod A. Call*	*Kinesiology*
Poster 227	**Patricia Ni**	Enzyme Activity of Key Krebs Cycle Enzymes in a Model of Volumetric Muscle Loss Injury	*Dr. Jarrod A. Call*	*Kinesiology*
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Poster 229	**Ana White**	Assessing the Functional Role of Descending Neural Pathways Using Conditioned H-Reflex	*Dr. Jing Xu*	*Kinesiology*
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Poster 231	**Riya Patel, Sydnie Keane, Rishabh Rege**	The Use of Multiple Muscle Stimulation to Enhance Muscle Metabolism	*Dr. Kevin McCully*	*Kinesiology*
Poster 232	**Samantha Ye, Benjamin Tharp**	The Influence of Oxygen Levels and pH During Exercise on Mitochondrial Capacity	*Dr. Kevin McCully*	*Kinesiology*
Poster 233	**Ansleigh Claire Abell**	A New Test for Leg Blood Flow in People with Peripheral Arterial Disease	*Dr. Kevin McCully*	*Kinesiology*
Poster 234	**Justin Minwoo Oh, Amishi Patel**	Exploring the Validity of an Instantaneous Fatigue and Recovery Test Using Electrical Stimulation and Accelerometer	*Dr. Kevin McCully*	*Kinesiology*
Poster 235	**Parker Jace Vaughan, Shelby Mallon**	Mitochondrial Capacity Immediately Following Exercise	*Dr. Kevin McCully*	*Kinesiology*
Poster 236	**Sarah Watson**	The Impact of Aerobic Fitness Status on Metabolic Flexibility	*Dr. Nathan T. Jenkins*	*Kinesiology*
Poster 237	**Hassan Smadi, Rama Khawaldeh**	Effects of Word Presentation During Treadmill Walking on Free-Recall and Recognition Episodic Memory	*Dr. Phillip Tomporowski*	*Kinesiology*
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Poster 240	**Anant Ayyagari**	The Impact on Mental Health and Productivity of College Professors During Work from Home	*Dr. Ming Zhang*	*Epidemiology & Biostatistics*
Poster 241	**Aaron Dino**	A Theoretical Evaluation of Measles-Unvaccinated Children Thresholds for Targeted Interventions	*Dr. Amy Winter*	*Epidemiology & Biostatistics*
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Poster 243	**Madison Bailey Clark**	Examining the Needs of Certified Nursing Assistants to Build a Self-Care Continuing Education Program	*Dr. Jenay M. Beer*	*Gerontology*

Poster 244	**Claire Sheppard**	Evaluating Social Support Services Provided by the CARE Center for Persons with Dementia and Their Care Partners	*Dr. Jenay M. Beer*	*Gerontology*
Poster 245	**Elise Marie Lodde**	Examining the Needs of Rural Georgians for Dementia Education, Diagnostic Services, and Post-Diagnosis Support	*Dr. Jenay M. Beer*	*Gerontology*
Poster 246	**Arya Datta, Madison Clark**	Examining the Effect of Mindful Eating on DASH Diet Adherence in a Full-Time Working Sample	*Dr. Jenay M. Beer*	*Gerontology*
Poster 247	**Nadia Talebi**	Examining the Relationship Between Macular Pigment Optical Density (MPOD) and Blood Pressure	*Dr. Jenay M. Beer*	*Gerontology*
Poster 248	**Nicholas Myers**	Evaluating a Brain Health Education Training Program Among Professional Health Educators	*Dr. Lisa Renzi Hammond*	*Gerontology*
Poster 249	**Adrian Bozocea**	Investigating PFAS Contamination Effects on Parental Reproductive Health and Child Development via Unsupervised Machine Learning	*Dr. Lisa Renzi Hammond*	*Gerontology*
Poster 250	**Sophie Elizabeth Slyman, Grace Mccorkle, Frances Ricks, Caitlin Grdinich**	Investigating the Use of Technology-Led Piano Lessons in Improving Older Adult's Cognitive Function	*Dr. Lisa Renzi Hammond*	*Gerontology*
Poster 251	**Cristina D'Alto**	Psychological Outcomes of Weight-Neutral Dietary Interventions: A Systematic Review of the Literature	*Dr. Sarah Saint Hamilton*	*Gerontology*
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Poster 253	**Madison Picklesimer**	The Relationship of Activity Intensity Levels and Caffeine Consumption	*Dr. Jennifer L. Gay*	*Health Promotion & Behavior*
Poster 254	**Jasmine Udeshi**	On Campus Caffeine Consumption	*Dr. Jennifer L. Gay*	*Health Promotion & Behavior*
Poster 255	**Madeline Catherine Kerestman**	Got Caffeine? The Association Between Caffeine Intake and Walking Levels Among UGA Students	*Dr. Jennifer L. Gay*	*Health Promotion & Behavior*
Poster 256	**Bansari R. Shah**	The Relationship Between Physical Activity and Sleep	*Dr. Jennifer L. Gay*	*Health Promotion & Behavior*
Poster 257	**Emma DiPuma, Emery Pikel, Alexander Scheid, Sarah Heaton, Fatima Islam**	Imagine It Is the Year 2100. People and Environments Around You Are Thriving. What Do You See?	*Dr. Michelle Ritchie*	*Health Policy & Management*

Poster 258	**Jason Meng**	Extending Knowledge and Skills in Disaster Management Through Local Application	*Dr. Michelle Ritchie*	*Health Policy & Management*
Poster 259	**Benjamin Brown**	Analyzing the Gaze Points and Strategies of Sight-Singers with an Eyetracker	*Dr. Rebecca L. Atkins*	*Music*
Poster 260	**Rose Sebaugh**	Assessing Potential Risk Periods of Disordered Eating in Collegiate Dancers	*Prof. Rebecca Gose*	*Dance*
Poster 261	**Aila Herenda**	Effects of Positive Psych Interventions on the First-Generation American	*Dr. Wendy Harris Biddle*	*Division of Academic Enhancement*
Poster 262	**Joshua Walker**	Institutional Bias or Failure? Evaluating Outcomes of the IMF's Low-Income Lending Facilities	*Dr. Carolina Caetano*	*Economics*
Poster 263	**Venusha Vishmika Buwaneka**	Analysis of the Fintech Market and Consumer-Treatment	*Dr. Gregory Day*	*Legal Studies*
Poster 264	**Ria Sardana**	Cyber Risk and Insurance in the Financial Sector	*Prof. Lindsay Sain Jones*	*Legal Studies*
Poster 265	**Sophia Beasley**	Influencers and Financial Markets: Crossing the Liability Line?	*Prof. Lindsay Sain Jones*	*Legal Studies*
Poster 266	**Dawson Templin**	Hospital Administrators and their Effect on Performance and National Ranking Outcomes	*Dr. Tim Quigley*	*Management*
Poster 267	**Alexa Nicole Robles**	Developing a Chatbot to Improve Prenatal Testing Education Amongst Pregnant Women	*Dr. Elena Karahanna*	*Management Information Systems*
Poster 268	**Carson Hart**	How Thin-Ideal Versus Plus-Size Models Influence Perceived Brand Authenticity and Brand Outcomes	*Dr. Rosanna K. Smith*	*Marketing & Distribution*
Poster 269	**Josie Dennis**	Popularity Breeds Similarity: Effects of Social Media Recommender Systems on Homogenous Beauty Standards and Mental Health	*Dr. Rosanna K. Smith*	*Marketing & Distribution*
Poster 270	**Bella Cabibi**	An Investigation in Measuring Commitment and What Influences a State's Strength of Commitment to Human Rights Treaties	*Dr. Andy Owsiak*	*International Affairs*
Poster 271	**Sloane Rice**	Brexit Reopens the Irish Border Conflict	*Dr. Andy Owsiak*	*International Affairs*
Poster 272	**Davis Wesley Potts**	How Does Sustainability Policy Affect Local Industries? A Study in the Archipelago of the Açores	*Dr. Gregory M. Thaler*	*International Affairs*
Poster 273	**Hannah Kesner, Inaara Lalani**	The Populist Radical Right: A Threat to Human Rights	*Dr. K. Chad Clay*	*International Affairs*

Poster 274	**Julianna Russ**	Recasting Surrogacy as Labor: Assessing International Law and Developing a Regulatory Framework	*Dr. Maryann Gallagher*	*International Affairs*
Poster 275	**Lilly Kersh**	Race and Motherhood in Politics: How News Media Coverage Differs Based on Intersecting Identities	*Dr. Maryann Gallagher*	*International Affairs*
Poster 276	**Justin Cohen**	Rifts in Congress: How Has Domestic Elite Polarization Affected U.S. Foreign Policy?	*Dr. Ryan Powers*	*International Affairs*
Poster 277	**Sara Anis Ali**	Analyzing the Conditional Discharge Program for Misdemeanor Marijuana Possession in Fayette County	*Dr. Teena Wilhelm*	*Political Science*
Poster 278	**Micah Duane Shannon**	The Geography, Growth, and Property Price Effects of Private Student Housing Developments in American College Towns	*Dr. Joseph T. Ornstein*	*Political Science*
Poster 279	**Chris Haswell**	Utilizing Transparency Reports: An Analysis of the Surveillance Relationship Between the United States Government and Big Tech	*Dr. Andrew Whitford*	*Public Administration & Policy*
Poster 280	**Cullen Trace Giddens, Sarah Kudyba**	Understanding the Acquisition of English VACs by Speakers of Two Typologically Similar L1s: Brazilian Portuguese and Italian	*Dr. Vera Lee-Schoenfeld*	*Linguistics*
Poster 281	**Jill S. McLendon**	Filling the Gap: The Correlation Between Particle Verbs and Transitivity in German and English	*Dr. Vera Lee-Schoenfeld*	*Linguistics*
Poster 282	**Rohini Bose**	Ethics of Artificial Intelligence in the Discovery Process of Litigation	*Dr. Jeremy Davis*	*Philosophy*
Poster 283	**Maya Cornish, Caroline Solomon**	Russian Language Resource Creation and Outreach for High Schools	*Dr. Alexandra Shapiro*	*Germanic & Slavic Studies*
Poster 284	**Daniel Sina Rouhani**	Superiority of Silk Wound Dressing Over the Dermabond® Prineo® Skin Closure System: A Prospective, Randomized, Single-Blinded Clinical Trial	*Dr. Janet Westpheling*	*Genetics*
Poster 285	**Anannya Das**	Analyzing Sufu Expression in the Sonic Hedgehog Signaling Pathway in Heterozygous Induced Lizard Embryonic Fibroblast Cells using CRISPR/Cas9	*Dr. Jonathan Eggenschwiler*	*Genetics*
Poster 286	**Kennedi Lashaun Scales**	Investigating Enhancer Function of 157 Base Pair Region Within FADS2 in Humans	*Dr. Kaixiong Ye*	*Genetics*
Poster 287	**Claire Cheng**	The Shared Genetics Basis of Circulating Polyunsaturated Fatty Acids and Brain Disorders	*Dr. Kaixiong Ye*	*Genetics*

Poster 288	**Isabelle Bowman**	Investigating the Influence of a Genetic Variant, rs968567, on FADS1 and FADS2 Expression Through Prime Editing	*Dr. Kaixiong Ye*	*Genetics*
Poster 289	**Elaina Barrickman**	Investigating Enhancer Function of 335 Base Pair Region Within FADS2 in Humans	*Dr. Kaixiong Ye*	*Genetics*
Poster 290	**Julia Louise Cazabon**	Investigating Enhancer Function of 335 Base Pair Region Within FADS2 in Humans	*Dr. Kaixiong Ye*	*Genetics*
Poster 291	**Alex Huong Chiang, Aryaman Singh**	The Effects of Vegetarianism and Genetics on Human Polyunsaturated Fatty Acid Levels	*Dr. Kaixiong Ye*	*Genetics*
Poster 292	**Shaelin Lee**	A Genetic Approach to Exploring the Relationship Between Heterochromatin Disruption, Genome Instability, and Disease	*Dr. Mary Goll*	*Genetics*
Poster 293	**Jiye Bae**	Intron Methylation Regulates IBM1 Expression in *Arabidopsis thaliana*	*Dr. Bob Schmitz*	*Genetics*
Poster 294	**Kelly Luo**	The Effect of Cis-Regulatory Variation on Chromatin Accessibility in the Maize Genome	*Dr. Bob Schmitz*	*Genetics*
Poster 295	**Aditya Birla**	Comparing Databases of Gene Expression to Determine Transcription Factor Function	*Taylor Marie Strayhorn*	*Genetics*
Poster 296	**Ziad Obideen**	Dissecting the Interactions Between the Bacterial Predator *Acinetobacter baylyi* and its Prey *Escherichia coli*	*Dr. Courtney Kathleen Ellison*	*Microbiology*
Poster 297	**Alexandra Benedetto**	The Influence of ALS3 or HGC1 Overexpression on the Improvement of Biofilm Formation in *Candida albicans*	*Dr. Aaron P. Mitchell*	*Microbiology*
Poster 298	**Abby Lauterbach**	A Comparative Study of Bee Genus Diversity and Abundance in Urban Food Production Sites Versus Urban Ornamental Sites in Athens, GA	*Dr. Kris Braman*	*Entomology*

Tuesday, April 4, 2023

Oral Session 5

Tuesday,
9:35-10:50 a.m.
Athena Breakout Rooms

Room A	**Sean Manning**	Addressing Energy Security Misunderstandings in Georgia: A State-Wide Educational Approach	*Dr. Maryann Gallagher*
	Emma Griffin	The Impact of Environmental INGO Presence on Ecological Terrorism Activity	*Dr. Amanda Murdie*
	Kiana Bussa	United Nations Human Rights Council Membership and Domestic Respect for Human Rights	*Dr. K.C. Clay*
	Brooke Sanders	The Global Importance of Women in Energy	*Dr. Maryann Gallagher*
Room B	**Kiernan O'Mara**	Attentional Deficits Related to Compromised Target Detection in Visual Paradigms	*Dr. Brett Clementz*
	Sydney Cottle	The Relationship Between Gender, Home Demands, and Burnout	*Dr. Lillian T. Eby*
	Alex Branch	The Relationship Between Insula Volume and Positive Symptoms in Psychotic Disorders	*Dr. Jennifer McDowell*
Room C	**Yiren Hou**	Overall Ranking of Small Area Means using Bayesian Method	*Dr. Abhyuday Mandal*
	Joshua Simon Track	Resolving the Inconsistency in the Physical and Psychological Differences of the Natural Slave and Natural Master of Aristotle's Politics	*Dr. Athanasios Samaras*
	David Burke	The Influence of Multidimensional Poverty on Malnutrition and Health Outcomes of Indigenous Panamanians	*Dr. Leonard Martin Ward*
Room D	**Kate Yarbrough**	A Letter's Landscape: Exploring the Odes of John Keats	*Dr. Roxanne Eberle*
	Gillian Lee Pytte	Julian of Norwich's Guide to Suffering: Christ's Divine Fall	*Dr. Cynthia Turner Camp*
	Maxim Harris Bateman	The Anatomy of a Psalm: A Literary Study of Biblical Poetry	*Dr. Susan Rosenbaum*

Oral Session 6

Tuesday, 11:10 a.m. to 12:25 p.m.
Athena Breakout Rooms

Room G	**Saumya Reddy Gade**	A Retrospective Study of Neoplasms in 97 Captive and Wild Virginia Opossums (*Didelphis virginiana*)	*Dr. Elizabeth Howerth*
	Evan Jacob Sinclair, Carlee Harris, Julia Florentino	Formulating the Parameters of Plastination	*Dr. Krzysztof Czaja*
	Abigail Roegner	The Search for a Universal Influenza Vaccine: Broadening Influenza A Immunization Using Next-Generation COBRAs and Nanoparticle Technology	*Dr. Jarrod Mousa*
Room A	**Shrika Madivanan**	Starvation as an Act of Resistance: Force Feeding as a Tool of Torture	*Dr. Leah Carmichael*
	Sophia DeLuca	Securitizing Periods: The Case for Incorporating Menstrual Hygiene Management into Women, Peace, and Security National Action Plans as a Mechanism to Improve Women's Security	*Dr. Maryann Gallagher*
	Milan Nayak	Minimum Wage and Human Voter Rights: What's the Relationship?	*Dr. K.C. Clay*
	Alex Drahos	The Space Race: Examining Terrorist Attacks in Public and Private Spaces	*Dr. Maryann Gallagher*
Room B	**Aayush Umesh**	Cabaret's Buddhist Hells and Psychedelics: Comparing Sally Bowles to Jean Ross in an Unconventional Performance	*Prof. George Contini*
	Wyn Alyse Thomas	Excerpts from "First Semester: A Musical"	*Prof. George Contini*
Room C	**Douglas Vines**	Fruit Shape of Watermelon Associated with Variation in ClSUN25-26-27a Alleles	*Dr. Cecilia McGregor*
	Yash Sajjan	Harvesting Microalgae Using Thermoresponsive Surfaces	*Dr. Sergiy Minko*
	Joseph Weston Clarke	Phenology and Floral Color Variation in Two Spring Ephemerals	*Dr. Megan DeMarche*

Oral Session 7

Tuesday, 12:45-2 p.m.
Athena Breakout Rooms

Room A	**Alex Drahos**	Breaking the Cycle of Hate: Exploring LGBT+ Hate Crimes in Post-Conflict Societies	*Dr. Andrew Owsiak*
	Albert Zhonghai Chen	China's Soft Power and International Cooperation	*Dr. Rongbin Han*
	Aicha Sabara	Starvation as a Tool of War: A Phenomenon, or is it?	*Dr. Leah Carmichael*

Tuesday, April 4, 2023

Oral Session 8

Tuesday,
2:20-3:35 p.m.
Athena Breakout Rooms

Room B	**Sara Adkins**	Helping Children with ASD Succeed in School: Evidence from the United States and Russia	*Dr. Olga Thomason*
	Lyla Gahl	The Historical Impact of the Films Solaris (1972) and 2001: A Space Odyssey (1968) on Public Perceptions about the Cold War in the Soviet Union and the United States	*Dr. Alexandra Shapiro*
	Katerina Dmitrivna Khudoleyev	Russian Iconography in Hollywood and its Impact on Media Consumers	*Dr. Olga Thomason*
	Jazlyn Piedra	The EU Responses to the Syrian and Ukrainian Humanitarian Crises	*Dr. Alexandra Shapiro*
Room C	**Yeongseo Son**	Inhibition of Neutrophil Elastase by the Bacterial Serine Protease Inhibitor Ecotin	*Dr. Balazs Rada*
	Aryan Thakur	Uncovering the Role of Chromomethylase-3 in Gene Body Methylation using Neurospora Crassa	*Dr. Robert J. Schmitz*
	Andrew Mathias	Developing an Early Diagnostic Biomarker for Parkinson's Disease Using Skin Samples	*Dr. Anumantha Kanthasamy*
Room D	**Jonas David Andrulonis**	Airpods, Everyday Aesthetics, and Subjective Well-Being	*Dr. Aaron Meskin*
	Emma Kay Ryals, Alyssa Dickson	The Beauty of Plurality: The Designing of Genderless Clothing	*Dr. Laura McAndrews*
	Avery Scott	Gender and Its Implications as a Fluctuating Construct Throughout the History of Ballet	*Dr. Lisa Fusillo*
Room A	**Natalie Marie Moss**	Warfare at Kaman-Kalehöyük, Turkey: Isotopic Analysis of Burned Remains - Preliminary Data and Future Directions	*Dr. Suzanne Pilaar Birch*
	Liza Watson	Building Blocks: How Children Learn Subsistence and Spiritual Knowledge	*Dr. Bram Tucker*
	Ansley Warnock	Correlation Between Mental Distress and Spirituality Related to Ancestral Veneration	*Dr. Bram Tucker*
	Daniella Di Carlo	Individual Differences in Arboreality in Western Gorillas	*Dr. Roberta Salmi*

Room B	**Logan Ledbetter**	Understanding the Situation: The Dynamic of Human Rights Violations in Ukraine	*Dr. Olga Thomason*
	Shelby Linton	The Nature of the Supernatural and Paranormal: An Exploration through Russian and American Cartoons	*Dr. Olga Thomason*
	Jessica Morgan Sobieski	Questions of National and Cultural Differentiation in Central Asian States	*Dr. Olga Thomason*
Room C	**Mary Stuart Herlihy**	Ketenimines as Diels–Alder Dienophiles	*Dr. Christopher Newton*
	Widener Norris, Samuel Snyder	The Kinetic Trapping of the Evasive Phosphatetrahedrane	*Dr. Henry F. Schaefer*
	Audrey Violet Conner	Computational Elucidation of Reactivity of bis-Silyloxyfurans with Ketenimines in the Diels-Alder Reaction	*Dr. Steven Edge Wheeler*
	Justin Kim	Crystallization of Serine Hydroxymethyltransferase from *Thermus thermophilus*	*Dr. Robert Stephen Phillips*
Room D	**Caitlyn Miller**	Communicating Uncertain Science to the Public	*Dr. Chelsea Bush*
	Noor Abdallah	Picturing the Overturn of Roe V. Wade: An Analysis of Newsroom Instagram Photographs and their Photographers	*Dr. Andrea Hudson*
	Saba Alemayehu	Examining the Effects of Virtual Psychological Ownership on Hurricane Risk Perceptions	*Dr. Sun Joo 'Grace' Ahn*
	Dylan Marie Lao	Church Exploration	*Dr. Christin Huggins*
Room G	**Rosalba Mazzotta**	Understanding the Combustion Chemistry of Biofuels	*Dr. Brandon Rotavera*
	Joshua DeJongh	Computational Fluid Dynamics Modeling of Jet-Stirred Reactors	*Dr. Brandon Rotavera*
	Philip Albenice	Chemical Kinetics Modeling of 2-methyltetrahydrofuran Combustion	*Dr. Brandon Rotavera*
	Sakshi Gandikota, Nicholas Papciak, Parker Anderson, Paul Wang, Riley Elwood	Analysis of Worker Happiness Using Computer Vision Techniques	*Dr. Jaime Camelio*

Oral Session 9

Tuesday,
3:55-5:10 p.m.
Athena Breakout Rooms

Room H	**Rinisha Ramprakash**	Simulating Interactions with Lunar Rocks	*Dr. Phillip C. Stancil*
	Jared Ian Maller	Physics Students' Use of the Taylor Series Approximation in Upper-Level Physics Courses	*Dr. Craig Wiegert*
	Catalina Macedo Giang	A Black Spatial Imaginary: Footprints in the Urban South	*Dr. Steven Holloway*
Room A	**Jasmine Means**	Madwoman Circe	*Dr. Danielle Bray*
	Maggie Yarbrough	"A Part of Her That Was Always Watching Her": Voyeurism and Feminine Adolescence in A Hat Full of Sky	*Dr. Danielle Bray*
	Ally Bonfield	The Cruel Prince and the Enemies-to-Lovers Trope	*Dr. Danielle Bray*
Room B	**Risha Hegde**	The Efficacy of Psychedelics in the Reduction of Symptoms of Anxiety and Depression	*Dr. Lillian T. Eby*
	Alex Harvill, Jordyn Priester	A Content Analysis of Women in Families from Intersectional, Contextual, and Global Perspectives	*Dr. J. Maria Bermudez*
	America Garcia, Valery Huaman-Lozano	A Heuristic Inquiry of Lazos Hispanos and the Effects of the COVID-19 Pandemic from the Community Health Workers/Promotoras' Lived Experiences	*Dr. J. Maria Bermudez*
Room C	**Margaret Hart**	The Evolution of Agricultural Sectors in the Growth South: Agriculture to Agribusiness	*Dr. Charles Bullock*
	Harper Ann Moffett	Health Equity in South Africa and the United States in the Age of the Pandemic: The Lingering Effects of Apartheid and Jim Crow	*Dr. Markus Crepaz*
	Sarah Quinn Kudyba, Cullen Giddens	The Acquisition of VAC Patterns by L2 English Learners from L1 Mandarin Chinese and L1 Japanese Backgrounds	*Dr. Vera Lee-Schoenfeld*
	Savannah Jane Williams	Creation of Pseudo-Names for Sound-Symbolic Perception Research	*Dr. Margaret Renwick*
Room D	**Lauren Elizabeth Moise**	Anti-Counterfeiting Technologies for the Luxury Fashion Sector: Benefits and Drawbacks	*Dr. Katalin Medvedev*
	Anya Shroff, Yanin Reinholz	Development of an In Vitro Model of Psoriasis	*Dr. Vladimir Reukov*
	Man Shah	Using a Plate-Based Approach to Test Toxicity of 1-HP on *C. elegans*	*Dr. Arthur Edison*

Abstracts

Picturing the Overturn of Roe V. Wade: An Analysis of Newsroom Instagram Photographs and their Photographers

Noor Abdallah, CURO Honors Scholar
Dr. Andrea Hudson, Journalism, Grady College of Journalism & Mass Communication

Roe v. Wade has been, and continues to be, a polarizing conversation in media and society. The Supreme Court upheld that abortion was constitutional for nearly 50 years until it overturned its decision in 2022. This research is underpinned by three theoretical assumptions: news media plays a significant role in shaping public discourse, journalists have a relationship to the work they create, and photographers are often seen as second-class members of the newsroom. Through these assumptions, this project aims to explore how the race and gender of photographers shapes the visuals surrounding judicial decisions. Using textual analysis, the researchers analyzed over 240 Instagram posts made by eight different news companies over a three-week period (before, during, and after the Supreme Court's decision). The researchers analyzed the content in the visuals themselves, as well as the photojournalists, focusing specifically on the race and gender of the photographers. Our findings are three-fold. First, there are clear stylistic trends in how newsrooms report on Instagram. While some emphasize the potential impact the decision had on reproductive rights, others focused on the political implications. Second, news organizations often neglect to provide photo credit on their Instagram posts. Finally, photojournalists of color were more likely to make photos that centered experiences of communities of color, while white photographers focused on individual hard news stories. This research highlights the ways in which visual storytelling and media representation are related, further showcasing the need to hire diverse news workers to tell stories from a variety of perspectives.

A New Test for Leg Blood Flow in People with Peripheral Arterial Disease

Ansleigh Claire Abell
Dr. Kevin McCully, Kinesiology, Mary Frances Early College of Education

Peripheral artery disease (PAD) is a circulatory problem that limits blood flow to the limbs, causing pain or discomfort. Current diagnosis of PAD is done through an ankle-brachial index, which is inaccurate and 66% of doctors don't prescribe this test when needed. The purpose of this study was to evaluate a potentially superior method of evaluating PAD using Near Infrared Spectroscopy (NIRS). Control healthy subjects and people with diagnosed PAD will be tested. An automated data collection system (The Black Box) was used to cut off blood flow in each leg by inflating a cuff on the distal thigh, and a NIRS device measured the oxygen levels on the medial gastrocnemius muscle. The half-time of recovery (T½) of the NIRS signal after cuff release was measured for blood flow. Preliminary testing on healthy subjects has been conducted, and a faster automated data analysis program has been written. T½ values were within the normal range (2.9-7 seconds) for control subjects. The analysis software has been developed so that the data was saved and then put into the software to find the T½ value. Data collection and analysis protocols have been developed, and preliminary data match expected results. The recruitment phase for testing people with PAD will be started with a target finish date of July. The new method of testing for PAD has the potential to increase both the number of people who are tested as well as the number of people with accurate diagnoses.

Evaluating the Physiological Effects of High-Intensity Interval Training on Skeletal Muscle Function in Healthy, Wildtype Mice

Ayoub Abubaker, CURO Research Assistant & Robel Yohannes
Dr. Jarrod A. Call, Kinesiology, Mary Early Frances College of Education

The rapid progression of current medical technology does not correlate with the progress, or lack thereof, made towards overcoming VML injuries. Without a practical means of rehabilitation, patients are left to follow the body's corollary regeneration process, resulting in a functional deficit in skeletal muscle.
High-Intensity Interval Training provides a feasible exercise regimen for healthy individuals who seek to improve and maintain their quality of life. It is well documented in its ability to increase aerobic capacity (Xie et al) in short sessions, making it efficient and accessible to almost anyone. For its accessibility as a movement pattern ability to improve aerobic capacity, we chose to explore the physiological effects of HIIT immediately following a VML injury.
In our study, nine mice underwent a VML injury to the hindlimb plantar flexors and were then separated into two groups: VML-trained (n=5) and VML-sedentary (n=4). The VML-trained group went through four weeks of rigorous training for three days a week. Two days after the final training session, all nine mice went through a treadmill exhaustion test, as well as complete muscle fiber oxygen consumption assessments the following week. The results of the HIIT protocol showed significance in time and distance ran to exhaustion and fat oxidation, but had little to no effect on body mass, injured muscle mass, or carbohydrate respiration.

Seeking Treatment for Chagas Disease: A Scoping Review

Tolu Adedipe, CURO Research Assistant
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According to the World Health Organization (WHO), about six million individuals were estimated to be infected with Chagas Disease (CD) in 2019, with Latin America having the highest prevalence. Despite that, there is little discussion regarding the treatment-seeking behavior of people who have been diagnosed with Chagas Disease. The focus of this literature review is to discuss the research on traditional and/or self-care treatment options used within endemic communities and the social determinants that are present when those options are chosen. We conducted a scoping review of scholarship in Google Scholar and PubMed using keywords such as 'self-care', 'Chagas disease', and 'traditional medicine'. Preliminary findings indicate that knowledge of CD and its available treatment options is limited in most endemic communities. The scholarship indicates that many people do not know what CD is even after experiencing the symptoms, because those that are visible can be common to other infectious diseases. Additionally, most research focuses on how people use pharmaceutical or other biomedical drugs, causing limited attention to self-care treatments and the illness experiences of people living with CD. Analyzing these behaviors can lead to an understanding of how these populations are affected by CD and what policies can be put in place to mitigate those effects.

Helping Children with ASD Succeed in School: Evidence from the United States and Russia

Sara Adkins
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Major developments in public awareness of autism spectrum disorder (ASD) has led to an increase in ASD diagnoses around the world. Cultural standards, governmental policies, educational

practices, family attitudes and income levels dictate the methods used to assimilate children with ASD with varying degrees of success, where even this goal of success looks different across cultures. Some countries use schools as an intermediate institution for employment preparation, applying a normalizing approach to various extents to diminish autistic symptoms, while other states take on an inclusionary approach to adapt the social environments to accept autistic traits. This research explores which factors influence the methods of integration of children with ASD in schools in the US and in Russia. This project examines academic studies and media depictions of children with ASD in school, as well as identifies affecting cultural notions and evaluates the effectiveness of the selected pedagogical approach. For example, various degrees of isolation are used by Russia and the United States. Russia operates base inclusive schools for students with ASD, whereas the United States creates smaller classrooms and alternative transportation for such students. These choices are scheduled by differences in geography, academic structure, and social attitudes towards children with ASD in these countries. The results of this study will unmask cultural misconceptions about people with ASD and aid the pedagogical strive to equip children with ASD with the best resources and circumstances for their academic success.

Exploring the Relationship Between Lactation Support Services and Breastfeeding Rates Across Georgia

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Breastfeeding is associated with improved maternal and infant health outcomes, yet Georgia's breastfeeding rates are lower than the national U.S. average. Lactation support services such as those provided by trained professionals like International Board-Certified Lactation Consultants (IBCLCs), support groups, and peer counselors can help overcome barriers to breastfeeding. We aimed to explore the relationship between lactation support services and breastfeeding rates across 159 Georgia counties. We used publicly available data with the primary outcome being breastfeeding initiation, defined as receiving any breast milk after delivery, based on 2018-2019 US Birth Certificate Data. Lactation support services included the number of IBCLCs, La Leche League support groups, and WIC peer counselors within a 25-mile radius collected from ZipMilk.org as of May 2022. The Capitol Impact Gateway was used to identify zip codes in each county, and the number of services was converted to a rate per 1,000 live births. USDA's rural-urban continuum codes distinguished metropolitan, rural, and urban counties, and the CDC/ATSDR Social Vulnerability Index (SVI) measured the overall vulnerability of each county using 15 U.S. census variables. RESULTS: There were no significant associations between breastfeeding initiation and lactation support services. Georgia counties classified as rural-urban and having a very high SVI were more likely to have lower breastfeeding initiation rates ($p<0.01$). DISCUSSION: This study identified Georgia counties with the lowest breastfeeding rates, which should be a target for future interventions. Other factors not identified in this study will affect the choice to breastfeed.

Chemical Kinetics Modeling of 2-Methyltetrahydrofuran Combustion

Philip Albenice

Dr. Brandon Rotavera, School of Environmental, Civil, Agricultural, and Mechanical Engineering, College of Engineering

Sustainable transportation energy remains a critical scientific challenge that requires liquid hydrocarbons and biofuels. To support ongoing efforts on advanced combustion technologies, the present research focuses on modeling the chemical kinetics of 2-methyltetrahydrofuran ($C_5H_{10}O$, 2-MeTHF), a next-generation biofuel, under combustion-relevant conditions. The goal of the simulations is to analyze concentrations and formation trends of chemical species with a mechanism of 2-MeTHF across a range of conditions in order to improve the understanding. Combustion models are comprised of a network of elementary reactions describing reactants and products, which influence the overall reactivity of a biofuel. The combustion simulations herein were conducted from 500 K - 1200 K and 1 atm - 20 atm to model species profiles. Oxygen concentrations were also varied to assess the influence on chain-reactions. ChemKin, a partial differential equation solver, was used to simulate the environment of a Perfectly Stirred Reactor and solve equations relating to energy conservation and reaction rate theory for combustion. Clear trends emerge in the species profiles. Some of the most salient involved initial radicals of 2-MeTHF. The resulting mole fractions of five-carbon products from 2-MeTHF radicals were significant. The clearest trend is that bicyclic ether intermediates tend to form in greater concentration compared to other five-carbon species. The significance of the present results is that the trends provide a guide for experimental work with a jet-stirred reactor. The implications of the present research contribute to reducing current dependence on petroleum-derived hydrocarbons and advance alternative energy.

Examining the Effects of Virtual Psychological Ownership on Hurricane Risk Perceptions

Saba Alemayehu, CURO Research Assistant

Dr. Sun Joo 'Grace' Ahn, Advertising, Grady College of Journalism & Mass Communication

Risk Communication can act as a resource for groups and individuals to obtain desired outcomes, such as when Hurricane risk communicators are obligated to communicate evacuation orders with the desire to protect citizens. Much of the common strategies risk communicators use when communicating hurricanes include the message distribution to the public through news media and state officers in at-risk areas but the issue is that much of the risk communicators for wide-spread areas such as counties and cities are government officials who have a more macro perspective to the risk while individual citizens are more inclined to have a micro perspective on the risk situations. This results in the safety messages of those in high-risk areas not to be received with severity and high cases of death. With the literature on psychological ownership and how people extend their identity to personal items, including those digital, our research examines how people's feelings of psychological ownership affect their threat and risk perceptions related to natural disasters, specifically hurricanes and storm surges. We used a VR experience of a hurricane and storm surge event to study how individuals' risk perceptions change when they develop feelings of ownership of the virtual possessions destroyed in the hurricane simulation to better communicate their risks. We predict that the VR experience, along with presence of psychological possession, will resonate with an individual's micro perspective and allow for their risk perception to be enhanced and the severity of hurricanes and storm surges be recognized in its truest form.

Made in America: Implications for Dual-Use Export Controls as the U.S. Brings Supply Chains Home

Zainub Rushna Ali, Foundation Fellow

Dr. Justin Conrad, International Affairs, School of Public & International Affairs

This security-focused policy analysis dives into an important puzzle about where American dual-use technology ends up. On the one hand, there have been several discoveries of American-produced military components in drones used by Iran and Russia. Alternatively, American supply cannot seem to meet its allies' demands for critical dual-use military technology, a challenge experienced in the Ukraine War. The pandemic accelerated U.S. supply chain insecurities and

vulnerabilities, which prompted the Biden Administration to pass the CHIPS and Science Act to spur the construction of domestic manufacturing facilities, specifically semiconductor manufacturing plants focused on research, development, and production. America's lack of leadership in semiconductor technology—the foundation for countless civilian- and military-use items—propelled this initiative to offset dependence on East Asia (currently responsible for 75 percent of global semiconductor production). The domestic goals of the CHIPS Act for economic growth are all productive and well-targeted, but much of the programming and language singularly hyper-securitizes the People's Republic of China. This analysis urges policymakers to consider future security threats that may arise in American industry as a result of the ramped-up domestication of supply chains for critical dual-use components like semiconductors. Opportunities for enhanced regulation by the Bureau of Industry and Security in the Commerce Department and greater integration between government and industry are considered here.

Postprandial Cognitive Performance in Response to an Acute Pecan-Enriched Meal Challenge

Davia E Allen, CURO Research Assistant

Dr. Jamie A. Cooper, Nutritional Sciences, College of Family & Consumer Sciences

Authors: Davia E. Allen, Alyssa J. Guadagni, M. Catherine Prater, C.M. Paton, and Jamie A. Cooper, PhD

To examine the effects of a pecan-enriched meal on cognitive performance in the domains of memory and learning and attention and processing speed in healthy adults. Thirty adults (n=15 men, n=15 women) were recruited for a double-blind, randomized crossover trial with two testing visits for two treatment conditions: an isocaloric pecan-enriched shake (68g pecans) or a high saturated fat shake as control (labeled as "A" or "B"). The Computerized Mental Performance Assessment System (Brain, Performance, and Nutrition Research Centre, Northumbria University) was used to administer cognitive performance tests. Memory and learning were assessed at baseline and every hour for 4 hours following shake consumption via Immediate and Delayed Word Recall, Word Presentation and Recognition, and Picture Presentation and Recognition tests. Attention and processing speed were assessed via the Rapid Visual Information Processing test (RVIP). Consuming Shake B resulted in significantly fewer false alarm responses on the RVIP test (p=0.0523) vs. Shake A. Additionally, a trend was observed for faster No Reaction Time in the Picture Recognition subtest (p=0.09) after the consumption of Shake B vs. Shake A. No further significant shake effects were seen for the remaining memory and learning subtests. Preliminarily, Shake B led to improved markers of cognitive performance in the domain of attention and processing speed as compared to Shake A. Enhanced attention and processing speed is associated with a superior ability to think and learn, so improvements could enhance or protect cognitive performance. Unblinding of treatment conditions will occur in early March.

Airpods, Everyday Aesthetics, and Subjective Well-Being

Jonas David Andrulonis

Dr. Aaron Meskin, Philosophy, Franklin College of Arts & Sciences

Should airpod listening be considered an everyday aesthetic activity, and regardless of this classification, can it serve to increase subjective well-being (SWB)? This philosophical but empirically informed essay will define airpod listening as the act of listening to contemporary genres of music using a personal, portable music listening device while going somewhere. Ultimately, the paper will find that, generally speaking and with one major exception, airpod listening should be classified as an everyday aesthetic activity and, regardless of this classification, airpod listening can benefit SWB in a similar way to other forms of everyday aesthetic activity. The first part of the thesis will be addressed primarily using Kevin Melchionne's "The Definition of Everyday Aesthetics". The section will reference findings from a Marie S. Skanland study to explore real life motives for music listening and consider other accounts defining everyday aesthetics. Apart from using airpods to block out external stressors, airpod listening will be found to be an everyday aesthetic activity, which will raise questions about the nature and boundaries of the category of everyday aesthetics. The second part of the thesis will be addressed primarily using Melchionne's "The Point of Everyday Aesthetics". Both Skandland's research and different accounts of everyday aesthetics and their benefits will be considered. This section will find airpod listening to be useful for increasing SWB, which is significant because understanding the potential SWB benefits of airpods and similar devices could eventually help individuals and medical professionals to use airpods to increase SWB for themselves and patients.

Physiological Effects of Auditory Stressors on the Horned Passalus Beetle

Amitesh Vikram Anerao

Dr. Andy Davis, Odum School of Ecology

Throughout their day-to-day lives, animals deal with various stressors. These acute stimulations can lead to temporary changes within the animal that usually do not result in long-term impacts. However, chronic stressors can cause physiological within animals that can even lead to long-term adaptations. For group-living, social insects that can communicate with auditory signals, it may be stressful to be in an environment where no other conspecifics can be heard. At least, this is the finding of some recent research from the Davis lab. Specifically, a prior study found that horned passalus beetles appear to suffer long-term weight loss when deprived of auditory signals from other beetles. The current project aims to understand this finding better by conducting a follow-up experiment. Specifically, the scientist will oversee a project that involves collecting beetles and housing them in the lab, then exposing different groups to different auditory signals, including other beetle sounds, no sounds, and the sounds of crickets. (Crickets acting as a natural environment simulant). The beetles will each have their own wood block as a food source. After this exposure for 3 weeks, the weight of beetles will be assessed, as well as the mass of their wood debris (to determine how much they ate). Analyses of these data should help to elucidate why these beetles are negatively impacted by the noise stressors, which will ultimately improve understanding of long-term stress effects on insects.

Analyzing the Conditional Discharge Program for Misdemeanor Marijuana Possession in Fayette County

Sara Anis Ali, CURO Honors Scholar

Dr. Teena Wilhelm, Political Science, School of Public & International Affairs

In 2015, Georgia adopted the First Offenders Act which allowed first time offenders to avoid a criminal offense on their record if they chose to accept a conditional discharge plea. The conditional discharge plea involved defendants taking a guilty plea and following through with a series of conditions stipulated in the plea deal. If defendants effectively completed the plea, then the court would remove the charge from their record. Georgia legislators created the conditional discharge plea hoping that it would reduce incarceration for a misdemeanor offense while lowering recidivism rates. I sought to evaluate whether the program effectively reduced recidivism while minimizing incarceration. I evaluated the conditional discharge program of Fayette County, looking at cases in 2018 to measure the effectiveness of the program. I found that out of the 308 total misdemeanor marijuana possession cases, about 248 people took the conditional plea. More than ⅓of individuals

who took the plea did not successfully fulfill its conditions and thus received an adjudicated guilty sentence. Overall, recidivism was very low, with about 8 percent of individuals having reoffended in the program. In regards to jail time, however, 171 people who received conditional discharge did not have a jail sentence, but among the 77 that did, the median jail sentence was about 18 days, and then mean was 42. Overall all the correlation between conditions broken and jail time received varies, but the correlation between unpaid fine amounts and jail time was .54, indicating some relation. The results indicate that while ⅓of individuals would fulfill the conditional discharge with minimal jail time, the likelihood of anyone reoffending is very low, making it seem like the need for jail provisions is unnecessary.

Examining Learning Outcomes in Undergraduate Biology Courses
Chioma Anyanwoke, CURO Research Assistant
Dr. Ania A. Majewska, Physiology & Pharmacology, College of Veterinary Medicine
Syllabi are the first documents students receive in a college course and are important sources of information for topics covered, how to contact the instructor, and grading and attendance policies. Besides contact information, syllabi can convey information to the student about the classroom environment with the wording used by instructors that does not relate to the course content, referred to as instructor talk. Past studies indicate that this instructor talk can be important for student engagement, success, and learning.
In this study, we examined the content of syllabi for undergraduate biology courses. We aimed to answer two main questions: (1) what are the categories, tone, and sentiment of instructor talk in syllabi, (3) is there a difference in instructor talk, tone, and sentiment in syllabi between upper and lower-level courses and small and large enrollment courses. To answer these questions, we examined over 300 biology course syllabi. We focused on sections describing grading and attendance policies, two areas that are likely to reveal instructor sentiments. We also collected information on the course level and class size and used the Python toolkits to assess the tone and sentiment of the text. We quantified the frequency and types of tone and positive vs. negative sentiments for each syllabus and across sub-disciplines. We used comparative statistics and mixed-effects models to analyze the data. The results of this work elucidate patterns of communication in biology syllabi and the underlying messages and emotions these important documents can convey.

An Investigation of Vocalizations when Functional Communication Training is Device Based Versus Voice Based
Kristen Archer; Claire Hampton; Karleigh Buchan; Abby Shainberg; Kara Scoggins; Lauren McKay
Dr. Sandie Bass-Ringdahl, Communication Sciences and Special Education, Mary Frances Early College of Education
Autism Spectrum Disorder (ASD) is a developmental disorder characterized by deficits in social communication and restricted, repetitive patterns of behavior. Functional communication training (FCT) is an intervention aimed at replacing challenging behaviors by identifying and reinforcing an appropriate alternative communication response. FCT is an evidence-based intervention effective in establishing a modality of communication for individuals with ASD and often incorporates AAC. Augmentative Alternative Communication (AAC) is a set of tools and strategies used to provide an alternative or a supplement to speech, such as a microswitch. This study's primary purpose is to evaluate child vocalizations across different phases of a clinic-based FCT intervention with and without AAC. A secondary purpose of this study is to examine the therapist's use of facilitative language techniques (FLTs) in the context of FCT and the impact on participant vocalizations. Research assistants have been trained in a child vocalization coding scheme and will use this scheme to identify and score different types of vocalizations across phases of FCT. Vocalizations will be analyzed across device-based (i.e., micro switch) and voice-based intervention sessions. We expect to find that child vocalizations will increase, and become more complex, as a result of FCT-based intervention. These findings will benefit clinicians and caregivers by helping to understand potential influences on an increase in child vocalization production across different communication modalities for a young child with ASD.

Studying Cognitive Control in the Spatial Stroop Task: Is it Possible to Learn over Time?
Krithi Ariga, CURO Research Assistant
Dr. Deborah A Barany, Kinesiology, Mary Frances Early College of Education
The Stroop task is commonly used to assess cognitive control, which is the ability to regulate our behavioral responses to achieve a desired goal. Typically, performance of the different trials of Stroop task are assumed to be independent of each other, but it is strongly possible that faster reaction times are linked to development of cognitive and motor control or learning of the task. The goal of this study was to assess learning rates in a spatial version of the Stroop task. Our spatial Stroop task involves four tasks with different types of motor responses: the keypress (which always comes first) followed by the step, jump, and reach tasks in which the order is randomized with each participant. Within the four tasks, participants first perform a "spatial" block in which participants solely on the physical location of the symbol. Next, participants perform a "conflict" block in which they respond based on the learned symbolic meaning of the stimulus, which may be matched (congruent) or mismatched (incongruent) with the physical stimulus location. The spatial condition is assumed to tests purely motor control while the conflict condition is assumed to tests cognitive-motor control. I hypothesize that there will be noticeably faster reaction times across blocks of the conflict condition, while reaction times will be relatively constant over spatial blocks. This would illustrate that improved cognitive control is possible with enough "practice" of a task, and that we can potentially train our minds to process stimuli in a manner consistent with task goals.

Using Heat Maps to Assess Food Selection Behaviors to Inform Food-Access Interventions with Rural Georgia Residents
Emily Armstrong, CURO Research Assistant
Dr. Alexa Lamm, Agricultural Leadership, Education & Communication, College of Agricultural & Environmental Sciences
There is a growing need to improve nutrition interventions in rural communities as residents face barriers accessing healthy food due to distances from grocery stores, lack of transportation, and absence of health professionals. One intervention to provide nutrient-dense food options includes grab-and-go coolers (GGCs). The purpose of this study was to examine purchasing habits of rural residents when presented with food options in GGCs. Data were collected via Qualtrics using non-probability opt-in sampling (N = 780) from rural Georgia residents. Respondents were presented with a picture of a GGC that contained fruit next to a chip rack with prices to simulate a real buying scenario. Respondents were asked to click on the food option they would select and then answer a follow-up select-all-that-apply question indicating why they made their choice. Descriptive statistics were analyzed using SPSS. Results indicated respondents more frequently selected chips (55.8%) than fruit (41.5%) on the heat map of the grab-and-go cooler. Respondents indicated they selected chips due to taste (81.6%), price (33.3%), ingredients (9.7%), and nutritional value (7.8%). Respondents indicated they selected fruit due to nutritional value (75.0%), taste (62.3%), ingredients (29.6%), and price (24.1%). Study

findings suggested respondents may be more likely to purchase unhealthy snacks even when presented with healthier options. Future interventions may benefit from presenting healthier food alternatives that appeal to taste. In addition, perceptions towards the importance of nutritional value need to be improved to increase purchasing intentions. Providing coupons for healthy foods may make them more appealing choices.

Integrating Real-Time Accelerometer Data to Quantify Extraneous Movement During Mock fMRI Scans

Aryan Arora, CURO Research Assistant
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Functional magnetic resonance imaging (fMRI) is a popular method to non-invasively assess brain functions by detecting variations in blood oxygenation due to neural activation. However, head motion during fMRI scanning leads to image blurring which hinders data analysis. Head motion during fMRI is especially problematic in children or in patients with neurological impairments, limiting the utility of fMRI in these populations. Attempts to minimize the effects of head motion have focused on post-scan corrections, but less attention has been given to developing methods that limit in-scanner extraneous movement. One promising approach is to train participants to limit head motion in simulated or "mock" fMRI environments, using real-time feedback of their motion. The goal of this study is to develop a new accelerometer-based protocol to accurately quantify head motion to use for real-time feedback during mock fMRI training. Accelerometers are sensors that measure the acceleration of moving targets and can perceive the frequency of fluctuations in movement. We evaluated the accuracy of accelerometer data in detecting head motion while participants performed either eye, hand, or leg movements. Preliminary results show that forehead accelerometer placement is the most practical position to reliably detect small changes in head motion. We hypothesize that the leg movement task will induce the most head motion because leg movements generate more acceleration due to their higher mass. Implications include development of an easy-to-use, standardized protocol that can be given used to train fMRI participants, ultimately reducing head motion and peripheral noise that interferes with fMRI data quality.

An Efficient and Effective Method for Permethylating N-Glycans for Structural Analysis

Arun Arumugam
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Permethylation is a common and essential technique for the detailed structural characterization of glycans by mass spectrometry in the field of glycobiology. Permethylated samples are more amenable to ionization, enhancing the sensitivity and accuracy of mass spectrometry analysis. However, current permethylation procedures both fail to reduce the amount of undermethylation and glycan left behind in the water fractions after liquid-liquid extractions. Improper permethylation of glycans leads to potentially inaccurate conclusions on the levels of certain glycans present within a sample, as some glycans may be lost during liquid-liquid extraction. We have built on former permethylation methods by formulating a new method that increases both the level of base and methylating agent used proportionally. Such an adjustment allows for both the level of undermethylation and glycan left in the water fraction, to decrease. The adjusted procedure is easy to carry out, fast, and capable of pushing glycan research forward. As interest in the structural characterization of glycans has increased in recent years due to awareness of glycans' presence in several diseases and physiological processes, efficiency in characterization is a must.

The Effects of Influenza A Infection on Early Pregnancy in Mice

Venkata Atluri
Dr. Xiaoqin Ye, Physiology & Pharmacology, College of Veterinary Medicine

Influenza affects ~1 billion people annually, with 3-5 million cases leading to severe illness and ~500,000 influenza-related respiratory deaths. Among the four types of influenza viruses, A, B, C and D, influenza A (IAV) is the only known to cause flu pandemics. Certain populations are more susceptible to severe illness and death, including pregnant women. Epidemiologic and mouse model data have correlated mid-to-late gestation pregnancy as a comorbidity to severe flu infection. Although, there has been limited investigation into the potential comorbidities of early pregnancy and severe IAV infection. We hypothesize early pregnancy IAV infection will decrease embryo implantation success and alter systemic immune response. C57BL/6 wild type mice were intranasally infected with either 50uL vehicle control (PBS), 200pfu, or 400pfu of a mouse-adapted PR8 high-pathogenicity IAV on 0.5 days post-coitum (D0.5). Weights were recorded from D0.5 to D4.5 (when embryo implantation should occur). Upon dissection, serum was collected for hormones measurement, and implantation sites were quantified. Current data shows all mice lose body weight after nasal administration, but there is no significant difference between control and infected mice. There is, however, a decrease in the rate of implantation between the control and 400pfu group. The collected tissues will be used to stain for immune markers (CD45, CD11b), proliferation markers (PCNA), and cell-death markers (Cleaved-caspase 3). The direction of our study is to elucidate the impact of viral infections on the reproductive system and how reproductive and immune functions intertwine with the overall goal of reducing pregnancy-related severe flu infections.

What Information Do College Students Most Value when Searching a Public Database of Historical Garments?

Percy Autera, CURO Research Assistant
Dr. Monica Sklar, Textiles, Merchandising & Interiors, College of Family and Consumer Sciences

The UGA Historic Clothing and Textile Collection is working to improve its online database for uses in education and outreach, both in the digital and non-digital space. Therefore, I, under the advisement of Monica Sklar, am conducting a survey of college students about what information they most value when searching online databases of historic clothing and textiles. Survey questions include demographics, where students search for historic dress items, and what specific information they are seeking when searching historic dress items. Learning more about what information college students' value when searching online databases of historic clothing and textiles will help to improve the Historic Clothing and Textile Collection's online database. Further, a more streamlined and complete database is more accessible to curators and other HCTC staff when studying artifacts, crafting exhibits, and educating others. This is a pilot study which Dr. Sklar intends to expand to include colleagues at other universities, giving this survey wider importance and relevance. By improving and increasing the data available in the Historic Clothing and Textile Collection's online database, I am making information more available to students, professors, and the public as a whole.

The Impact on Mental Health and Productivity of College Professors during Work from Home

Anant Ayyagari, CURO Research Assistant
Dr. Ming Zhang, Epidemiology & Biostatistics, College of Public Health

The objective of the research was to investigate the impact the COVID-19 pandemic and the switch to remote work had on college

professors. Our hypothesis was that remote work had a negative impact on quality of life and productivity. This is an important topic for research to be conducted upon because it will help guide policy on how to conduct remote work in the future. It can also help give better insight to the struggles professors faced during the pandemic. For our research, we primarily used PubMed to search for articles that were relevant to our research focus. We then analyzed the articles to determine what variables were seen to impact the productivity and quality of life in college professors. The literature showed that workers tended to have worse productivity and worse mental health outcomes during remote work. Despite this, most people still supported remote work because of the flexibility and the increased work life balance. We believe that our research can be used to guide future research regarding the best practices for remote work in the future. In the future, we plan on distributing a Qualtrics survey to professors across the country to gain more data on the impact of COVID-19 on professors.

Intron Methylation Regulates IBM1 Expression in Arabidopsis thaliana

Jiye Bae

Dr. Bob Schmitz, Genetics, Franklin College of Arts & Sciences

DNA methylation is a biological process that results in the addition of methyl groups to the fifth carbon of cytosines in DNA. This process regulates diverse biological processes in plants and animals, including development, cell differentiation, and various diseases such as cancer. While DNA methylation occurs dominantly in CG sites in mammals, in plants, it occurs in all sequence contexts of CG, CHG, and CHH. In Arabidopsis thaliana Col-0 accession, there is a long 7th intron in the IBM1 gene that contains highly methylated repeats, which is required for the proper expression of the full-length IBM1 transcript. However, the IBM1 intron of Cnt-1 accession lacks DNA methylation. It shows a decreased expression of IBM1 and, in turn, an increase in global gene body CHG methylation. The direct evidence of a correlation between intron methylation, IBM1 expression, and the global CHG methylation level has yet to be discovered. Therefore, in this research, I aim to remove the IBM1 intron sequence of the Cnt-1 accession using CRISPR/Cas9 system, which will induce large deletion of IBM1 intron. The homozygous mutant in the second generation after transformation (T2) will be analyzed to determine the effect of IBM1 intron and its methylation on the IBM1 gene expression level. I will also overexpress the functional IBM1 gene in the Cnt-1 accession to observe the impact of IBM1 expression on global CHG methylation in genes. I expect higher IBM1 expression level in the transgenic, which would display lower level of global CHG methylation in genic regions.

Glycomaterial Implants Facilitate the Recovery of Forelimb Motor Function after Severe Brain Injury

Simar Bajwa, CURO Research Assistant

Dr. Lohitash Karumbaiah, Animal & Diary Science, College of Agricultural & Environmental Sciences

Severe traumatic brain injuries (sTBIs) result from blunt force and penetrating brain trauma that cause long-term brain volume loss and functional impairments. There are currently no approved interventional therapies to prevent brain volume loss and dysfunction in sTBI patients. We hypothesized that acutely implanted 3D brain-mimetic constructs will prevent brain volume loss and facilitate recovery of reach-and-grasp function in rats. In order to test this hypothesis, we performed intracortical engineered chondroitin sulfate (eCS) hydrogel implantations acutely (48h) after sTBI lesions in rats. To mimic clinically relevant mass lesion evacuation procedures of contused tissue, we induced controlled cortical impact (CCI) injuries to the rostral forelimb area (RFA; M1/M2 cortex) followed by biopsy suction ablation (SA) of contused tissue at 48 h post-CCI. Forelimb reach and grasp function was evaluated on a skilled reach task (SRT) every week for five weeks post-CCI. At Week 5 after CCI, animals underwent retrograde axonal tracer (Fluorogold) injections for terminal axonal tracing studies. Our results from SRT demonstrated significant deficits in reach to grasp activity of TBI only (CCI + SA) groups compared to the Sham (craniotomy only) group at Week 4 and 5 post injury. Hydrogel treated animals (CCI-SA-eCS) showed significantly improved reach and grasp performance efficiency and a reduced assay duration when compared to TBI controls at 5 weeks post injury. Overall, these data demonstrate that eCS hydrogel implants induced recovery of forelimb motor function sub-acutely after sTBI. Ongoing work is focused on assessing neuronal activity and plasticity of reach and grasp circuitry.

Investigation Enhancer Function of 335 Base Pair Region within FADS2 in Humans

Elaina Barrickman, CURO Research Assistant & Julia Cazabon

Dr. Kaixiong Ye, Genetics, Franklin College of Arts & Sciences

Genes in the FADS block, FADS1 and FADS2, encode fatty acid desaturase enzymes which catalyze the rate limiting step of conversion of fatty acid precursors to bioavailable long chain polyunsaturated fatty acids (LC-PUFAs), which manage inflammation and fuel the human brain. Two haplotypes in the population correlate to different biosynthetic efficiencies, but molecular mechanisms remain in some part unknown. This study strives to determine whether an identified fragment in the putative regulatory region for FADS2 can act as an enhancer in the presence of a minimal promoter and determine differences in expression between haplotypes using dual-luciferase reporter assay.

Investigating Enhancer Function of 335 Base Pair Region within FADS2 in Humans

Elaina Barrickman, CURO Research Assistant

Dr. Kaixiong Ye, Genetics, Franklin College of Arts & Sciences

An 85-kb long genomic region covering the entire FADS1 and most of FADS2 has been found to play important roles during human genetic adaptation to local diets. The same genomic region has been associated with more than 40 traits and diseases. While previous expression quantitative trait (eQTL) analysis has suggested the presence of likely more than one regulatory variant, the exact causal variants are still unknown. This project aims to perform cellular and molecular biology experiments to narrow the 85-kb region down to one or more causal variants and to elucidate their mechanisms in disrupting gene regulation. Two haplotypes in the population correlate to differential biosynthetic efficiencies, but molecular mechanisms remain partially unknown. This study strives to determine whether an identified fragment in the putative regulatory region can act as an enhancer using a luciferase reporter assay. Two different versions of the same genomic regions have been PCR amplified from two homozygous donors and inserted into a plasmid with a minimal promoter. We have verified that our plasmid contains our fragment of interest by sequencing, and our next experiment will be to transform our plasmid into cells to determine expression patterns. The fragment's relative effect on gene expression will be tested in a human liver cell line with luciferase reporter assays, which visualize differences in luciferase expression between haplotypes. Our 335 base pair fragment contains a single nucleotide polymorphism (SNP) that has been previously demonstrated as a causal SNP in human colorectal cancer. To contextualize our study within the current literature, we plan to investigate its role in the HepG2 human liver cancer cell line.

Investigating Enhancer Function of 335 Base Pair Region within FADS2 in Humans

Elaina Barrickman, CURO Research Assistant
Dr. Kaixiong Ye, Genetics, Franklin College of Arts & Sciences

An 85-kb long genomic region covering the entire FADS1 and most of FADS2 has been found to play important roles during human genetic adaptation to local diets. The same genomic region has been associated with more than 40 traits and diseases. While previous expression quantitative trait (eQTL) analysis has suggested the presence of likely more than one regulatory variant, the exact causal variants are still unknown. This project aims to perform cellular and molecular biology experiments to narrow the 85-kb region down to one or more causal variants and to elucidate their mechanisms in disrupting gene regulation. Two haplotypes in the population correlate to differential biosynthetic efficiencies, but molecular mechanisms remain partially unknown. This study strives to determine whether an identified fragment in the putative regulatory region can act as an enhancer using a luciferase reporter assay. Two different versions of the same genomic regions have been PCR amplified from two homozygous donors and inserted into a plasmid with a minimal promoter. We have verified that our plasmid contains our fragment of interest by sequencing, and our next experiment will be to transform our plasmid into cells to determine expression patterns. The fragment's relative effect on gene expression will be tested in a human liver cell line with luciferase reporter assays, which visualize differences in luciferase expression between haplotypes. Our 335 base pair fragment contains a single nucleotide polymorphism (SNP) that has been previously demonstrated as a causal SNP in human colorectal cancer. To contextualize our study within the current literature, we plan to investigate its role in the HepG2 human liver cancer cell line.

Cannabinoids Increase Food Intake and Impulsive Eating Behavior

Rawad Basma, CURO Research Assistant
Dr. Emily Noble, Nutritional Sciences, College of Family & Consumer Sciences

Cannabinoids are a lipid signaling molecule known for promoting hyperphagia, and are useful in conditions of appetite dysregulation. However, the behavioral mechanisms by which cannabinoids increase eating behavior remain unknown. Furthermore, the brain makes its own cannabinoids, called endocannabinoids, and these play a key role in regulating food intake. Endocannabinoids act at the type-1 cannabinoid receptor (CB1) to stimulate food intake. We set out to determine the behavioral and neural mechanisms by which cannabinoids impact eating behavior using a novel gelatin-based edible delivery system to deliver CB1R agonists. Female rats were given 0.12 mg/kg edible CB1 agonist, CP55940, which increased intake of standard rat chow during the first two hours of the dark cycle, respectively, compared to vehicle edibles. Using Sable Systems food intake monitoring cages to track meal patterns following CB1 agonist delivery, we determined food intake increases are facilitated by an increase in meal number, not meal size, suggesting an increase in appetitive behavior. We therefore tested female rats in the differential reinforcement of low rates of responding operant task, which tests appetitive impulsive responding for sucrose. Rats given 0.12 mg/kg edible CB1 agonist demonstrated an increase in impulsive responding for sucrose. Surprisingly, the CB1 agonist increased activity in an open field compared to vehicle and this occurred in both the fed and fasted conditions. Future experiments will determine if CB1 antagonists can be packaged into the novel gelatin-based edible delivery system to reduce hyperphagia and impulsive eating associated with consumption of palatable diets.

The Anatomy of a Psalm: A Literary Study of Biblical Poetry

Maxim Harris Bateman, CURO Honors Scholar
Dr. Susan Rosenbaum, English, Franklin College of Arts & Sciences

The Book of Psalms is misunderstood. It has been studied by devout Christians and religious scholars alike for centuries, but these readers have missed a major aspect of the text. Because they are often viewed as either religious or historical texts, the Psalms are rarely considered for what they truly are: a montage of poems. Having previously analyzed the structure, subject, and tone that classifies a "psalm" as a poem, the focus of this study will be broadened to analyze overall themes and motifs throughout the Book of Psalms. By charting the use of specific words and symbols, the underlying narrative of the Book will be brought to the surface, enabling a better understanding of its structure. The psalms will be analyzed in their English translations with great consideration to their original Hebrew context. The Psalms are lenses into the human experience; they tell of the deepest lows and the greatest highs a man can experience. Thus, analyzing them as poetic vessels of emotion will uncover not only the core of what makes a Psalm a "psalm," but also the core of what it means to be human.

The Cross-sectional Associations between Reactive/Proactive Aggression and Internalizing Problems: A Meta-Analysis

Josh Baylor
Dr. Noel Card, Human Development & Family Science, College of Family & Consumer Sciences

In the United States, between 2016 and 2019 the prevalence of anxiety among children and adolescents was 9.4%, and that of depression was 4.4% (CDC, 2022). According to the CDC, this trend is expected to increase over time in school-age children. This draws attention to scholars to examine behavioral factors that associate with these symptoms. Prior research has found an association between proactive and reactive aggression and internalizing problems. This meta-analysis explores the cross-sectional associations between proactive and reactive aggression and internalizing problems. Nine studies (N=6059, Mage=13.16) were included in this ongoing meta-analysis. A literature search yielded 81 potential studies for inclusion. We used the keywords "reactive aggression," "proactive aggression," "anxiety," and "depression" to streamline the process. Studies needed to A) involve a normal population, B) include r-correlations on the relationship between proactive or reactive aggression and internalizing problems, and C) utilize cross-sectional data. Effect sizes were coded as a correlation (Pearson's r) between the aggression sub-types and internalizing problems. The Random Effects Model was used to calculate the effect sizes. Results for proactive aggression and internalizing problems were significant (r= .098, p<.001, k=35). Heterogeneity was significant (Q= 289.86, p<.0001). Results for reactive aggression and internalizing problems were also significant (r=.2062, p<.001, k=33). Heterogeneity was significant (Q= 617.50, p<.0001). Our initial findings are consistent with existing research on internalizing problems and aggression; there is a stronger correlation between reactive aggression and internalizing problems than proactive aggression. Future research should be done to determine the role of moderators in this association.

Anticipated Support as a Function of Goal Pursuer and Previous Behavior

Matthew Isaiah Bazan, CURO Research Assistant
Dr. Michelle R. vanDellen, Psychology, Franklin College of Arts & Sciences

In the current study, we investigated whether individuals are less influenced by their own self-control failures than others' self-control failures, and whether these perceptions are linked to expectations of support. We hypothesized that self-control

failures have a larger effect on willingness to provide support than they do on expectations of receiving support. We manipulated participant roles (actor or observer) as well as outcomes (self-control success or failure). Participants named someone they knew and described a recent experience where either they or that person successfully or unsuccessfully exerted self-control. We used 2 x 2 ANOVA to examine effects on three primary outcomes including perceived effort, goal commitment, and anticipated support as well as secondary variables of future success, perceived difficulty, and uncertainty of support provision. We found that the effect of outcome was larger for others than the self for all variables except, expected support. However, mediational models suggest perceived commitment and effort do mediate effects on support. These results help explain when people might provide support in others.

Influencers & Financial Markets: Crossing the Liability Line?
Sophia Beasley, CURO Honors Scholar
Prof. Lindsay Sain Jones, Insurance/Legal Studies/Real Estate, Terry College of Business
In 2018, Kylie Jenner tweeted "no one uses Snapchat anymore." Within 24 hours, Snapchat's stock fell approximately 6%. Recently, Elon Musk increased the worth of Dogecoin, a cryptocurrency, by approximately 15% after announcing it could be used to buy Tesla merchandise. These situations demonstrate the vast power certain influencers have on stock and commodities markets. My research investigates whether influencers should be allowed to profit from their influence on the stock and commodities markets. My preliminary assessment is influencers are prohibited from intentionally influencing stock and commodities markets via securities and commodities laws. Whether they can lawfully profit from unintentional influence is less clear. My project argues influencers should forfeit any profit made from unintentional influence but should not be held criminally liable since the influence was not intended. The project is being approached doctrinally, but I plan to add an empirical analysis to evaluate scenarios of unintentional influence for potential evidence that influencers have taken advantage of their effects on the markets. Such data could be important in drawing the lines for legal and ethical accountability. This project holds importance ethically and legally. Akin to the misappropriation theory, influencers arguably have created an unfair advantage for themselves. Without evidence the influence was intentional, these actions should not be misconstrued as fraud. I anticipate my research to show when influencers profit from their effects on the markets, it becomes increasingly difficult to draw a line between intentional and unintentional influence.

An Autoethnography Account: The Impact of Research on Identity
Ryan Belfi
Dr. Doris Acheme, Communication Studies, Franklin College of Arts & Sciences
This semester, I am working as a research assistant and participating in many responsibilities for the first time. One responsibility is transcribing interview data of international and domestic teaching assistants discussing their experiences as instructors. During this research practicum, reflexivity has been a powerful technique that has promoted self-reflection as it concerns my identity as a white, female, U.S. American student. Using the qualitative method of autoethnography, I am gathering data through voice recordings, video logs and notes as I reflect upon my identity. So far, my autoethnographic research is teaching me that identity has a large impact in the classroom. I have learned my identity as a white, U.S. American, English speaker, has made my experiences in classrooms easier because I do not defend my academic credibility as international and racial/ethnic groups of graduate teaching assistants do. I have also learned that it is as much my responsibility as it is my interaction partners to accommodate to cultural and/or social differences. Also, by being a woman, I may not be taken as seriously in professional settings compared to white males. During my study abroad in Spain, I believe the experience learned from the self-reflexivity afforded by this autoethnography research will serve as a guide while I adapt to a new culture. I plan on sharing lessons learned through this autoethnography with classmates/students so they can learn the importance of understanding and patience with instructors, whether they are U.S./non-U.S.

The Influence of ALS3 or HGC1 Overexpression on the Improvement of Biofilm Formation in Candida albicans
Alexandra Benedetto
Dr. Aaron P. Mitchell, Microbiology, Franklin College of Arts & Sciences
Candida albicans is an opportunistic fungal pathogen. It is generally found as a commensal fungus that grows on skin and mucosal surfaces. This pathogen concerns physicians due to its ability to grow extensive, treatment -resistant biofilms on abiotic surfaces, such as implanted medical devices. C. albicans exists in two morphological states, yeast and hyphae; its ability to switch between the two morphologies is required for biofilm formation, a key virulence trait. Previous studies have shown that the ALS3 and HGC1 genes are activated during biofilm formation in many clinical isolates. From this preliminary data, we hypothesized that overexpressing ALS3 and HGC1 may help to improve biofilm formation in isolates that form biofilms poorly. I tested this hypothesis by engineering overexpression of ALS3 and HGC1 in 9 clinical isolates. Overexpression strains were generated using a transient CRISPR Cas9 system with sgRNAs specific to the ALS3 or HGC1 promoter. Here we show that increased expression of ALS3 or HGC1 is sufficient to drive increased biofilm formation in certain clinical isolates. This result shows that expression of two known biofilm genes is limiting for biofilm formation in some isolates. Conversely, there are yet to be discovered genes that are limiting for biofilm formation in the other isolates.

The Function of Chicken Yolk Sac Tissue in Regulating Thyroid Hormone Metabolism and Availability During Early Embryogenesis
Grant Gaines Bennett
Dr. Laura Ellestad, Poultry Science, College of Agricultural and Environmental Sciences
Improved hatchability and overall chick quality are important for the poultry industry. By understanding pathways that regulate chick metabolism during the 21-day embryonic development period, strategies that improve livability and early post-hatch growth can be implemented. The yolk sac tissue (YST) is a multifunctional organ that transports yolk nutrients to the developing embryo. Prior work has suggested that the YST produces somatotropic axis components during embryonic development, indicating that it could regulate growth and metabolism during this time. Since the thyrotropic axis also regulates growth and metabolism in chickens, the purpose of this experiment was to determine if YST plays a role in transport and signaling of thyroid hormones (THs) during embryogenesis. YST was collected on embryonic (E) days 3, 6, 9, and 12. Expression of mRNA for enzymes involved in TH availability, TH receptors, and TH transporters was determined. Deiodinase 2 (DIO2) was decreased significantly after E3 ($p<0.05$). TH receptor alpha (THRA) was found to increase between E3 and E12 ($p<0.05$). The TH transporter transthyretin was highly expressed in YST at all ages. Since DIO2 helps increase availability of bioactive TH, its early expression suggests that YST can activate TH stored in yolk and transport it to the embryo with transthyretin. Increased levels of THRA would maintain TH signaling even in the face of decreased bioavailable TH later in development. Together, these data suggest that YST plays an

active role in regulating chicken embryonic growth and metabolism by facilitating transport and signaling of THs from the yolk.

Freezing Tolerance across Elevation and Ontogeny in Boechera stricta

Caroline Beuscher

Prof. Jill Anderson, Genetics, Franklin College Arts & Sciences

The effect of climate change on global temperatures may induce severe evolutionary pressures in plant populations. One unexpected consequence of climate change is increased freezing events due to earlier melting snowpack. Snow acts as insulation, keeping temperatures constant. Boechera stricta is a perennial flowering species native to the Colorado Rocky Mountains. Populations at lower elevations are exposed to freezing events due to early snowmelt in April, while populations at higher elevations experience benign temperatures as snow melts out after June. We hypothesize that populations from lower elevations will be locally adapted to freezing, and that freezing tolerance will increase with later ontogeny. To address these hypotheses, we completed a freezing assay utilizing B. stricta from differing ontogeny groups. We randomly assigned trays to different freezing events, simulating current and future climate conditions, followed by germination and survival observation. We found a significant relationship between elevation by treatment interactions and probability of germination in seeds following a freezing event, where low elevation populations had higher germination under future climate conditions. Interactions between elevation and growth rate in older seedlings were also significant. Freezing tolerance appears to be linked to ontogeny group and may have a cost in benign conditions in B. stricta. We can conclude that B. stricta is locally adapted in regard to freezing tolerance. Our results suggest that local adaptation may be harmful to B. stricta as populations face novel climate conditions. This study illustrates the role of plant adaptative responses in intraspecies diversity and persistence in changing environments.

Computer-Based Petal Color Classification and Analysis of Geranium Viscosissimum

Jahnvi Bhagat

Dr. Shu-Mei Chang, Plant Biology, Franklin College of Arts & Sciences

Computer-Based Petal Color Classification and Analysis of Geranium viscosissimum

Flower color variation is commonly observed in nature, but tracking it can be a difficult task depending on the location and flowering time of the species. Citizen science databases, such as iNaturalist.org, are useful for collecting such data but come with inconsistencies because color judgment can be subjective. To improve upon these challenges, Dr. Chang and her team have developed a computer-based workflow to evaluate petal colors using a spring flower, Geranium maculatum. The main goal of my project was to add steps prior to the existing workflow to improve the isolation of flower segments from the background. Specifically, I first downloaded a dataset of all research-grade G. viscosissimum images from iNaturalist. I then annotated and determined the usability of each image for petal classification using ImageAnt, an image annotation software. Next, I used the program Ilastik, a machine learning algorithm, to segment the petal from each image which was overlayed on the original image to determine the color of the petals (in terms of Hue, Saturation, and Value). This workflow provides an accurate and efficient way to characterize many images collected by citizen scientists. I applied the new workflow to determine the color variation of Geranium viscosissimum across its distribution range and found that petal color varies greatly in Saturation, then Hue, and least in Value. I plan to do further analysis using bioclimatic databases to identify environmental factors that may have contributed to maintaining floral trait variation in nature.

Identifying Neurons that Mediate Hyperphagia through Cannabinoid Receptor Activation

Omeka Bhatia

Dr. Emily Noble, Nutritional Sciences, College of Family & Consumer Sciences

Cannabinoids are a class of lipid signaling molecules that are both produced endogenously (endocannabinoids) and ingested via exogenous drugs (cannabis). Cannabinoids that activate he cannabinoid type 1 receptor (CB1R) have been shown to potently increase food intake. Hypothalamic neurons are critical mediators of eating behavior, and the CB1R has been reported on hypothalamic neurons responsible for modulating food intake. We set out to determine the neural mechanisms by which cannabinoids impact eating behavior using a novel gelatin-based edible delivery system to administer CB1R agonists. In Experiment 1, male Wistar rats were given an edible CB1R agonist, CP55940, at a dose that increases intake of standard rat chow during the first three hours of the dark cycle compared to vehicle edibles. Using food intake monitoring cages to track meal patterns following CB1 agonist delivery, we determined food intake increases are facilitated by an increase in meal number, suggesting an increase in appetitive behavior. Based on these findings, we hypothesized that specific populations of hypothalamic neurons, known as MCH neurons and orexin neurons, mediate cannabinoid-induced food intake. In Experiment 2, male Wistar rats (n=8/group) were given an edible CB1R agonist or vehicle edible and were transcardially perfused 90 minutes later. Brains were extracted and cryosectioned for immunohistochemical analysis of the presence of cFOS in the lateral hypothalamus. cFOS is an immediate early gene transcribed when neurons are recruited, and quantification of cFOS in neurons is a common technique to assess neuronal activity following an intervention. We found cFOS in the lateral hypothalamus of animals fed the CB1R agonist and discovered that cFOS was not present in MCH neurons, but it was present in orexin neurons. Moving forward, quantification of orexin neurons and colocalization with cFOS will reveal if orexin neuron activation is increased by CB1R activation.

Comparing Databases of Gene Expression to Determine Transcription Factor Function

Aditya Birla, CURO Research Assistant

Taylor Marie Strayhorn, Genetics, Franklin College of Arts & Sciences

Transcription factors regulate gene transcription to proteins in eukaryotes, shaping organismal responses and development. In maize alone, thousands of transcription factors direct cell function, and current understanding of transcription factor targets is underdeveloped. Our project's goal is to identify a transcription factor's target genes by inserting plasmids carrying the transcription factor in leaf tissues where it is normally absent. As a result, target genes of this transcription factor are activated. Once the transcription factor's target genes are expressed, we can compare the subsequent expression via RNA sequencing to global expression patterns in pollen and other tissue samples to identify the transcription factor's role in pathways which affect that tissue's development. A bioinformatics pipeline enables developmental pathway targets of the transcription factor to be elucidated and analyzed to generate transcription factor libraries. The data are extremely large, so download is streamlined using fasterq-dump protocol, and is quality assessed via visual interpretation. This acts as a checkpoint prior to continuation of the data through the pipeline. A pilot screen of forty transcription factors has already yielded RNA sequencing reads that have been processed by the pipeline. In the future, we hope to use this workflow to analyze the entire maize TFome to provide resources for other researchers.

Exploring Decision-Making of Undergraduates in STEM Research
Meghan Blitchington, CURO Research Assistant; Jamye Thigpen; Alexzandria Moran
Dr. Erin Dolan, Biochemical & Molecular Biology, Franklin College of Arts & Sciences
Participation in undergraduate research in the sciences can help students gain confidence in their scientific abilities, foster their identity as a scientist, and help them clarify if they want to continue in research. Undergraduates can access science research training through a traditional undergraduate research experience (URE) where they intern in a faculty member's research group and through course-based undergraduate research experiences (CUREs), where they do research as part of a laboratory course. Although CUREs are gaining traction as a means for undergraduates to gain research experience, it is not fully known how student experiences differ, if at all, in UREs and CUREs. We reasoned that students may differ in the extent to which they have opportunities to make decisions, which is a sign of intellectual contribution to and ownership of the research. Thus, we investigated the research question: What research decisions do science undergraduates make in UREs and CUREs? We collected open-ended survey data from a national sample of undergraduates (n = 525) in which students reported all the decisions they made each day they did research. Data were analyzed using standard qualitative content analysis by a team of researchers. All data were consensus coded by our research team. Overall, students reported 3,162 decisions across four semesters. We identified who made the decision (the student alone or as part of a group) and the topic of the decision. The topics included decisions about the research direction, background, and organization, as well as how to organize, carry out (do), trouble shoot, analyze, draw conclusions, and write about the research. Students also made decisions about their own development and growth and decisions not related to research. Characterizing the types of decisions that undergraduates make in UREs and CUREs is an important step in determining how these research experiences affect student outcomes. In the future, we plan to link these decisions (frequency and topic) to student outcomes, such as their confidence, science identity, and career intentions.

Examining Middle Ear Protection Conferred by a Live Vaccine Candidate against Bordetella Bronchiseptica in a Mouse Model
Julian Bolanos
Dr. Eric Harvill, Infectious Diseases, College of Veterinary Medicine
Pathogens have evolved complex virulence mechanisms to suppress host immune responses. The bacterium Bordetella bronchiseptica (Bb) is one such mammalian respiratory tract pathogen which uses mechanisms to efficiently suppress and evade the host immune system. To do this, Bb utilizes a critical immunomodulatory factor (btrS) that coordinates the expression of virulence factors like the Type III secretion system (T3SS) that suppress the host immune response. When the btrS gene is deleted in Bb, it limits the bacterium's ability to immunomodulate the host, allowing the host to clear the infection and mount a strong protective response against Bb. Because it mounts a strong protective response against Bb while being cleared out efficiently, BbΔbtrS has been found to be a promising live vaccine candidate. Here we propose to examine if BbΔbtrS can protect the middle ears (MEs) from Bb. The Bb-mouse infection model for the MEs is the first natural ME mouse infection model of acute otitis media (AOM). We will compare how well mice vaccinated with BbΔbtrS will protect MEs from being infected. The infections of MEs will be compared with those from naïve unvaccinated mice through an analysis of bacterial load (CFU/ME) in the MEs by plating samples of homogenized MEs on agar. We will also evaluate the titers of IgA and IgG antibodies in the ME samples and serum by ELISA. Vaccine-based protection of the MEs still remains an important medical objective. AOM is a major global burden affecting many aspects of healthcare including large prescriptions of antibiotics and the development of chronic infectious complications leading to deafness. This study will provide new insight into the nature of ME immunity in AOM and vaccines to prevent it.

Approaching Satellite Autonomy through the use of Finite State Machines
Cameron Bonesteel, CURO Research Assistant
Dr. Deepak R Mishra, Geography, Franklin College of Arts & Sciences
Task scheduling is a critical part of satellite mission operations and is integral to the successful operation of the Multiview Onboard Computational Imager (MOCI) satellite. MOCI has a primary goal of performing and studying high level computation in space using a graphics processing unit (GPU). In order to achieve this goal, the onboard computer (OBC) needs to be able to autonomously control all subsystems on board the satellite with little input from a user on the ground. These subsystems will complete tasks such as taking and processing images when it is outside the zone of control by a ground operator. Part of this autonomous control is a finite state machine (FSM) that consists of several operational states and rules for transitioning between those states such as time, orbital location, and satellite health parameters. Some of these rules must come from the ground operators and are outputted from the MOCI Automatic Satellite Scheduler (MASS), a simulation suite designed to provide the operator with the optimal mission schedule for mission success. The proper use of the information from MASS is integral to the development of the MOCI FSM as well as FSMs on future missions. Understanding the availability of simulation information as well as how computers can make automated decisions is also one of the first steps to successful on-board intelligent decision making for satellites.

The Cruel Prince and the Enemies-to-Lovers Trope
Ally Bonfield
Dr. Danielle Bienvenue Bray, English, Franklin College of Arts & Sciences
With the rise in popularity of social media headliner, TikTok, and its subcategory called "BookTok," where books are reviewed and discussed, the enemies-to-lovers trope has gained large amounts of traction. The trope itself can be seen in many variations across the romance genre; however, when this trope occurs, all variations have the same general idea, defined as when two characters progress from ferociously hating each other to forming a mutual respect and romantic love. One novel that comes up frequently when discussing this trope in online spaces, such as BookTok, is Holly Black's The Cruel Prince, the first novel in Black's The Folk of the Air trilogy. Though the aspects of exactly what makes up this controversial trope are heavily debated, The Cruel Prince depicts themes of power, agency, and the reversal of gender expectations in its rendition, making for a rich novel, in terms of understanding exactly what a romance with one's enemy in a fantasy setting could look like. This paper will closely examine the relationship between titular character, Jude, and her parallel, Prince Cardan, their refusal to adhere to traditional gender roles, creating a cyclical power dynamic, where both characters demonstrate their abilities to be the other's equal and weakness when it comes to achieving their respective goals, as well as the, sometimes controversial, traits of the enemies to lovers trope that directly influence their story.

Development of A Poloxamer/Alginate Based Bioink for 3D Bioprinting Applications

Ruchi Borole, CURO Research Assistant; Jessica Patel; Bryan Shim
Dr. Vladimir Reukov, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

Recently, there have been many technological advancements in additive manufacturing, such as extrusion-based three-dimensional (3D) bioprinting. Extrusion-based (3D) bioprinting allows for the creation of tissue with contrasting cell types using a combination of different materials including a biopolymer ink. Utilizing solutions with optimal consistency is essential to printing stable structures to sustain cell growth as the effectiveness of a biopolymer ink is defined by its adhesion capacity to tissues, sufficient residence time of cells, and the effect of bacterial growth. In order to standardize this process, a method of measurement called the parameter optimization index (POI) will be used to define the optimal printing speed and pressure needed to achieve the highest accuracy and precision. This experiment aims to find the POI of pluronic F-127 and sodium alginate concentrations. The bioink solutions were prepared in solutions of deionized water kept at 4⅓This procedure was repeated using concentrations of 13%, 16%, and 20% pluronic F-127 by weight and 6%, 3%, and 3% sodium alginate respectively. The solution with 13% pluronic F-127 and 6% sodium alginate was recognized to have the best consistency and viscosity for printing, using a capillary viscometer. To promote cell growth, the optimal bioink will be autoclaved and seeded with fibroblasts with fluorescent properties. Cell growth and viability will be observed and evaluated using a compound epifluorescent microscope. Cell viability will be further evaluated using MTT assays.

Ethics of Artificial Intelligence in the Discovery Process of Litigation

Rohini Bose, CURO Honors Scholar
Dr. Jeremy Davis, Philosophy, Franklin College of Arts & Sciences

Artificial intelligence has come to play an increasingly significant role in the discovery process of litigation. There are several types of artificial intelligence-powered tools that have been developed in order to answer to specific needs, from e-discovery softwares that aid in legal research to prediction-based technology that aims to forecast litigation outcomes. Scholars have explored the overall trajectories for the implementation of artificial intelligence systems within discovery given the trajectories of artificial intelligence systems in adjacent fields. This paper explores the morally challenging dimensions of three systems of AI as they are used in the discovery process: legal analytics, artificial intelligence as evidence, and generative artificial intelligence. The paper argues that there are important ethical considerations that must be made about the implementation of these AI systems in discovery. It builds upon prior work and recent developments in scholarship to offer an outline of how the implementation of these three systems may have ethical implications that have the potential to ripple throughout the legal system. The results of the paper pertain to the questions of power, transparency, trust, responsibility, and justice within and surrounding our legal system we must contend with. These questions emerge upon investigating the morally challenging areas of the implementation of these artificial intelligence systems in discovery. The paper advances discussion in the area of artificial intelligence in the discovery process by bringing attention to these ethical questions and by offering a position upon which to build.

Investigating the Influence of a Genetic Variant, rs968567, on FADS1 and FADS2 Expression through Prime Editing

Isabelle Bowman
Dr. Kaixiong Ye, Genetics, Franklin College of Arts & Sciences

Within the Fatty Acid Desaturase (FADS) gene cluster there lies an 85-kb region foundational in metabolism of polyunsaturated fatty acids (PUFAs). This non-coding region has shown contributions to metabolic diseases and health conditions, such as cardiovascular disease. Variants known as single nucleotide polymorphisms (SNPs) within the genetic code are point mutations believed to be a root cause in this association through the potential to either enhance or limit gene transcription binding factors. One variant, rs968567, has been identified as a causal variant specifically within the FADS2 region and we aim to further investigate this claim by uncovering its activity within the FADS1 and FADS2 regions through in vivo experiments. To accomplish this, prime editing technology will edit a single nucleotide—producing the variant without any additional genome changes. A prime editor and prime editing guide RNA complex, (PE-pegRNA), precisely cuts one target DNA strand and transcribes a sequence with the focused edit in its place. Following, qPCR and western blot techniques reveal cellular mRNA and protein levels respectively. We intend to use analysis of these measurements to investigate the influence rs968567 has on gene function, and overall fatty acid metabolic activity and linked diseases.

The Effect of Influencer Social Reassurance on Gen Z's Willingness to Recommend Secondhand Fashion

Sophia Boyer
Dr. Jewon Lyu, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

Generation Z is known to have high interests in sustainability issues, but often faces barriers to making sustainable purchase decisions due to their perception of sustainable fashion being expensive, unfashionable, and inaccessible. Previous studies have highlighted that secondhand fashion may be a more cost-effective and attractive sustainable shopping method for Gen Z consumers. However, lingering stigmas associated with secondhand fashion may affect Gen Z's willingness to disclose and recommend secondhand shopping. This study investigates the research question, "How does influencer postings about secondhand fashion affect Gen Z's willingness to recommend secondhand shopping?" by utilizing the Theory of Planned Behavior to investigate the relationship between influencer social reassurance, self-consciousness, and consumer behavior. This study hypothesizes that social reassurance by influencers will positively correlate with recommendation behavior by positively increasing viewer's subjective and personal norms toward secondhand fashion. This study expects positive social reassurance from influencers to have a significant impact on Gen Z's attitudes and subjective norms towards secondhand fashion, increasing their willingness to recommend, and the effect will be stronger for highly self-conscious individuals. This study surveys undergraduates' attitudes and behavior towards secondhand fashion using Qualtrics. It includes close-ended questions on demographics, norms, social reassurance impact, and recommendation willingness. Data is collected through convenience sampling and analyzed to test the hypothesis and determine relationships. This study contributes to previous literature by providing empirical evidence on the relationship between social reassurance and recommendation behavior and provides practical insights for marketers on effectively promoting secondhand fashion to Gen Z consumers.

Investigating PFAS Contamination Effects on Parental Reproductive Health and Child Development via Unsupervised Machine Learning

Adrian Bozocea, CURO Summer Fellow, CURO Research Assistant
Dr. Lisa Renzi Hammond, Gerontology, College of Public Health

How does PFAS contamination impact human reproduction and development? While PFAS has substantial commercial applications, the health effects associated with PFAS contamination, parental reproductive health, child development are significantly understudied, but current literature suggests reductions in fertility alongside abnormal child development. Using Northeastern University's PFAS contamination site tracker, 1782 sites were

identified nationally, and 50 sites were randomly selected. A literature review was conducted, and 39 neurodevelopmental, general development, and paternal reproductive health markers connected to PFAS contamination (e.g. neurological disabilities, birthweight, semen parameters, etc.) were selected. Marker data was collected and matched to each contamination site. During this process, the unsupervised machine learning algorithm was developed through the established Apriori structure and the Python language. The algorithm was designed to identify and analyze trends between PFAS contamination and selected markers. The analysis of the data is still ongoing. We anticipate higher incidences of developmental deficits, delayed development, and decreases in parental reproductive health and fertility. Large-scale utilization and high resistance to degradation has led PFAS to contaminate air, water, and ground sources. This universal contamination has led to PFAS identification in blood serum samples of more than 98% of the US population. This combined with a lack of toxicity research is incredibly concerning. We hope that our findings will aid in the development of PFAS usage guidelines, increase the scope of PFAS toxicity research, and serve to highlight how everyday usage can impact parental health alongside child health and development.

Finite Element Analysis and Modal Analysis of the MOCI Cubesat During Dynamic Loading at Launch

Hunter Bradford, CURO Research Assistant
Dr. Deepak R. Mishra, Geography, Franklin College of Arts & Sciences

Prior to successfully launching a satellite into orbit, there are a number of mechanical design considerations that need to be met in order to ensure a satellite does not become structurally compromised during launch. Two factors of consideration that need to be met prior to launch are the modal requirements of the launch provider and the static structural demands of the payload. The modal requirements from the provider are to ensure the satellite does not resonate with the natural frequency of the rocket and therefore shake itself apart. The structural analysis is used to ensure the satellite and the payload remain intact while experiencing over 30 G's of acceleration. For fragile payload components, these are concerning issues that should be thoroughly verified using multiple simulation systems and in multi-axis configurations. The satellite that will be verified will be one of the UGA Small Satellite Research Lab's CubeSat missions known as the Multi-View Onboard Computational Imager mission (MOCI). Initially started in 2017, MOCI is nearing flight readiness with a tentative schedule to launch within Q2 2023. To simulate these unique conditions of the final assembly, finite element analysis (FEA) software will be utilized to ensure the standards have been adequately met. Although prior simulations have been conducted, the purpose of this research is to simulate the finalized MOCI assembly in its entirety and prove that it is flight ready.

Utilizing Additive Manufacturing of Semi-Crystalline Thermoplastics and Topology Optimized Generative Designs for Complex Small Satellite Bus Geometries

Hunter Bradford
Dr. Deepak R. Mishra, Geography, Franklin College of Arts & Sciences

Small satellite buses have traditionally been manufactured through subtractive means and ultimately limiting capability in feature, form, and an inability to alter the volumetric density of the material. However, emergent additive manufacturing methods that utilize Fused Deposition Modeling (FDM) integrated with soluble support material allow us to print synthetic thermoplastics, such as Polyetheretherketone (PEEK). Consequently, the number of structural parts and hardware components is reduced, along with the cost. Structural strength and dimensional stability of PEEK are comparable to traditional aluminum alloys in the construction of most satellite components. Additive manufacturing further allows the implementation of topology optimization algorithms to develop and produce complex geometries with resolutions up to 5µm in x/y movements and 1µm in z movements. Thermoplastics possess ideal strength to weight ratios and thermal expansion coefficients that can be exploited to design more desirable components of small satellite buses. We believe that topology-optimized, 3D-printed small satellite frames made from PEEK can offer a lighter alternative to their metal alloy counterparts. To show this, we will demonstrate the generative optimization of the SPectral Ocean Color (SPOC) satellite's 3U frame and compare its structural and modal analysis simulations to those of an optimized design.

Optical Alignment and Tuning of Multiview Onboard Computational Imager (MOCI) 6U CubeSat Optical Payload

Jackson Bradford
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With recent advancements in sensor technology, the optics and satellite industries are able to achieve resolutions and focus with optical systems in small form factors impossible only a decade prior. The optical industry currently pushes lens performance to its limit in order to maximize an optical system's resolution and to maintain parity with the progression of next generation optical sensors. Understanding and performing optical testing procedures has become a mission-critical task for any satellite mission utilizing onboard optical systems. Ensuring proper optical alignment and tuning is of the utmost importance when integrating an optical system into a satellite mission as there are no simplistic, alternative opportunities to correct minute errors in alignment and spacing after any satellite's final integration. To ensure proper optical alignment and tuning, Modulation Transfer Function (MTF) testing and Slanted-Edge MTF testing are utilized to produce certainty in an optical systems flight readiness. Modulation transfer function testing comprehensively measures an optical system's total resolution and is a vital consideration for final flight approval. Slanted-Edge MTF testing is used to further confirm an optical system's flight readiness and certifies proper lens alignment within an integrated system. MTF testing and Slanted-Edge MTF testing require extreme tolerances and stringent lab practices to ensure complete, accurate, and reproducible results. The UGA Small Satellite Research Lab (SSRL) is finalizing and tuning the optical alignment that is the centerpiece of the Multiview Onboard Computational Imager (MOCI) 6U CubeSat. The SSRL is composed entirely of undergraduate researchers with minimal optomechanical background. This research allows students the opportunity to replicate industry standard optical testing procedures in a clean room environment, in order to further their education and bolster professional skills. This research details the preparation of the optical system and dives into the intricacies of Slanted-Edge MTF testing, as MOCI moves toward preflight integration and eventual launch.

The Relationship Between Insula Volume and Positive Symptoms in Psychotic Disorders

Alex Branch
Dr. Jennifer McDowell, Psychology, Franklin College of Arts & Sciences

Dysfunction of the insula has been implicated as a contributor to the symptomology of psychotic disorders like schizophrenia and schizoaffective disorder. Schizoaffective disorder differs from schizophrenia in that it has features of a mood disorder in addition to psychotic symptoms like hallucinations and delusions. The insula's many connections to the limbic system and role in the integration of external sensory input make it a compelling structure for psychosis research due to many of the characteristics of psychosis relating to these functions. It also plays a role in

interoception and might be accountable for deficits in higher order cognitive processes seen in schizophrenia. Specifically, reductions in the volume of the left anterior portion of the insula have been correlated in previous research with increased positive symptoms such as hallucinations and delusions. Although a causal link has not been established between dysfunction of the insula and schizophrenia, alterations in the volume or connectivity of the insula could disrupt the normal integration of sensory input and manifest as an increase in the prevalence of delusions and hallucinations. We analyzed MRI data from the Australian Schizophrenia Research Bank, comparing insula volume between 61 subjects with psychosis and healthy controls. Each MRI went through segmentation, the process of labeling subcortical structures, which was performed by Freesurfer 6.0. Additionally, each participant took the Scale for the Assessment of Positive Symptoms (SAPS). A correlation will be run between positive symptom score and bilateral insula volume. It was hypothesized that the left anterior and total insula volume will be decreased in individuals with schizophrenia and schizoaffective disorder compared to healthy controls. An additional hypothesis is that the prevalence of positive symptoms as measured by SAPS will be correlated with the decrease in left anterior and total insula volume in individuals with schizophrenia and schizoaffective disorder. This will hopefully help in understanding the neural basis of positive symptoms and ultimately lead to better diagnostic and treatment strategies.

Evaluation of a Piglet Specific Delayed Match to Sample (DMTS) and Delayed Non-Match to Sample (DNMTS) Cognitive Task

Taylor Brooks

Dr. Holly Kinder, Animal & Diary Science, College of Agricultural & Environmental Sciences

Traumatic brain injury (TBI) is one of the leading causes of death and disability within the U.S., effecting over 475,00 children annually. Children suffering from TBI develop cognitive deficits including impairments in learning and memory. Swine represent an ideal translational model for human TBI due to similarities in brain anatomy and physiology. Despite successful translation of pig TBI models, a large gap remains in the development of sensitive and standardized assays that assess piglet cognition. The objective of this study was to determine if healthy piglets can perform a pig-specific delayed match to sample (DMTS) or delayed non-match to sample (DNMTS) task to evaluate learning and memory. Eight male piglets were clicker trained to interact with images mounted on a board utilizing their snout. Piglets were then trained to perform the DMTS task (n=4) or DNMTS task (n=4). Task performance was evaluated on image selection and latency to choice with a success criteria of 80% accuracy over 3 consecutive days. Normal piglets are expected to successfully perform the DMTS task by selecting the stimulus image depicted in the sample trial within the following 10 choice trials; alternatively, piglets are expected to perform the DNMTS task by selecting the image different from that shown in the sample trial in the next 10 choice trials. We anticipate the success of the DMTS and DNMTS tasks to sensitively evaluate piglet cognition which will be used in future studies evaluating novel therapeutics in a pediatric piglet TBI model.

Analyzing the Gaze Points and Strategies of Sight-Singers with an Eyetracker

Benjamin Brown, CURO Honors Scholar

Dr. Rebecca L. Atkins, Hugh Hodgson School of Music, Franklin College of Arts and Sciences

A number of studies have explored musicians' cognitive processes, strategies, and activities when sight-reading and sight-singing, but few studies have used eye tracking technology in sight-singing tasks. Our goal was to analyze the eye-hand span of musicians while sight-singing music using a Tobii T120 eye tracker. Participants were given four 8-measure melodies to sight-read, each sung for 30 seconds as a practice trial followed by a performance trial, emulating what singers would typically expect in an aural skills class or choral audition. The performance trial data showed a negative correlation between eye-hand span and singing accuracy, meaning that the students who tended to look further ahead from where they were in the music performed more poorly. This result contradicts previous studies and questions the extent of the common notion that singers should always look ahead while sight-reading. We are currently analyzing the eye-hand span data of the practice trial to compare it with that of the performance trial. We also aim to investigate how the accuracy of the performance is affected by both the accuracy of the practice trial and the practice strategies used.

The Influence of Multidimensional Poverty on Malnutrition and Health Outcomes of Indigenous Panamanians

David Burke, CURO Honors Scholar, CURO Research Assistant

Dr. Leonard Martin Ward, Romance Languages, Franklin College of Arts & Sciences

From the earliest days of colonization in North America, indigenous peoples have lost control of their land. In Panama, corporations and the government use historically indigenous lands to produce the most profit possible via exportation-focused agriculture and other projects, rather than sustaining the people to whom the land originally belonged. In addition to no longer being the primary beneficiaries of their land, indigenous Panamanians also suffer significantly higher rates of multidimensional poverty than their non-indigenous counterparts. Multidimensional poverty is a highly informative measure of poverty because it considers ten factors that influence quality of life, rather than only measuring income. As a result of unethical land use practices and pervasive poverty, indigenous Panamanians, especially children, have startlingly high rates of chronic malnutrition, which leads to higher rates of preventable chronic diseases and a lower overall quality of life. Advocates for indigenous people have suggested a potential solution to this issue: food sovereignty. Food sovereignty is a system of agriculture that prioritizes local farmers and citizens having control of their land instead of corporations. Under this idea, indigenous Panamanians would be able to grow foods and other products that meet the needs of those living on their land. Such a solution would be highly complicated to reach because it would require systemic changes in the priorities of Panamanian society, but it is a promising idea. For now, however, current gaps in wealth and the rights to land foster a large health disparity between indigenous and non-indigenous Panamanians.

Language Outcomes in Children Who Are Deaf or Hard of Hearing and Use the Auditory-Verbal Therapy Approach

Anna Camille Burnett; Zina Robbins; Addie Lee

Dr. Sandie Bass-Ringdahl, Communication Science & Special Education, Mary Frances Early College of Education

Congenital or prelingual hearing loss in children may pose a challenge to the development of spoken language and literacy skills. Auditory-Verbal Therapy (AVT) is a rehabilitative approach that aims to teach individuals who are Deaf or Hard of Hearing (D/HH) to communicate effectively and efficiently through listening and spoken language. This type of therapy begins with early intervention and focuses on auditory skills while avoiding non-auditory facial communication and sign language. The goal of AVT is for individuals who are D/HH to achieve spoken language skills similar to those with typical hearing. It is suggested that immersing D/HH children in an AVT setting will aid in closing the language gap between children with typical hearing and children who are D/HH. This systematic review aims to learn more about the language and

academic outcomes of children who are D/HH who participated in an AVT program.

United Nations Human Rights Council Membership and Domestic Respect for Human Rights
Kiana Bussa
Dr. K. Chad Clay, International Affairs, School of Public & International Affairs
The United Nations Human Rights Council (HRC) was founded in 2006 to replace the now-defunct Commission on Human Rights as the central United Nations body concerning human rights. Previous literature indicates that, at the international level, the Council is highly politicized. States remain interested in deemphasizing their own and their voting blocs' poor human rights records while unproductively focusing on the poor behavior of others. However, less research has been devoted to the role of the HRC as an institution on the domestic behavior of states. This paper investigates the relationship between the Human Rights Council and domestic state respect for physical integrity rights. This investigates whether states alter their behavior during two critical periods: the period preceding HRC elections and the period following the elections. Research is ongoing, but the anticipated results are increased respect domestically during these two critical periods. Altered domestic respect for physical integrity rights in either period would provide evidence for the Human Rights Council being an institution of particular social influence. Revealing the Human Rights Council as an environment of unique normative significance may shift how states and non-governmental organizations interact with the Council.

Analysis of the Fintech Market and Consumer-Treatment
Venusha Vishmika Buwaneka, CURO Honors Scholar
Dr. Gregory Day, Insurance/Legal Studies/Real Estate, Terry College of Business
The research question this project hopes to answer is how the fintech industry engages users and treats them both in the short-term and long-term. Engagement strategies that retain the user to the fintech and even the products that are offered will be analyzed, with a focus on strategies and products that may be detrimental to the user, perhaps by encouraging them to make bad trades or accept loan terms that are unfavorable. The anticipated findings of this project will be specific examples of fintechs that employ strategies that could be considered either unethical or detrimental to the user. These examples will then contribute to a paper Professor Gregory Day is writing regarding how anti-trust regulation needs to interact with the fintech industry.

An Investigation in Measuring Commitment and What Influences a State's Strength of Commitment to Human Rights Treaties
Bella Cabibi, CURO Research Assistant
Dr. Andy Owsiak, International Affairs, School of Public & International Affairs
States' commitment to human rights treaties varies—from strong to weak. Some states ratify these treaties without reservation and comply fully with the treaties' provisions. Other states withhold from signing, or if they sign, fail to ratify, issue numerous reservations that undermine the treaties' terms, or decide not to comply with the treaty's provisions. What explains this variation? To answer this question, scholars need a good measure of "commitment." In this project, I reconceptualize commitment and develop a new measure of it based on three main factors: whether a state signs (or ratifies) a treaty, the number of reservations that a signing state attaches to the treaty, and the state's subsequent compliance with the treaty's provisions. I then combine these three components into a single measure of commitment and explain the weighting decisions beyond their aggregation (e.g., why compliance contributes most to my measure). Once I develop the measure, I plan to statistically explore the factors that lead to greater or less commitment, which might include a state's (i) level of democracy, (ii) legal, political, and economic institutions, and (iii) geographic location. I anticipate that the level of democracy will affect the strength of commitment to human rights treaties more than the other potential factors.

Bio-Volcano: Preliminary Data from Mt. Etna Expedition
Grace Cantele, CURO Summer Fellow
Dr. Mattia Pistone, Geology, Franklin College of Arts & Sciences
Mercury remains one of the more dangerous volatiles emitted by volcanic systems, and exploring the emission route to the accumulation in organic and inorganic material has the potential to impact the safety precautions of those who live in the proximal areas to volcanic systems. The volcanic soil, erupted rock, and chestnut leaf data presented below were collected off the slopes of the active volcano Mt. Etna, located on the island of Sicily, in the efforts to derive the total mercury concentrations so that we may spot a correlation between the size of a volcanic eruption and the amount of mercury expelled into the atmosphere. To test such a correlation, I ran statistical analysis; and the interpretations of the p-values conclude that there is a statistically significant relationship between the amount of mercury and the elevation at which it was collected, as well as the amount of mercury and the distance from the main active vent, with soil samples carrying the average bulk of the concentration. This evidence can be used to conduct further research into establishing a predictive model for the amount of mercury released to the size of the volcanic eruption, thus proposing mercury dispersion and accumulation as possible monitoring parameters in volcanic hazard assessment.

Metacognitive Development in Life Science Majors: Insights from Year One of a Longitudinal Study
Rayna J. Carter, CURO Honors Scholar
Dr. Julie Dangremond Stanton, Cellular Biology, Franklin College of Arts & Sciences
Metacognition, or awareness and control of thinking, is crucial to student success in life science courses, helping them learn more and perform better. Yet many first-year students are still developing their metacognitive skills. The College Learning Study seeks to study how metacognition develops over the course of college by examining the metacognitive regulation skills first-year students have already developed. The College Learning Study seeks to define and characterize metacognitive development in life science majors. The College Learning Study is a longitudinal study of 52 students with undergraduate life science majors from 3 USG institutions, (1) a research university, (2) a master's university, and (3) a baccalaureate college. The study conducts annual, semi-structured interviews to examine students' metacognitive regulation skills including evaluating, planning, and monitoring. We predict that factors such as self-efficacy, personal epistemology, agency, and unique educational environments may influence metacognitive growth and development. In the study's first stage, we have found that most first-year students monitor and evaluate based on assessments and grades. Additionally, some first-year students resist dropping high school study strategies, even if they are not effective. At the same time, however, first-year students are open to new study strategies from social media, instructors, and peers. Understanding the development of student metacognition will allow instructors to support students' metacognitive growth early in their college career. Fostering the growth of metacognitive regulation skills like monitoring, evaluating, and planning will boost the success of students in life science majors and beyond.

The Effects of Cerebral Palsy on Fine Finger Control
Evan Castellano
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Approximately 1 in 345 children in the U.S. are affected by the neuromuscular disorder Cerebral Palsy (CP). The area of emphasis we want to look at is what effects CP has on the fine motor control of the hand—specifically finger individuation. The manual dexterity of the fingers tremendously impacts the overall functionality of the upper limb. Individuation ability is defined as the ability to move one finger while keeping the other fingers unmoved. Our lab designed a hand device (Hand Articulation Neuro-training Device (HAND, JHU reference #C14603)) that detects micro-isometric forces at the fingertips in 3D. Using this tool, we designed an Individuation task to assess CP children's finger individuation ability. From the forces detected at all fingertips, we derived an Individuation Index, quantified by a function of force from the instructed finger against the total sum of forces from the uninstructed fingers. We collected data on CP children using the HAND Device, comparing it to healthy children. The Index, Ring, and Thumb were the fingers used when creating the Individuation Index. The short-term goal to observe differences between the fine motor skills of children with CP to developing children has been accomplished. Our data revealed CP children's Individuation Index across these fingers are consistently lower than healthy children's. The long-term goal of this study is to utilize the recorded data from the affected hands of CP children to design an effective therapy to help them regain fine motor skills.

Blockade of CSF1R Ameliorates CSF1R Driven STAT3/Fyn Signaling Axis in Experimental Parkinsonism
Katelyn Castelli, CURO Research Assistant
Dr. Arthi Kanthasamy, Physiology & Pharmacology, College of Veterinary Medicine
Parkinson's disease (PD) is the second most common neurodegenerative disorder characterized by pronounced microglia mediated neuroinflammation, alpha-syn (a-syn) pathology and progressive loss of nigral DAergic neurons. Emerging evidence supports a role for peripheral monocyte dysfunction in PD pathogenesis; the mechanisms underlying monocyte-induced CNS inflammation remain poorly understood. Given that monocytes express high levels of CSF1R, we sought to investigate the contribution of this receptor to monocyte/macrophage inflammatory phenotype. Herein we show that upregulation of CSF1R is positively correlated with proinflammatory phenotype of splenic macrophages in a neuroinflammation mouse model of PD. Moreover, treatment of RAW cells with aggregated alpha-synuclein led to TREM2 down regulation with a concomitant increase induction of STAT3/FYN signaling axis. Importantly these events were preceded by disruption of mitochondrial homeostasis and oxidative stress response. Conversely, CSF1R inhibitor, PLX5622, abrogated the afore mentioned proinflammatory phenotype. These findings suggest that CSF1R promotes monocyte/macrophage proinflammatory phenotype via STAT3/FYN signaling axis, providing novel insights into the mechanism by which macrophage activation contributes to their proinflammatory phenotype in the context of alpha synucleinopathy.

Investigating Enhancer Function of 335 Base Pair Region within FADS2 in Humans
Julia Louise Cazabon, CURO Research Assistant
Dr. Kaixiong Ye, Genetics, Franklin College of Arts & Sciences
An 85-kb long genomic region covering the entire FADS1 and most of FADS2 has been found to play important roles during human genetic adaptation to local diets. The same genomic region has been associated with more than 40 traits and diseases. While previous expression quantitative trait (eQTL) analysis has suggested the presence of likely more than one regulatory variant, the exact causal variants are still unknown. This project aims to perform cellular and molecular biology experiments to narrow the 85-kb region down to one or more causal variants and to elucidate their mechanisms in disrupting gene regulation. Two haplotypes in the population correlate to differential biosynthetic efficiencies, but molecular mechanisms remain partially unknown. This study strives to determine whether an identified fragment in the putative regulatory region can act as an enhancer using a luciferase reporter assay. Two different versions of the same genomic regions have been PCR amplified from two homozygous donors and inserted into a plasmid with a minimal promoter. We have verified that our plasmid contains our fragment of interest by sequencing, and our next experiment will be to transform our plasmid into cells to determine expression patterns. The fragment's relative effect on gene expression will be tested in a human liver cell line with luciferase reporter assays, which visualize differences in luciferase expression between haplotypes. Our 335 base pair fragment contains a single nucleotide polymorphism (SNP) that has been previously demonstrated as a causal SNP in human colorectal cancer. To contextualize our study within the current literature, we plan to investigate its role in the HepG2 human liver cancer cell line.

Colorfastness Testing for Sublimation Printing on Digitally Designed Textiles
Emily Macfarlane Chambers, CURO Research Assistant
Dr. Laura McAndrews, Textiles, Merchandising and Interiors, College of Family & Consumer Sciences
This research project combines digital print creation in Lectra's Kaledo Print CAD software and textile testing on various fabrications. Sublimation printing or direct printing is rapidly developing due to its high speed and quality, lower manpower and potential environmental aspects. Sublimation textile testing has not been widely conducted; therefore, adoption of this printing method into mass production is limited. Hence, the research objectives for this project were to design various textile prints in Kaledo Print CAD, to print the designs utilizing the Mutoh sublimation printer on various textile fibers and constructions, and to test various colorfastness - wash durability (Dry-cleaning and Home Laundering). First, two sets of eight Pantone color swatches were printed on both a knit and woven fabric construction. One set of Pantone swatches for each fabric construction was held as a control sample. Second, one set of swatches for each fabric was tested on dry cleaning, home laundering, and UV Light. The dry-cleaning was standard, and the home-laundered swatches were washed five times on the normal/cotton setting at 120 degrees Fahrenheit temperature using the 1993 Standard Reference Detergent. Once testing was completed, the evaluations of colorfastness were checked using the Macbeth SpectraLight II viewing cabinet with the type of illumination being daylight to compare the tested and non-tested fabric and using the Gray Scale for Evaluating Change to rate the color change. For each test we completed, there was no color change.

Production of 3-Hydroxypropionate by Metabolically-Engineered Thermophile Caldicellulosiruptor Bescii
Amisha Chaudhary
Dr. Mike Adams, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences
Concerns over climate change are driving factors towards microbial production of industrially important fuels and chemicals. In industrially feasible microbial production, lignocellulosic plant biomass is the most desired substrate due to its renewability and cost efficiency, but the recalcitrance of plant biomass is a significant challenge. Caldicellulosiruptor bescii is a thermophilic bacterium with the unique capacity to utilize lignocellulose. Thus, it is an excellent platform for sustainable production of non-native

chemicals such as 3-hydroxypropionic acid (3-HP). Industrially, 3-HP is one of the platform chemicals listed by the US Department of Energy as a precursor for eco-friendly biofuels and bioplastics. Microbial 3-HP production from biomass sugars starts with acetyl-CoA as the immediate precursor and involves acetyl-CoA carboxylase (ACC), malonyl-CoA reductase (MCR), and malonic semi-aldehyde reductase (MSR). While production of acetyl-CoA involves release of CO2 (from pyruvate), the CO2 is reincorporated in the first step 3-HP generation, implying the potential to reach net zero carbon emission. The aim of this study was to enable 3-HP production by combining the native C. bescii ACC gene and two non-native MCR and MSR genes. Therefore, a plasmid vector was constructed to engineer MCR and MSR genes from another thermophile, A. brierleyi. While the plasmid has been successfully transformed in C. bescii, 3-HP production was not detected. However, an alternative engineering of C. bescii strain sourcing all three genes heterologously from A. brierleyi resulted in 3-HP detection. Further genetic engineering will be performed to supplement energy and redox equivalents in these reactions to maximize 3-HP output.

China's Soft Power and International Cooperation

Albert Zhonghai Chen, Ramsey Scholar
Dr. Rongbin Han, International Affairs, School of Public & International Affairs

This study aims to investigate the potential relationship between China's Soft Power and international cooperation with China. By collecting various measurements of China's soft power, including music and media search volumes, Chinese perception on cultural relations, and presence of Chinese restaurants, and correlating them with UN voting records, this study will determine whether there is a statistically significant relationship between culture and political cooperation. While still in the data collection phase, there is the potential to find that cultural exports and soft power can lead to political cooperation and development.

The Shared Genetics basis of Circulating Polyunsaturated Fatty Acids and Brain Disorders

Claire Cheng, CURO Honors Scholar
Dr. Kaixiong Ye, Genetics, Franklin College of Arts & Sciences

Dietary and circulating levels of polyunsaturated fatty acids (PUFAs) have been associated with brain disorders as PUFAs are vital in brain function and development. Studies suggest omega-3 supplementation can help reduce psychotic symptoms such as anxiety. The causal roles of PUFAs in said disorders remain elusive as findings have been based on observational studies. The phenotypic association between PUFA levels and brain disorders is partially driven by their shared genetic factors. This project aimed to study the shared genetic basis for these relationships to understand the roles of PUFAs in brain disorders and illuminate interacting mechanisms. We investigated the shared genetic basis between 11 PUFA traits and 20 brain disorders and inferred their causal relationship using genome-wide association study summary statistics. We estimated genetic correlation and genetic overlap with LDSC and MiXeR. We found widespread and moderate shared genetic basis between PUFA levels and most brain disorders, suggesting shared genetic variants. We then applied Mendelian Randomization (MR) for causal inference with TwoSampleMR. In our forward MR, DHA shows protective effects on bipolar disorder ($\beta = -0.26$, $P = 0.034$) and major depression ($\beta = -0.032$ $P = 0.026$). These results indicate that elevated levels of DHA might reduce susceptibility to bipolar disorder and major depression. Our MR analysis did further support the shared genetic components of PUFAs and brain disorders. Additional analyses such as fine mapping will be conducted to understand the specific shared genes between PUFAs and corresponding brain disorders.

An Analysis of Dyadic Perspective-Taking Discourse Using LIWC-22 Text Analysis Program to Identify Improvements to Article Diction and Produce More Engaging Discourse

Vaishnavi Harsha Chennareddy, CURO Research Assistant
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Perspective-taking is the ability to perceive others' emotions, beliefs, or intentions. Current research evaluates perspective-taking through childhood development models and even neuroimaging. However, there is limited research on the use of linguistic analysis to assess perspective-taking. Therefore, the goal of this project is to utilize linguistic analysis to determine how prompting perspective-taking in dyadic discourse can induce varying engagement based on the discussed subject and participant background. Thus, I am examining archival study data where participants were randomly assigned to read and discuss either human health or environmental health articles with a partner using a semi-structured discussion format. Participants in condition one read about environmental racism or unethical human experimentation, whereas participants in condition two read about water or air pollution (without discussion of major human impact). Markers of perspective-taking engagement include affective (perceived emotions of others), cognitive (perceived beliefs of others), intention (predicted actions of self in others' situations), or avoidance of perspective-taking altogether. I hypothesize that human health condition participants will demonstrate more affective and cognitive markers of perspective-taking, whereas environmental health condition participants will demonstrate more intention and avoidant markers due to the articles' differing emphasis on human impact. LIWC-22 will be used to quantify reliance on engagement markers. Affective markers include emotional words. Cognitive belief markers include a non-"I" pronoun or noun followed by an emotional word. Intention markers include "I would," followed by an action word. Avoidance markers include "I" followed by either an emotional word or action word.

The Effects of Vegetarianism and Genetics on Human Polyunsaturated Fatty Acid Levels

Alex Huong Chiang; Aryaman Singh
Dr. Kaixiong Ye, Genetics, Franklin College of Arts & Sciences

The interaction between genetics and environment can influence an individual's phenotypic expression, from physical traits to disease predisposition. The objective of this project is to evaluate if and to what degree the interaction between genetic variation and vegetarian diets affects the phenotypic expression of fatty acid levels. To study and analyze this relationship, we will conduct a genome-wide interaction study (GWIS), which is a type of genetic analysis that tests for an association between genetic variation, a specific environmental factor, and a particular phenotypic outcome. The interaction effects can reveal genetic effects that are only visible when considering the influence of an environmental exposure, such as diet. We divided approximately 500,000 participants from the UK Biobank into vegetarian and non-vegetarian cohorts and analyzed their genetic and phenotypic variation. This experiment was successful in finding genetic loci that had a statistically significant interaction effect on one or more of the 14 fatty-acid-related phenotypes under vegetarian exposure. We identified 6 novel genetic loci, which are associated with the omega-6 omega-3 ratio, linoleic acid percentage, and omega-3 percentage phenotypes. Since fatty acid levels, such as omega-6 and omega-3, have been previously found to correlate with cholesterol levels and cardiovascular health, studies such as this one are important for learning about the genetic underpinnings of human health. The results of GWIS and other types of genetic analyses could be used in the future to assess individual genetic risk and tailor personalized nutritional plans and medical treatments.

The Relationship Between Adolescent Cannabis Use and White Matter Structure in Psychosis

Amanda Childs
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While recreational cannabis use by adolescents is illegal in the United States, nearly a third of high school seniors in 2022 reported having used cannabis in the past year. Frequent cannabis exposure during adolescence has been found to affect white matter structure and is associated with a greater risk of psychosis. Both healthy individuals and individuals with psychosis underwent diffusion tensor imaging, a form of diffusion-weighted magnetic resonance imaging used to quantify neurological white matter structure. For the purposes of this project, the psychosis group will comprise 178 patients with schizophrenia (SZ), 147 with schizoaffective disorder (SA), and 62 with bipolar disorder with psychosis (BPP). Subjects were asked to report the number of times they had consumed cannabis between the ages of fifteen and eighteen using a set categorical scale. White matter structure was quantified using fractional anisotropy (FA), a measure of water movement, in different white matter tracts of the brain. These values will be used to investigate the relationship between white matter structure and cannabis use in late adolescence, psychosis, and a possible interaction of cannabis use and psychosis. We hypothesize an overall mean difference, with the psychosis group having lower FA scores, a potential indicator of decreased white matter structure, in comparison to the healthy group. Furthermore, we hypothesize increased cannabis use in late adolescence to be associated with lower FA scores in both groups. Investigating this relationship is critical considering the recent changes in cannabis legalization in the U.S. and increased adolescent use of cannabis.

High Throughput Drug Discovery for Multiple Hereditary Exostoses

Kimberly Cisneros, CURO Research Assistant
Dr. Ryan J. Weiss, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Multiple Hereditary Exostoses (MHE) is a congenital skeletal disorder affecting one in every 50,000 children, and there are currently no approved therapies. This disorder is defined by the formation of cartilage-capped bony outgrowths, known as exostoses, at the growth plate of skeletal elements. Over 90% of cases are caused by loss-of-function heterozygous mutations in exostosin-1 (EXT1) or exostosin-2 (EXT2). These genes encode for enzymes responsible for the biosynthesis of the cell surface polysaccharide, heparan sulfate (HS). Heterozygous mutations in EXT1 or EXT2 lead to a decrease in HS levels, which disrupts signaling pathways regulating chondrocyte organization and function. Since deficiencies in HS are a key component of MHE, we hypothesize that overexpression of the normal EXT allele will compensate for the mutant allele and could restore functionally normal levels of HS in cells as a novel therapeutic approach. The goal of this project is to utilize drug screening assays to identify small molecule agents that increase the expression of EXT1 and/or EXT2 as a treatment for MHE. We engineered EXT1 and EXT2 reporter cells and performed drug repurposing screens to search for FDA-approved drugs that increase the expression of EXT1/EXT2. From the screens, we identified compounds that target diverse cellular pathways and enhance EXT1 and/or EXT2 expression. We have validated one of the hits, a PI3K inhibitor, by assessing alterations in HS biosynthesis, EXT expression, and chondrogenesis in vitro. In summary, drug screening assays identified promising drug candidates that will hopefully bring us closer to finding a cure for MHE.

Examining the Needs of Certified Nursing Assistants to Build a Self-Care Continuing Education Program

Madison Bailey Clark
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The US aging adult population is expected to grow to 84 million by 2050. It is estimated that 70% of aging adults will need assisted living care at some point in their lives. Certified nursing assistants (CNA) are critical for assistive care but 50% of CNA report burnout and negative job attitudes. The purpose of this study was to determine 1) whether education can improve CNA satisfaction and 2) to learn what kinds of educational topics would most benefit CNA. A 22-item survey was developed using the Qualtrics platform to measure demographics, job satisfaction, and opportunities for career progression, continuing education, and self-care. A total of 244 CNA (M=30.4 ± 6.3 years; 44.7% female, 20% non-White) completed the survey. The majority of CNA surveyed expressed interest in receiving education on work-life balance (72.7%), mental health support through selfcare (77.9%), and improving their quality of life (77.92%). Key motivations for continued education included applicability to future advanced degrees or certificates (87.4%), skill acquisition (88.5%), and salary increases (88.5%). Only about half (56.4%) of CNA expressed feeling satisfied with their career. Although continuing education is not a job requirement, CNA are open to receiving continuing education on topics relevant to their self-care and career progression.

Phenology and Floral Color Variation in Two Spring Ephemerals

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Climate change threatens the stability of ecosystems through changes in phenology. As temperature shifts happen at different times compared to historic trends, the timing of biological events may be altered. Spring ephemeral plants are expected to flower earlier due to the early onset of spring. This may have many consequences, and much research has been done in recent years to determine how earlier flowering affects plant populations. It has been shown that spring wildflowers which flower earlier in the year tend to experience colder temperatures and higher rates of frost damage. This is likely because though spring warming may come earlier, temperature shifts between seasons have also become more variable; plants may flower in response to early warming, but the risk of subsequent drops in temperature remains high. Traits that respond to changing temperature may be influenced by this trend. Specifically, anthocyanin pigment concentration has been found to vary significantly with temperature. This may be an example of adaptive plasticity, as higher rates of pigment production in colder temperatures results in darker colors, more light absorption, and better heat retention. However, significant changes to the floral color of plant populations could result in changes in pollinator attraction, and ultimately the rate of pollination services. I am using an artificial soil warming experiment to produce early flowering responses in Claytonia virginica and Mertensia virginica and am using digital photography in tandem with image calibration software to obtain reflectance data from their flowers and quantify color changes that result.

Rifts in Congress: How Has Domestic Elite Polarization Affected U.S. Foreign Policy?

Justin Cohen
Dr. Ryan Powers, International Affairs, School of Public and International Affairs

From the 101st Congress that convened in 1989 through today, polarization between members of Congress has increased dramatically. This growth in the ideological distance among

legislators has been intensely studied concerning its effects on domestic political issues. However, there has not been exhaustive research regarding elite polarization's effect on foreign policy. Previous research suggests that foreign policy has become a 'background' issue in Congressional elections, theoretically allowing ideologically extreme members of Congress to enact radical foreign policy changes without fear of electoral punishment. As Congress holds 'the power of the purse,' this paper analyzes various foreign policy spending measures (including overseas development assistance and overseas troop deployments) to see if this increased polarization has led to erratic changes when voters elect a new majority. After completing a quantitative analysis of the spending indicators, the paper finds that the hypothesized erratic changes have not occurred. In addition, this paper provides insights into how future theory-based research on foreign policy in the United States can be adjusted to account for America's distinctly polarized environment. As polarization in the United States continues to increase, knowledge of how the current political environment affects foreign policy will be crucial to understanding the changing role of the U.S. on the world stage.

Effect of Perinatal Dietary Supplementation on Brain Development of Offspring

Ursula Cole, CURO Research Assistant

Dr. Hea Jin Park, Nutritional Sciences, College of Family & Consumer Sciences

Maternal nutritional status plays a role in brain development of offspring. Docosahexaenoic acid (DHA) is known for its role in neurocognition, and egg yolks (EGG) contain various compounds beneficial for neurodevelopment. We investigated the impact of perinatal intake of DHA or EGG on the markers of brain function of offspring in a pig model, focusing on the hippocampus region, which is vital for learning, memory and spatial navigation. Sows (n=16) were fed a diet containing EGG (350mg/kg BW/day), DHA (75mg DHA/kg BW/day), or control from late-gestation through lactation. At weaning, the hippocampus of male piglets (n=2/sow) was stained with immunohistochemical markers of brain function. The expression of hippocampal NeuN was decreased in DHA or EGG. The expression of doublecortin was increased in EGG, while it was decreased in DHA. DHA also increased Glial-fibrillary-acidic-protein expression. Moreover, we found that EGG or DHA activate specific functional networks in the piglet brains including sensorimotor-network, salience-network or basal-ganglia-network. The activity of a specific network was correlated with these markers at specific areas of the hippocampus. Our findings suggest nutritional manipulation during the perinatal period may alter the expression of proteins related with brain function and further influence functional connectivity of male offspring at weaning.

The Relationship Between Student Test Grades and Varying Features on Cheat Sheets

Lili Cole Clark

Dr. Logan Fiorella, Educational Psychology and Instructional Technology, Mary Frances Early College of Education

Studies indicate that a significant amount of students find examination situations threatening and suffer from test anxiety during or just before the exam (Nsor-Ambala 2020). One solution found by educators to mitigate this is allowing cheat sheets on exams. However, student cheat sheet quality fluctuates and the quality influences its overall effectiveness, like student's final exam performance (De Raadt 2012). Previous research lacks an emphasis on features of the cheat sheets in correlation with students' performance in undergraduate statistics courses. The present study aims to investigate the relationship between various features on a cheat sheet and overall class letter grade. The findings of this research will inform strategic use of cheat sheets among Undergraduate Statistic students. With the optimization of their cheat sheets, students can improve test scores and assist in the overall goal of teachers to assess a student's ability to understand and apply what they have learned while improving test scores.

Computational Elucidation of Reactivity of bis-Silyloxyfurans with Ketenimines in the Diels-Alder Reaction

Audrey Violet Conner, Foundation Fellow, CURO Research Assistant

Dr. Steven E. Wheeler, Chemistry, Franklin College of Arts & Sciences

Classified as a [2+4] cycloaddition between a conjugated diene and a dienophile, the Diels-Alder reaction is a well-established, synthetically efficient reaction used throughout organic chemistry. One advantage of the Diels-Alder reaction is the wide array of functionalities that can be tolerated as the diene and dienophile. Some pairings of functionalities, such as the reaction of imino dienophiles with furan dienes, however, have been left understudied. Current experimental studies are probing the reactivity of ketenimines, the nitrogen analog of ketenes, with bis-silyloxyfurans to access highly substituted highly substituted pyridone derivatives, a common moiety found in nature. In this work, we use computational quantum chemistry to elucidate the reactivities of substituted and unsubstituted bis-silyloxyfurans with ketenimines observed experimentally as well as predict reactivities of systems that have not yet been tested. To do this, we are employing density functional theory (DFT) to locate energy minima and transition state geometries and energies on a multidimensional potential energy surface. We then analyze these geometries using the distortion/interaction model developed by Houk and co-workers to gain insight into the factors controlling reactivity for these understudied compounds. This will allow us to make predictions on important chemical outcomes such as the regioselectivity of these reactions.

Development of a Novel Atropo-Enantioselective Quadruple Diels–Alder/retro-Diels–Alder Reaction

Audrey Violet Conner, Foundation Fellow, CURO Research Assistant

Dr. Christopher Newton, Chemistry, Franklin College of Arts & Sciences

Asymmetric catalysis, a type of catalysis in which the formation of one stereoisomer is favored over others, is particularly useful in the synthesis of biologically active molecules, as different stereoisomers have different biological activities. 1,1-Binaphthol (BINOL) and its derivatives are a well-studied group of chiral catalysts and ligands used in asymmetric catalysis. The goal of this project is to atropo-enantioselectively synthesize BINOL derivatives through the implementation of a synthetically novel quadruple Diels–Alder/retro-Diels–Alder (DA/rDA) reaction on a dimeric tetrazine moiety. The DA/rDA reaction is a well-established, synthetically efficient reaction used throughout organic chemistry. Through its use, we hope to find a simple, efficient method to build polycyclic aromatic systems which may be used in asymmetric catalysis. Recently, we have successfully synthesized the dimeric tetrazine moiety through the homocoupling of a monomeric bromo-tetrazine species and are currently working to optimize the reaction. Once the dimeric species has been synthesized in sufficient quantities, we will begin employing the quadruple DA/rDA reaction sequence to build the desired polycyclic aromatic systems.

Eviction Mapping: From Citizen Scientists to Geographers Efforts to Map Evictions in Athens-Clark County in Response to COVID-19

Bailey Cook, CURO Research Assistant; Benjamin Wiley

Dr. Jerry Shannon, Geography, Franklin College of Arts & Sciences

There is inadequate data on evictions in Athens-Clarke County. The estimated number of people who are experiencing evictions is hotly contested, with local officials arguing that the estimation is either

an underestimation or an exaggeration of the actual experiences of evictions in the city. With no eviction data, the status of housing insecurity in Athens cannot be fully determined. We will cover the history of the project, starting as a community lead and run effort to track evictions during COVID to the Community Mapping Lab taking over the project. We will discuss how citizen researchers laid the foundation of our work and how we have adapted their work to fit our own needs, while preserving their own intent and labor. The COVID-19 pandemic has exacerbated housing precarity throughout the world. By the end of 2021, the average monthly cost of rent in Georgia increased by more than 20%, positioning it as the sixth-highest rent increase among all U.S states. The Community Mapping Lab's Anti-Eviction Mapping Project collects and visualizes data from September 2021 to January 2023 to expand our understanding of how eviction is shaping the Athens community. We will visualize and analyze this data using ArcGIS to display spatially the amount of evictions, the locations of evictions, and the most frequent evictors in Athens. We will use this data to expand our understanding of the local housing crisis and to provide a dataset and map, which can be used to answer many important questions about housing in Athens at the intersection of various socio-economic factors. Results from this study will provide a baseline data set for further research on evictions in Athens, including analysis of future redevelopment projects, eviction techniques such as displacement financing, move-in evictions and no-fault evictions, use of vacation home rentals, landlord technology, and future eviction relief policies. With this data set, researchers and community members can more easily investigate and fight against eviction in Athens.

Russian Language Resource Creation and Outreach for High Schools
Maya Cornish, CURO Honors Scholar; Caroline Solomon
Dr. Alexandra Shapiro, Germanic & Slavic Studies, Franklin College of Arts & Sciences
High school students in the United States are not typically taught about the history or culture of former soviet countries. In this CURO poster presentation, I will share information about a website my teammates and I are developing that is designed for Georgia high schoolers learning the Russian language. Our project is intended to improve students' historical and cultural understanding of the region by increasing access to education level-appropriate resources in a cost-effective manner. A secondary goal of the project to is to attract attention to areas where Russian is commonly spoken outside Russia. In the poster, I will highlight the countries for which content has been developed, present the involvement of different teammates, and show the input we received from the participating high schoolers.

The Relationship Between Gender, Home Demands, and Burnout
Sydney Cottle
Dr. Lillian T Eby, Psychology, Franklin College of Arts & Sciences
During the COVID-19 pandemic, working women experienced increased home demands due to the shift to remote work, school closures, and reduced childcare options. Considering that gendered time investments in family and home demands fit traditional gender roles, it is important to research the consequences of these increased home demands on women during the pandemic. The project examines the association between gender, home demands, and emotional exhaustion (burnout) during the pandemic using archival survey data collected from approximately 300 working adults in Georgia after the shelter in place order was lifted. I anticipate that the results will show that women report higher burnout than men (specifically emotional exhaustion), women will have greater home demands than men, and the relationship between gender and burnout will be explained by women having comparatively greater home demands. The results of this study will have implications for future research on connections between home demands and burnout through a gendered lens.

Psychological Outcomes of Weight-Neutral Dietary Interventions: A Systematic Review of the Literature
Cristina D'Alto
Dr. Sarah Saint Hamilton, Gerontology, College of Public Health
Weight-neutral interventions address health behaviors and psychological factors without emphasizing weight loss. Such interventions have demonstrated improvements in psychological measures, some which underlie behavior. Research shows a stronger relationship between behavior change and health outcomes than between weight loss and health. Weight loss interventions problematically focus on the latter and often rely upon assumptions that relate to weight stigma. Psychological well-being is therefore often ignored, when it could be a crucial factor in long-term health outcomes. This literature review examined the short- and long-term psychological outcomes of weight-neutral dietary programs in adults. The primary aim was to assess whether weight-neutral interventions can achieve positive psychological effects without the risk of weight stigma. The literature consisted of dietary interventions that utilized Health at Every Size, mindful eating, non-diet, weight-neutral, or intuitive eating approaches. Fifteen studies met the inclusion criteria. Participants in weight-neutral interventions improved in scales measuring depression, self-esteem, self-efficacy, and body image in comparison to no change or improvement to a lesser extent in control groups. Nine of the studies reviewed included a follow-up measurement, ranging from one week to two years post-treatment. Across multiple psychological variables, weight-neutral intervention participants in three of these studies maintained their improvements where the control groups did not. Changes in psychological variables may be maintained for longer among weight-neutral intervention participants than control groups. Thus, weight-neutral dietary programs may produce more effective and longer-lasting psychological improvements. Further research should determine whether improvements in psychological wellbeing translate into health behavior change, regardless of weight status.

Analyzing Sufu Expression in the Sonic Hedgehog Signaling Pathway in Heterozygous Induced Lizard Embryonic Fibroblast Cells Using CRISPR/Cas9
Anannya Das
Dr. Jonathan Eggenschwiler, Genetics, Franklin College of Arts & Sciences
The Sonic Hedgehog (Shh) signaling pathway is a conserved pathway that is important for proper embryonic development. This pathway is regulated by a series of transcription factors, of which Sufu is a known repressor. Sufu is important for regulation of the Shh pathway in Mammalia, with a loss of function causing developmental defects. This is contrasted by the Shh pathway in Drosophila, where a loss of function of Sufu demonstrates no obvious phenotypic differences. We decided to look at reptiles, specifically Anolis sagrei, which is an evolutionary intermediate to Mammalia and Drosophila, to determine the function of Sufu in this organism's Shh pathway. We hypothesize that regulation of the Anolis sagrei Shh pathway will be more similar to Mammalia than that of Drosophila. We used plasmid transfection to introduce the CRISPR/Cas9 system into induced lizard embryonic fibroblast cells, iLEFs, and subsequent Sanger sequencing to determine genotypes. We have currently screened eighty clones and observed four heterozygotes with a wildtype/frameshifting mutation. We plan to determine the phenotypes of the heterozygote Shh signaling pathway compared to that of wildtype. We recently discovered that all four heterozygotes are puromycin sensitive, meaning we will also

retarget the wildtype allele with the same CRISPR/Cas9 and plasmid construct in order to create homozygotes to understand the impact of a total loss of Sufu on the Shh pathway.

Examining the Effect of Mindful Eating on DASH Diet Adherence in a Full-time Working Sample

Arya Datta & Madison Clark

Dr. Jenay M Beer, Gerontology, College of Public Health

Hypertension affects approximately 49% of Americans and may be preventable by adherence to quality diets, like the Dietary Approaches to Stop Hypertension (DASH) diet. However, only 10% of Americans adhere to a healthy diet. Behavioral approaches such as mindful eating may improve diet behaviors, leading to better diet adherence. This study examines whether mindfulness improves adherence to the DASH diet beyond education on diet alone. Thirty-seven people were enrolled in a six-week eHealth DASH diet and mindful eating education program developed for working adults. Participants were matched based on baseline trait mindfulness level and placed into either DASH education with mindfulness or the DASH education-only control group. A DASH diet score was calculated using pre-and-posttest three-day diet self-reported diaries to examine changes in diet adherence. Thirty participants (M=47.95 ±11.38 years; 91.9% female; 16.2% non-white) completed pre and posttest measures. The DASH education with mindful eating group showed significant within-group DASH score improvements from the pre-to-posttest (p= 0.037). The DASH education only group did not improve from baseline (p=0.236). The results from this pilot sample indicate that mindful eating improves DASH diet adherence after six weeks. Larger sample sizes are needed to see significant changes between education and mindful eating for diet adherence.

Neutralizing mAbs against Parainfluenza Virus 3 Hemagglutanin-Neuraminidase Protein Displays Potent Inhibition of Viral Replication

Riley Davis

Dr. Jarrod Mousa, Infectious Diseases, College of Veterinary Medicine

Human parainfluenza virus 3 (PIV3) is a leading cause for respiratory disease, and can cause severe disease in children, immunocompromised, and elderly individuals. The hemagglutinin-neuraminidase (HN) protein on the virus plays a critical role in host cell membrane binding by sialic acid receptor binding along with interactions with the PIV3 fusion protein, which leads to viral-host cell membrane fusion and subsequent infection. We are focused on the antigenic characteristics of the HN protein to create a useful therapy against PIV3. To accomplish this, our lab has isolated human monoclonal antibodies to evaluate binding to the PIV3 HN protein. Peripheral blood mononuclear cells (PBMCs) from adults were screened to determine which B cells showed significant binding against PIV3. These B cells were isolated by single-cell sorting and B cell receptor sequences were amplified and sequenced for generation of monoclonal antibodies. After successful mAb purification, each mAb was tested for binding affinity to the PIV3 HN protein and neutralization of the PIV3 virus. Nine of these mAbs exhibited a significant level of binding to PIV3 HN protein and went through a series of hamster studies. Among three mAbs tested, two mAbs successfully inhibited increased viral replication in the lungs and were deemed highly successful for further study. The success of these mAbs suggests there may be novel neutralizing mAbs against several binding sites on PIV3 HN protein.

Efficacy of Intranasal Delivery of COBRA H1 Vaccine Using VacSIM® Delivery Method

Kareena de Leon

Dr. Donald Harn, Infectious Diseases, College of Veterinary Medicine

Influenza virus infection causes respiratory disease in millions, the death of thousands, and dire productivity losses each flu season. Antigenic drift of the HA surface glycoprotein changes how flu vaccines and strains interact between seasons. Though the WHO determines the composition of distributed vaccines for each season, these HA glycoprotein variations still challenge the compatibility of the vaccines and prevent the creation of a broadly reactive influenza vaccine. VacSIM® is a vaccine delivery system that encapsulates vaccine components in a biologically inert hydrogel and slowly releases them in situ to bolster the host›s immune response to immunization. Mice were vaccinated with recombinant HA vaccines plus or minus VacSIM. We used an ELISA assay to measure the antibody titers produced in the various cohorts of immunized mice. These results contribute to the ongoing search for a universal influenza vaccine.

Computational Fluid Dynamics Modeling of Jet-Stirred Reactors

Joshua DeJongh, CURO Research Assistant

Dr. Brandon Rotavera, School of Environmental, Civil, Agricultural, and Mechanical Engineering, College of Engineering

In 2020, combustion of biofuels and petroleum-derived hydrocarbons provided approximately 99% of transportation energy in the U.S., with demands not projected to decline significantly globally, for decades. In practical applications, combustion merges detailed chemistry with fluid dynamics, the understanding of which is paramount to developing computational models for the design of next-generation engines affording high-efficiency and decreased emissions. To mitigate the complexities imposed from the coupling of chemical reactions with fluid dynamics, gas-phase chemical kinetics analysis requires experiments that are conducted under constant temperature and pressure. A jet-stirred reactor (JSR) provides a means for using turbulence to ensure thermal homogeneity of reactants on timescales shorter than chemical reactions occur. However, the extent to which homogeneity is ensured depends on the conditions of the experiment and the parameters that affect the level of turbulence. In the present work, a computational fluid dynamics (CFD) model is developed using Ansys Fluent for simulating fluid flow within a JSR. Primarily, the model aims to examine the thermal homogeneity of nitrogen flow within a JSR. In particular, the CFD simulations evaluate the effects on turbulence and spatial temperature gradients within JSRs due to the initial temperature of the nitrogen flow, boundary conditions, and experimental parameters, such as residence time, temperature, and pressure. The broader objective is integration of the CFD model with chemical kinetics mechanisms for species such as n-butane, tetrahydrofuran, and diethyl ether, to assess the role of dilution in ensuring thermal homogeneity for different chemical systems.

A Low-Cost, Custom Vibration Table for Small-Satellite Environmental Testing

Aidan Delliponti

Dr. Deepak R. Mishra, Geography, Franklin College of Arts & Sciences

Mechanical vibrations are of primary concern to any structure that experiences cyclic loading. Aerospace applications must especially consider vibrations as the launch environment induces a wide range of random vibrations under an abundance of different frequencies that could fatigue or ultimately fracture the physical satellite bus or payload due to unbounded loading. The Small Satellite Research Laboratory takes great care to simulate finite-element models of our full satellite assemblies but have never been able to qualify these models using real-world measurements. The cost of commercial vibration tables with a frequency output range necessary for classifying the first five modes of space hardware are remarkably high and pose a significant barrier to entry for environmental testing. This poster describes the design, construction, and validation of a small, variable frequency vibration table capable of simulating

forced vibration of 1U-12U sized cube satellites and individual satellite components in both modal excitation and random vibration experiments. Schemes for characterizing modal shapes at variable response points with regards to forced frequency are also discussed.

Securitizing Periods: The Case for Incorporating Menstrual Hygiene Management into Women, Peace, and Security National Action Plans as a Mechanism to Improve Women's Security

Sophia DeLuca, Foundation Fellow

Dr. Maryann Gallagher, International Affairs, School of Public & International Affairs

1.8 billion people menstruate globally, many without access to proper resources. Inadequate menstruation hygiene management (MHM) can lead to economic, health, and physical insecurity. Despite the scope of menstrual inequity, very few countries have enacted national MHM policies, due to stigma and misconceptions that menstruation is just a "women's issue." This paper investigates whether Women, Peace, and Security National Action Plans (WPS NAPS) are a viable method for increasing national MHM policies. In order to establish precedent for MHM inclusion in WPS NAPS, this paper makes the case for categorizing menstrual hygiene as a security issue – impacting both national security and human security, including economic, physical, and health security. National MHM policies from Kenya and Scotland serve as case studies for what MHM could look like if included as a component of Women, Peace, and Security National Action Plans.

The Effect of Wrack on Rodent Activity in a Salt Marsh

Hanna Lena Demmler, CURO Honors Scholar

Dr. James E. Byers, Ecology, Odum School of Ecology

Wrack is the accumulation of dead plant material and debris that floats in aquatic and marine ecosystems. It can be deposited in various areas and may affect the system by facilitating plant growth or providing protection, shelter, and food for local organisms. This study aimed to investigate the effect of wrack on the activity of rodents, a predominantly terrestrial group of organisms. Floating, motion-activated camera traps were deployed in two different high elevations locations within the Dean Creek salt marsh on Sapelo Island. We simultaneously deployed a pair of camera traps – one next to a large wrack deposit and one in undisturbed salt marsh cordgrass vegetation. These traps were inverted 5-gallon buckets with 2 side cutouts for organisms to enter and exit and a camera placed at the top end to take pictures of any organisms entering. The 2 traps were deployed for 8 days and again as a pair in another location within Dean Creek marsh. We processed all the pictures and examined them for evidence of rodent visitation. Due to substantial loss of bait food over the length of the trap deployment, we standardized our counts for the first 3 full days of deployment. There were no differences between wrack and control for average number of visits, average duration of visit, or average duration between visits, but significant differences between the 2 replicate placements. Therefore, it seems that position or tidal elevation within the marsh may be more influential on rodent activity than the presence of wrack.

Modeling Urban Canopy Cover and its Effectiveness on Flood Resilience for Coastal Communities under a Changing Climate

Bob Deng, CURO Research Assistant

Dr. Felix Luis Santiago Collazo, School of Environmental, Civil, Agricultural, and Mechanical Engineering, College of Engineering

How can green infrastructure bolster flood resilience for coastal communities in the wake of climate change? This research project aims to determine the effectiveness of green infrastructure, specifically urban canopy cover, in combating climate flooding on Tybee Island, GA. Through hydrologic and hydraulic modeling, we can quantify the impact of urban canopy cover along Tybee Island's Right of Ways. The hydrology modeling will be completed using the i-Tree Hydro software, which aims to quantify the ecological and economic benefits trees provide, while the hydraulics modeling will be completed in the ICPR software (Interconnected Channel and Pound Routing). Results will include a database of different native trees on Tybee Island and the benefits they provide, including a volumetric amount of runoff intercepted for each tree, as well as a raster of potential areas where these trees can be implemented. These results will be part of Tybee Island's Natural Infrastructure Master Plan, which describes the green infrastructure alternatives needed for the near future to embrace climate change and enhance flood resiliency. The methods employed in this research can also be replicated for other coastal cities around the world to use in their analyses of the benefits green infrastructure can provide to their climate resiliency efforts.

Popularity Breeds Similarity: Effects of Social Media Recommender Systems on Homogenous Beauty Standards and Mental Health

Josie Dennis, CURO Research Assistant

Dr. Rosanna K Smith, Marketing & Distribution, Terry College of Business

AI plays a significant role in shaping beauty standards in part via recommender systems on social media platforms such as Instagram, TikTok, and Snapchat. These recommender systems typically promote images based on their popularity. Popular images are often comprised of influencers who are increasingly more idealized in appearance via sophisticated filters and other body modification techniques. One consequence of this exposure to idealized imagery is the increased homogenization of beauty standards. Exposure to idealized imagery has well-documented adverse effects on adolescent female body image and mental health. This project involves the examination of three central aims: 1) Demonstrate popularity-based algorithms on social media platforms encourage increased exposure to homogenous faces and bodies; 2) Test how exposure to homogenous physical appearances impacts the mental health of adolescent female social media users; 3) Test whether adjusting popularity-based algorithms to those that introduce randomness attenuates negative mental health outcomes via increasing exposure to diversity of physical appearances.

Computational Analysis of The Genomes to Fields and Indigo Ag Microbiome Data

Hanish Vasudev Desai, CURO Research Assistant

Dr. Jason Wallace, Crop and Soil Sciences, College of Agricultural & Environmental Sciences

The microbiomes of crops are important in their growth and survivability. A deeper analysis of a crop's microbial community is needed to understand the importance certain bacteria have in maize. The advances in high-throughput sequencing (HTS) in recent years have advanced the development of microbiome analysis. My project's objective is to utilize software tools such as QIIME2 and R to perform a computational analysis of a dataset from a microbial survey project. I will be utilizing various plugins and packages from QIIME 2 and R to investigate the various aspects affecting microbes living in the environment around and inside plants. Maize samples from a microbial survey were sectioned into four tissue types (Soil, Rhizosphere, Root, and Leaf), and had their bacterial communities analyzed. The soil and rhizosphere were found to harbor a more abundant and diverse community than the root and leaf. Field location has little to no contribution to the variability of microbes when compared to the different maize compartments. These results demonstrate that there is a difference in the microbiome between the different tissues of maize, with location having hardly any influence. Future research on these microbes will be conducted to

identify and classify possible environmental conditions that could be causing these differences in Zea mays.

Segmental Leg Blood Flow Measured with NearInfrared Spectroscopy

Zabilon Sheshu Dessalegn & Ryan Willoughby
Dr. Kevin McCully, Kinesiology, Mary Frances Early College of Education

Peripheral arterial disease (PAD) is a common condition in older adults that narrows the arteries and causes morbidity and mortality worldwide. An ankle-brachial systolic blood pressure test is used to evaluate patients with PAD; however, the success of this test is hindered if the patient suffers from diabetes, obesity, and other factors that harden the arteries. Near-infrared spectroscopy (NIRS) is a promising method to assess blood flow, based on the recovery rate of oxygen saturation following a period of ischemia. In a population of healthy, young, subjects, 6 males and 1 female, we tested subjects on two separate days. NIRS devices were placed simultaneously on the vastus lateralis, medial gastrocnemius, and foot pad of the right leg. The leg is lifted at a forty-five-degree angle to induce ischemia. After the leg is dropped, the half time (T½) of oxygen saturation was measured after four random ischemic cuff durations (30, 60, 180, 300 seconds). All subjects preferred the leg lifts to cuff ischemia as a way of measuring blood flow. All of the foot tests provided analyzable data while only 9 calf tests and 5 thigh tests were analyzable. T1/2 values for 60 seconds and 120 seconds of leg lifts were 7.8±3.4 and 8.4±2.6 for the thigh, 5.9±2.5 and 6.9±3.2 for the calf, and 12.4±5.4 and 12.7±6.6 for the foot. For comparison, the values were 6.2±1.7, 6.2±1.7, and 12.7±3.7 for 180 seconds of ischemia. The mean values were not different between values for all measures. The magnitudes of the blood flow response were ~10-30% of the signal for the 180 seconds cuff ischemia, which contributed to the difficulty in making the T1/2 measurements with leg lifts. Although leg lifts are a more comfortable and preferred method of testing for PAD, the low rate of reproducibility along with the varying degrees of accuracy based on the position of the NIRS devices, suggest that additional adjustments to the protocol or additional studies should be recommended before leg lifts can be recommended for us to evaluate PAD.

Testing Color Calibration of Mammalian Fur Images in Peromyscus polionotus (oldfield mice) as a Case Study

Skyler DeWitt, CURO Research Assistant
Dr. Sonia Altizer, Odum School of Ecology

Color is an important functional trait for mammals that aids crypsis from predators, thermoregulation, and sexual selection. Despite being an overt and charismatic component of a mammal's visual appearance, color remains an understudied trait due to a lack of comprehensive, transferable method to quantify and interpret color values. Thus far, studies on variation in pelage color are limited in geographic scope or coarsely categorize color values. Animal images, however, are abundantly available through community platforms like iNaturalist and museum digital repositories. To take advantage of these datasets and expand the geographic scope of color studies, methods to generate color measurement need to be accurate and replicable. This study examines the consistency of color calibration using the Calibrite palette and software by comparing hue, lightness, and saturation extracted from specimen photos in three photographic contexts: an enclosed light-box standard, overhead lighting common in museum storage facilities, and ambient light comparable to natural habitats. We selected 30 oldfield mice (Peromyscus polionotus) specimens from the Georgia Museum of Natural History to generate images and perform color analysis across a variety of color morphs that match substrates found in native habitats. We predict that color values extracted from different image contexts will be consistent. Alternatively, if we find the Calibrite system does not quantify color consistently, we recommend standardized image capture methods and encourage further development of accessible color analysis methods. Broadly, this project provides guidelines to animal photographers and ecologists that wish to study the variation and function of color in animal ecology.

Individual Differences in Arboreality in Western Gorillas

Daniella Di Carlo
Dr. Roberta Salmi, Anthropology, Franklin College of Arts & Sciences

Most primates are considered arboreal, however the amount of time they spend in trees varies. Among the great apes, gorillas are known to have the largest body size and are considered the most terrestrial and most folivorous species. While mountain gorillas dwell mostly terrestrially and feed on leaves and herbs, preliminary research on the less well-known western gorillas suggests that they may climb trees more often and rely on a more frugivorous diet. To determine individual differences and the effect of seasonality, we investigate arboreality in wild western gorillas (Gorilla gorilla). We use observational data (2,410 hours; male: 705; female mean: 426±81, n=4) collected on one-male, multi-female group from Sep. 2004 to Oct. 2005 at the Mondika Research Center located in the Republic of Congo. We are analyzing the effects of sex, age, rank, reproductive state, and seasonality on time spent above ground, tree height use (i.e., 0-5m; 6-15m; >15m), activity performed when in trees (i.e., rest, feed, travel, social), and type of food consumed. Research from a smaller dataset in a previous study indicates that males climb less than females. Understanding the extent of arboreality in western gorillas will directly benefit conservation practices by providing additional information on suitable habitat resembling naturalistic forest structure. In doing so, gorillas in captivity can exhibit behaviors that they would in a natural habitat by having the opportunity to choose physical behaviors and eating patterns. Moreover, results from this study could improve the design of outdoor spaces for captive western gorillas, the only subspecies currently found in zoos.

Social Determinants of Adaptation in Agricultural Communities

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The Tragedy of the Commons is a known phenomenon describing individuals acting in self-interest when given access to an open resource. While this phenomenon is true in many public good circumstances, cooperation has been shown to exist in farmer-managed irrigation systems in the Global South. While studies have been shown analyzing how cooperation outcomes in these systems change with varying levels of water scarcity and even financial equity, and basic models have been shown analyzing cooperative outcomes, the effects of social factors on cooperative outcomes in these systems have not been modeled. The focus of this project is to examine how social inequality influences the evolution of institutions cooperative behavior in these systems, which are subject to variability in water availability. Specifically, we use an agent-based model to investigate the performance of a farmer-managed irrigation system in Northern India. We expect to see that under systems with high degrees of social inequality, farmers in marginalized groups are likely to exit the irrigation system to take up non-farm wage employment. We also expect to see the prevalence of water allocation rules that favor elite farmer groups in these systems. We expect to see that the dominance of elite farmers is likely to be mitigated by social networks, which facilitate the exchange of resources and information. As water scarcity and irrigation infrastructure damage are becoming more prevalent due to climate change, this study will provide insight into cooperative

outcomes and how these water management response to climate change may vary based on social contexts.

A Theoretical Evaluation of Measles-Unvaccinated Children Thresholds for Targeted Interventions

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Despite being a vaccine-preventable disease, measles directly results in over 200,000 annual deaths. Identifying and vaccinating "zero-dose children", children who have not received any routine immunization, is a leading priority to control measles transmission. The focus of this research is to determine the threshold of measles zero-dose children that requires vaccine-targeted intervention to prevent an outbreak for 54 Gavi, the Vaccine Alliance-eligible countries. The thresholds are simulated by taking into account country-specific age contact patterns and timing of routine vaccination. The statistical software package R is used to manage the data and calculate country and age-specific thresholds. As a part of this simulation, transformed country-specific age-contact matrices and theoretical matrices of monotonically increasing immunity profiles for children aged 1-14 years are created. They are integrated to create immunity age profile matrices that yield a population-level immunity of at least 93%. These immunity age profiles are then combined with measles vaccine effectiveness estimates published by the World Health Organization to provide the range of vaccine coverage profiles for children aged 1-14 years that will prevent an outbreak. At the conclusion of this project, the vaccine coverage estimates will be synthesized to provide country-specific and age-specific childhood measles vaccination targets. These targets may be used by governmental and international organizations to inform targeted immunization strategies.

Creating Diverse Sexual Health Medical Illustrations- Lessons Learned from the Classroom

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Sexual education programs often include internal female reproductive organs but not external female genitalia. According to a recent study at Indiana University, of the programs that contain external genitalia, only 1% of human sexuality images are non-white. The lack of diverse medical illustrations represents a skin color bias which can negatively impact the sexuality education of people with non-white skin tones. This project aims to create inclusive medical images of the female external anatomy and comprehensive sexual education for schools and communities. A diverse team of undergraduate and graduate students from Women's Studies, Public Health, and Medical Illustration programs at UGA were recruited to work on the project. The project partnered with a local school district to guide curriculum development and medical illustrations. Priority areas for sexual education were determined through meetings with the school district. A need for diverse female external genitalia images and inclusive lessons was identified. Medical illustrations were developed through a partnership with the UGA Lamar Dodd School of Art, and sexual health lesson plans were created by Public Health and Women's Studies students. Sexual health lesson plans included discussions around anatomy and physiology, sexual body image, pleasure, and diversity. Lesson plans included teacher notes, student fill-in-the-blank sheets, and student activities. The medical illustrations have recently been used in a college sexuality education class, where students referred to the images as "inclusive, realistic, and relatable." The project's images and lesson plans have also been shared with UGA's University Health Center Staff and the local school district.

"Imagine it is the year 2100. People and environments around you are thriving. What do you see?"

Emma DiPuma; Emery Pikel; Alexander Scheid; Sarah Heaton; Fatima Islam
Dr. Michelle Ritchie, Health Policy & Management, College of Public Health

Individual, household, and community adaptation to climate change is informed in part by social-ecological processes and place-based knowledge. This study builds on prior research to better understand the lived experience of climate change adaptation efforts, particularly those implemented by residents in North Central Iceland. Namely, prior research conducted by Dr. Ritchie found influential processes include having a historical knowledge of ecosystem change, feeling concern for the future of the local area, and valuing provisioning ecosystem services. Over summer 2022 members of the Ritchie Research Lab conducted interviews with over 50 residents to further explore how individuals' risk perception and sense of place inform their implementation of climate change adaptation. Then, over a dozen students from interdisciplinary backgrounds at UGA were trained in social sciences research methods and worked together to transcribe and clean the audio recordings of interviews. This research team continues to work and meets weekly to discuss progress, review protocols, and reflect on new themes uncovered. Polished transcriptions will undergo a sentiment analysis and a deductive thematic qualitative analysis using LIWC and NVivo Pro softwares, respectively. Initial results will be shared with residents of North Central Iceland over the summer of 2023 for feedback and guidance on next steps.

The Single-cell Expression Patterns of FADS1 and FADS2 across Developmental Stages and Species

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Fatty acid desaturases, a type of enzyme involved in the production of polyunsaturated fatty acids (PUFAs), have been linked to many metabolic disorders such as high cholesterol as well as neurological disorders. Studying FADS1 and FADS2 expression patterns can improve our understanding of their role in metabolic disorders. To investigate the expression of FASD1 and FADS2 across cell types, developmental stages, and species, we re-analyzed single-cell transcriptomics datasets. We examined the expression of FADS1 and FADS2 in several human organs at the adult and fetal stage, as well as organ tissues from a non-human primate and mice to see whether the expression patterns are conserved across species. Expression levels were recorded as well as changes in expression across developmental stages in human and mice. Initial results show FADS2 plays an important role in human fetal development as it is more expressed than FADS1 in all fetal tissues, whereas FADS1 and FADS2 expression in adult tissues was more muted. Comparison with the expression levels in the non-human primate shows similarities in the brain and adrenal gland. In mice, FADS1 was more expressed than FADS2 across all tissues and developmental stages. The results confirm differential expression of FADS1 and FADS2, in particular with regards to stage of development and tissue type. A potential direction of research could be to investigate whether FADS1 in mice plays an analogous role to FADS2 in primate, which can lead to a better understanding of the role of FADS1 and FADS2 in humans.

Investigating Brainsight Neuronavigation Methods for Transcranial Magnetic Stimulation

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Transcranial magnetic stimulation (TMS) is a non-invasive method

of targeting focal brain areas with magnetic pulses to measure neural activity; it is essential to accurately place the TMS coil over the brain interest area. TMS studies have used neuronavigation systems, like Brainsight, to aid in the TMS coil placement. A first step in using Brainsight is to co-register a 3D brain image to landmarks on the participant's head. This involves placing points on the leftmost, rightmost, topmost, frontmost, and backmost landmarks of the participant's head. Brainsight identifies the optimal co-registration based on the landmarks; then the pointer is placed on the participant's head to find the margin of error. The margin of error should be less than 5 mm; however, the margin of error varies based on the placement method. The goal of this study is to find the most effective placement method that reduces the margin of error. This study will investigate three methods. The first method is placing a singular point on the area of interest while the second method is to place three points in the shape of a triangle around the area. The last method is to utilize the midline of the head and to place three points in a line on the area. Additionally, each of these methods will be tested (using the margin of error) with and without the use of a headstand to test its effects. Comparing these methods will help develop a protocol that could be applicable to future studies involving TMS.

Evaluating Health Promotion Impacts of Extension-Based Programs in Rural Communities of Georgia

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Health promotion programs are crucial to improving many areas of public health around the world. One such area is the proper access to healthy food. Healthier Together (HT) is a public health program funded by the Centers for Disease Control and Prevention in partnership with the UGA Colleges of Public Health, Agricultural and Environmental Sciences, and Cooperative Extension that aims to increase access to healthy foods and physical activity opportunities in four rural Georgia counties to reduce the occurrence of diet-related chronic disease. This has been done through establishing community gardens, partnering with food pantries, and planning for more bike lanes and walking paths. This research was conducted to measure the effects of HT after COVID-19, as changes in program resource use during the pandemic were unknown. Surveys were distributed to community members at everyday locations in all four counties. Data were collected to measure the effects of the program one and two years after onset of COVID-19 to determine community resilience. The study examined the usage and impact of HT resources to see if program reach increased, decreased, or stayed the same through the pandemic's effects. The results of the study indicated that project resource use across the four counties had little to no significant overall change from 2021 to 2022 due to the COVID-19 pandemic. Implications of the study include how Extension-based programs can help specific demographic groups who use the program less. This allows outreach and engagement strategies to be further contextualized and enhances community program engagement.

The Space Race: Examining Terrorist Attacks in Public and Private Spaces

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After urban terrorist attacks, cities often securitize their public spaces. For example, in the aftermath of 9/11, New York City saw a 27% increase in security zones. However, there is a lack of empirical evidence that securitizing and reducing public spaces effectively mitigate terrorist attacks. This prompts the question: are terrorists more likely to target public spaces than private spaces? Given the lack of research on the topic, the answer is unknown. To explore this question, I have two hypotheses: (1) public spaces are more likely to be attacked than private spaces, or (2) private spaces are more likely to be attacked than public spaces. I theorize that terrorist behaviors shape the decision on which of these spaces to attack. For the first hypothesis, I anticipate that terrorists want to harm the maximum number of people possible and thus will attack public spaces more because the perception is that more people are in insecure public spaces. For the second hypothesis, I anticipate that terrorists desire to cause fear and psychological insecurity by attacking private spaces which appear more secure. Using data on the frequency of terrorist attacks in public and private spaces in the US, I will validate one of these claims. Based on this outcome, I will consider the implications of public space reduction on urban environments, equality, equity, and security. It is important to answer this question because it could eliminate misconceptions that lead to this harmful urban privatization/securitization and help officials take meaningful action to prevent urban terrorism.

Breaking the Cycle of Hate: Exploring LGBT+ Hate Crimes in Post-Conflict Societies

Alex Drahos, Foundation Fellow
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Intergroup conflict often leads to human rights violations, particularly against vulnerable populations. Research frequently examines the intersection of these violations and vulnerability through a gendered (e.g., women), age-based (e.g., children), or religious lens. Does this intersection also exist with the LGBT+ population? Limited academic research has explored the connection between post-conflict societies and LGBT+ communities. This paper explores the vulnerability of the LGBT population within post-conflict societies, focusing on Northern Ireland and the United Kingdom. We hypothesize that environments with high in-group/out-group tensions perpetuate a competitive victimhood setting, which is the tendency to view one's group as having suffered relative to an out-group. Consequently, competitive victimhood increases feelings of prejudice and the desire for revenge, leading to more targeting of out-groups and thus increased LGBT+ hate crimes in post-conflict societies. To support our hypothesis, we will conduct a survey that primes participants for a competitive victimhood mentality and measures their support for out-groups, including the LGBT+ community. Additionally, we will analyze law enforcement data on hate crimes and political terrorism to explore the correlation between intergroup tension and these offenses. We expect the final results of this study to confirm that post-conflict societies are more susceptible to hate crimes due to increased levels of competitive victimhood. We hope that this research will start a conversation on how to protect the LGBT community in places with high levels of intergroup conflict and tension.

Renal Regulation of Calcium and Phosphorus Homeostasis during Early and Mid-peak Egg Production in Laying Hens

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In laying hens, calcium and phosphorus are vital for eggshell mineralization and the kidney plays an important role in regulation of calcium and phosphorus homeostasis, by action of vitamin D3, which regulates expression of calcium and phosphorus transporters in this tissue. Therefore, it is important to understand how vitamin D3 metabolism and the expression of these genes interact to maintain homeostasis. This study sought to determine 1) expression levels of the calcium and phosphorus transporter genes at early

and mid-peak production and 2) how expression levels change at specific time points during the egg formation cycle. Kidney was collected from hens at 25 and 43 weeks of age at different time points after egg laying (1:30, 6, 15 and 21 hours). Levels of mRNA related to calcium and phosphorus uptake and utilization, and vitamin D3 metabolism were measured in kidney by qPCR. Data were analyzed by two-way ANOVA and Fisher's LSD test when ANOVA indicated significance ($P \leq 0.05$). Changes in mRNA expression of calcium transporters were influenced by age. Specifically, there was an increase in the expression of NCX1, TRPV6, and the calcium chaperone Calbindin 1 (CALB1) at 43 weeks compared to 25 weeks. Conversely, mRNA expression of phosphorus transporters Pit-1 and Pit-2 were not influenced by age, but by time point, with elevated expression at 15 hours after egg laying. Changes in gene expression at peak egg production indicate greater renal reabsorption of calcium for eggshell formation, while simultaneously excreting phosphorus as waste generated from bone breakdown.

Investigation into the Metal Resistance and Denitrifying Activity of the Genus Castellaniella

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The Oak Ridge Reservation (ORR) in Oak Ridge, TN contains the site of former nuclear waste disposal ponds, known as the S-3 ponds. The subsurface surrounding these former waste ponds is highly acidic and contains high concentrations of nitrate and multiple heavy metals (e.g., U, Al, Mn, Fe, Cu, Co, Cd, Ni). The contamination poses a significant ecological threat, and has the potential to be detrimental to local ecosystems. These conditions can be detrimental to the growth and denitrification activity of subsurface microorganisms. The high nitrate concentration at the site makes preserving complete denitrification activity (i.e., nitrate/nitrite reduction to N2 gas) essential. Many microorganisms have been isolated from the ORR subsurface that are resistant to the conditions at the site. These microorganisms maintain their ability to grow and many retain denitrification activity. Castellaniella sp. MT123 is among these isolates. In the present study, the growth and denitrification properties of MT123 were investigated. Phenotypic experiments, which consist of growth curves measuring optical density of cultures both in the presence of and in the absence of site-relevant contamination, have shown that this isolate can grow in the presence of site-relevant heavy metal mixtures. Genotypic investigation has corroborated these results, showing a significant number of heavy metal resistance gene clusters in the genome of MT123. Current and future studies are investigating the heavy metal and low pH tolerance of other Castellaniella strains isolated from ORR. These results will be compared to the MT123 results to examine the microdiversity of this genus at ORR.

Do Hungry Predators Prefer Bored Prey? The Interactive Effects of Starvation Time and Boring Sponge Infection on Prey Selection by the Atlantic Oyster Drill

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Predator-prey interactions help shape community structure and function. Parasites may alter these interactions by changing the physiology or behavior of their host organism. Extensive research has been conducted on direct predator-prey interactions, but relatively few studies have examined how parasites mediate prey selection. In this study, we examined the relationship between boring sponge (Cliona celata) infection in Eastern oysters (Crassostrea virginica), a key foundation species along temperate coasts, and prey selection by Atlantic oyster drills (Urosalpinx cinerea). Specifically, we examined the effect of boring sponge presence and predator starvation time on prey selection. Based on previous work, we hypothesized oyster drills starved for longer are more likely to select an infected oyster. To test this, we conducted a series of choice trials with drills that had been starved for various time intervals (10, 20, or 30 days) to determine if starvation influences prey selection by oyster drills. Preliminary results revealed that drills starved for 10 days selected only healthy individuals; with increasing starvation time infected prey were increasingly selected. If oyster drills preferentially select healthy oysters, this may lead to increased relative abundance of sponge-infected oysters on reefs, potentially influencing the overall ecosystem function of this foundational species.

Sex Differences in Functional Play Behavior in 34-month-old Children

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The study of children's play provides insight into developmental progression and cultural influences. Various forms of play have been identified in the developmental literature. Functional play is defined as when a child demonstrates more conventional uses of play objects or conventional associations between play objects. This is a precursor to symbolic play which is when a child uses toys to represent real-world events or actions. Previous research has observed differences in toy preferences between male and female children participating in symbolic play. The current study aims to discover if these differences extend into functional play. Functional play behaviors were observed during solo free play bouts in a sample of 10 female and 9 male 34-month-old infants. The amount of elaborate functional play behaviors were recorded. There was no relation between instances of elaborate play and children's sex; however this study aims to extend that finding and explore potential sex differences in functional play behavior and manipulation. The findings of this study will help to guide further research in the understudied field of functional play. Sex differences/non-differences in toy selection and manipulation found in functional play may suggest the age and developmental stage at which gender socialization begins to make a measurable effect on play.

Elucidating the Structure and Function of Type IV CRISPR-Cas Systems

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CRISPR-Cas is an adaptive and heritable immune system found in bacteria and archaea which defends them from invading mobile genetic elements (MGEs). The recently identified Type IV systems are distinguishable from previously characterized systems (types I-VI): 1) they are rarely associated with CRISPR arrays, challenging their role in crRNA-guided, and thus sequence-specific immunity – the hallmark of CRISPR-Cas function; 2) they are almost exclusively encoded on MGEs instead of host chromosomes (like other CRISPR-Cas types), in conflict with the traditional function of CRISPR-Cas systems in host immune defense. Evidence suggests Type IV systems may mediate competition between MGEs, rather than host protection; however, the mechanisms by which this would function remain mysterious. Type IV CRISPR-Cas systems have been separated into 5 different sub-types (IV-A through IV-E) based on their genetic composition. The Type IV-C systems are of interest to our lab due to their narrow distribution confined to archaea. We have shown that the Type IV-C Cas10 subunit possesses DNase activity in vitro, sharing similarities with the Type III systems. We are working to purify ribonucleoprotein complexes of Type IV-C systems from non-model species of hyperthermophilic Archaea (Thermococcales). Our recent results reveal complex formation of a Type IV-C system

around a host-derived Thermococcales crRNA. Complex interactions persist through both affinity and size-exclusion chromatography, with a distinct RNA species able to be extracted from SEC-purified complexes. Our work to determine the structure and function of Type IV-C systems could reveal the first ever understanding of Type IV systems in situ.

Shifting Patterns of Environmental Use on Ossabaw Island, Georgia, USA: A Sclerochronological Time Sequence

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Ossabaw Island, a barrier island off of the coast of Georgia within the Georgia Bight region, was first inhabited by Native Americans over 5000 years ago. This research project seeks to understand how Native American inhabitants of Ossabaw Island harvested resources from the surrounding coastal environments over the last 2000 years. By measuring the ratio of oxygen isotopes in growth lines in oyster shells found in middens and shell rings, it is possible to reconstruct the environment from which oysters were harvested. This method, called sclerochronology, is the basis for the research project. The calculated relative water temperature represents the season that the oyster was harvested, and the salinity of the water represents the environment the oyster lived in. Therefore, through this method it is possible to make statements about the seasonality and types of habitats that were the focus of shellfish collection. The project utilizes oysters collected from two sites, Bluff Field and Finleys' Pond, to create a time sequence of environmental change. It is expected that subsistence practices will change through time as environmental and related societal changes occurred in the study area. Not only is a temporal sequence of harvest collection new for this area, but the sites comprising the sequence are individually unique, such that results from each site will be valuable in interpretations of their specific histories. Additionally, the switch from sustainable to unsustainable oyster harvesting practices will be explored through the addition of a third site representing Euroamerican inhabitation in later research.

Optimizing Parameters for Additive Manufacturing

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Additive manufacturing allows for many more design possibilities compared to subtractive manufacturing. 3D Printing in particular has many useful benefits inherent to the technology which makes 3D printing a prototype faster, cheaper and easier. The world of 3D Printing is ever expanding into new markets and with this new expansion research must be done on the correct application of the technology in order to properly implement it into new markets. There is still plenty unknown in regards to how to use a 3D printer for different kinds of production. Some parts may need a glossy surface finish, whereas others want the optimal strength to weight ratio for their part. What if you use 3D Printing for the final design? Selecting proper parameters and settings for your printed part can change a lot about the fundamental characteristics of the part. By changing the number of perimeters in a part or by increasing the percentage of infill you can change the mechanical properties of the part in your favor. My aim is to uncover the optimal printing parameters required to make a part as mechanically apt to its application as possible. Through experimentation of printing parameters, I can correlate material and mechanical properties with unique print settings. There are a number of printer settings that can affect the quality and behavior of the material of a part. By manipulating these settings, the part can look and behave completely different and therefore not work as intended. It is my goal to understand through experimentation and observation the role that all of these parameters play in the culmination of the final part to ensure a perfect print with respect to its application. When considering enhanced strength in parts many filaments include carbon fiber strands to increase stiffness strength and temperature resistance. My aim is to evaluate the effectiveness of carbon fiber reinforced filament within an application of parts for a 3d printer to represent real world application. I will use the information from this experience to inform my decision of material choice for an upcoming project to build a 3d printer with mostly printed parts.

Does O-acetyl-ADP Ribose Deacetylase Inhibit RNase III?

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The protein O-acetyl-ADP-ribose deacetylase (oAARD), encoded by the gene ymdB, has been reported to inhibit the enzyme RNase III in E. coli (Kim, et al 2008). RNase III is a common RNA degrading enzyme that is found abundantly in and on many environments, including the skin, dirt, laboratory benches, and all living organisms. Inhibiting RNases could be valuable for situations where the stability of RNA needs to be maintained. An assay was developed to evaluate whether in vivo over-expressed oAARD can attenuate naturally occurring levels of RNase III in E. coli. Using agarose gel electrophoresis, it was demonstrated that the over-expressed protein does not appear to inhibit RNase III activity. Thus, the protein did not stabilize RNA throughout a time course experiment of RNA species produced from plasmids. To better understand why the results do not match the literature, a version of the oAARD over-expression plasmid with an N-terminal polyhistidine tag was prepared that allows the efficient, one-step purification of the protein. With purified oAARD, in vitro assays will be performed with commercially available RNase III and RNA.

Antitrust Political Economy: The Law & Economics of Market Power

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Today, economic concentration is on the rise, and in response, new questions have arisen in antitrust law. Antitrust is the area of law that governs how firms compete. At the core of antitrust law is the idea of market power - without market power firms presumably cannot effectuate anti-competitive business strategies. We ask: how have changes in economic thought regarding market power been reflected in changes in antitrust law? The following paper analyzes this question through a re-periodization and re-characterization of antitrust law and policy. It examines the dynamic landscape of antitrust since WWII through a lens of macroeconomic challenges and microeconomic responses. The first section explores a major shift in antitrust doctrine in the US v. ALCOA case. We argue that this case reflected new economic thinking which was motivated by the Great Depression and the subsequent New Deal. The second section focuses on what is called the "Double Helix" between the ideologies of the Chicago and Harvard schools. We challenge the typical thinking that the influence of Chicago and Harvard are mutually exclusive. Rather, the change in antitrust seen in the late 20th century largely reflected economic consensus and did not absorb the most "diehard" prescriptions of the Chicago School of law and economics. The final section of this paper explores new thinking in law and economics regarding rising market concentration in the modern day. We do so by looking into the influence of the New Brandies Movement and other Post-Chicago antitrust ideologies.

Diver-Held and Stationary Camera as Tools to Observe Bluestreak Cleaner Wrasse (Labroides dimidiatus) Mutualisms and Cheating

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The bluestreak cleaner wrasse (Labroides dimidiatus) is well known for engaging in cleaning mutualisms with "client" reef fish due to the complex behavioral dynamics involved. Both visiting clients and cleaners benefit when cleaners remove ectoparasites from clients, but cleaners have been observed "cheating" by removing healthy tissues from the client instead. In studies that observe these interactions, the two most common survey methods involve either a roving, diver-held camera or a stationary, mounted camera. However, both methods have trade-offs that may influence the kinds of data able to be collected. Since human presence is known to alter fish behavior and observed reef community diversity, diver-held surveys may influence which clients or behaviors are observed. Though stationary cameras do not have a human-presence component, they are unable to follow a focal subject, meaning that behavioral observations may be interrupted if the subject moves out of frame. Here we evaluated these two observation methods by quantitatively comparing their assessment of different behavioral metrics. We analyzed stationary and diver-held footage collected on 12 cleaning stations located on patch reefs near Mo'orea, French Polynesia. For both methods we compared cleaner visibility, the frequency and duration of cleaner-client interactions, and the species richness of clients observed interacting with cleaners. It is essential to understand how different methods of data collection affect the data collected so that these differences may be accounted for when designing experiments and interpreting results on cleaning station activity.

Sarracenia Purpurea as an Indicator for Climate Change Based Range Shifts in the Genus Sarracenia

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In recent times the impacts of climate change on the ranges and ecology of plant species have been studied intensely. Virtually all plant groups stand to be impacted by climate change and its resultant effects; threatened, endangered, and endemic plants stand in equal or often greater peril due to lower numbers, dispersal rates, and/or more limited ranges. Obligate wetland plants like the North American pitcher plants of the genus Sarracenia inherently exist in a more precarious ecological context than more generalist plant species by way of the relatively strict environmental parameters in which such plants can persist. This implication is especially pertinent when regarding the environmental phenomena accompanying climate change; over an extended period, processes such as desiccation, nutrient deposition, and shifting temperature patterns may render many southern wetlands less advantageous or even intolerable habitat for Sarracenia. In this circumstance the identification of remaining suitable habitat would be critical for the conservation of all species present within the genus. Sarracenia purpurea, the widest-ranged and most common species in the genus Sarracenia, is the most appropriate study species for investigating the impacts of climate change on the group's distribution due to its ubiquity across eastern North America and broad environmental niche. Given S. purpurea's presence at both the northern and southern range limits for the genus and potential to assess habitat suitability for itself and other members of its genus, this study utilizes its presence in combination with climatological data and other environmental variables to predict range shifts for S. purpurea by the year 2100.

Magmatic Sulfides in Deep Crustal Conditions

Jeremiah Funke
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Ultramafic cumulates within the Ivrea-Verbano Zone of Italy containing Fe-Ni-Cu-PGE sulfide mineralization are associated with an initial pre-Permian metasomatism event that partially melted and emplaced mantle derived magmas into the lower crust. However, the relationship between the processes and timeline related to sulfide mineralization is poorly constrained. This study may help fill in knowledge gaps by investigating evidence of post-Permian multiphase processes in sulfide bearing, ultramafic-mafic rocks. Optical microscopy and scanning electron microscopy (SEM) analysis were used for evaluating chemical composition, microstructural information, and crystallization sequence. Sulfides are present as interstitial patches, inclusions within cumulus silicates and veinlets within a network of pervasive fractures. Several veinlets, enriched in both oxide and sulfide phases, crosscut into both interstitial and cumulus sulfides. All the samples contain both sericite and chlorite, which has been interpreted as hydrothermal alteration related to a later stage of heating and percolation of fluids. Both microstructural and mineralogical evidence suggest that post-emplacement heating initiated hydrothermal reactions on the preexisting magmatic sulfide deposits and either added, or remobilized sulfides through a network of pervasive fractures and interstitial voids.

A Retrospective Study of Neoplasms in 97 Captive and Wild Virginia Opossums (Didelphis virginiana)

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Virginia opossums are the only marsupials in the United States, but there is limited information in the literature on their diseases, including neoplasia. Neoplasms are often spontaneous, but there could be underlying causes not yet identified due to their limited research. This retrospective study summarizes the neoplasms identified in Virginia opossums (Didelphis virginiana) submitted to three diagnostic services at the University of Georgia for pathologic evaluation between January 2009 and September 2022. Ninety-seven opossums were identified via a search of the databases of these services. This included biopsies from 19 animals and postmortem material from 78 others. The opossums of known ages ranged from 63 days to 4 years and the 97 consisted of 61% captive and 24% wild opossums. Neoplasms were identified in 31% (30 of 97) of the opossums. Neoplasms were only found in captive opossums or opossums that did not have an origin (either captive or wild) listed in their report. The youngest opossums with neoplasms were 1 year old (4 of 30), with the other opossums being 2 years or older (26 of 30). Pulmonary tumors were the most common and present in 60% (18 of 30) of the opossums with neoplasms. Additional neoplasms were found in the skin/subcutaneous, liver, heart, reproductive (female), gastrointestinal tract, endocrine, brain/spine, muscle/bone, and hematopoietic/lymphatic regions. This study provides a reference for the common neoplastic conditions in Virginia opossums and provides more information on the trends of neoplasms for the species.

The Historical Impact of the Films Solaris (1972) and 2001: A Space Odyssey (1968) on Public Perceptions about the Cold War in the Soviet Union and the United States

Lyla Gahl
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Film is a powerful art form, which has a potent effect on public opinion and political processes. Andrei Tarkovsky's film Solaris and Stanley Kubrick's film 2001: A Space Odyssey are considered two of the most influential cinematic masterpieces of all time, released

during an era of intense rivalry between the world's superpowers. The goal of conducting this thematic analysis is to explore the context of two critically acclaimed science-fiction films to come out of the Soviet Union and the United States during the Space Race and the extent to which they shaped public perceptions about the Cold War. The research process has involved viewing Solaris and 2001: A Space Odyssey and reading critic and audience receptions and newspaper articles published in the United States and Soviet Union following the films' releases. By documenting patterns in themes of Cold War propaganda and resistance across these materials, connections can be drawn between cinema and public opinion. The larger implications of this research may shed light on the significance of film as a modern tool of mass media and an agent of political influence.

Satiety and its Implications in Planarian Flatworm Movement Behavior

James Gaither

Dr. Rachel Roberts-Galbraith, Cellular Biology, Franklin College of Arts & Sciences

Planarians are flatworms with the unique ability to regenerate, including their nervous systems. In fact, the entire brain of a planarian can be regenerated after amputation. Understanding planarian behavior is important to our group because we can use animal behavior to assess whether brain regeneration occurs properly. In my work, I am exploring whether planarians exhibit behavior associated with hunger and satiety. We currently do not know whether planarians experience satiety or how long satiety might last after feeding. We hypothesized that planarians do in fact experience satiety and that recent feeding would reduce planarians' attraction to food and feeding behavior. To test this hypothesis, I fed and then refed worms at different time points 0-24 hours. I recorded worm movement towards and away from food to analyze whether the planarians approached the food. I also included green dye in their food during refeeding periods to visualize whether planarians ate. My findings will establish whether planarians do experience satiety and can act as a starting point for more sophisticated experiments on the role of neurotransmitters in satiety and how satiety and hunger may affect regeneration and other animal behaviors. A better understanding of the neural circuits of hunger in planarians could allow us understand evolution of feeding behaviors, with a long-term goal of providing insight that could help us better manage human diseases related to feeding such as anorexia or binge-eating disorder that can occur alone or as a comorbidity with neurodegenerative diseases.

Breastfeeding Needs Assessment of Athens-Clarke County and Surrounding Communities

Sophia Gambale

Dr. Alex Kojo Anderson, Nutritional Sciences, College of Family & Consumer Sciences

While it is recommended that mothers breastfeed their infants for the first 12 months after delivery, mothers (especially those in socioeconomically marginalized communities) face challenges preventing them from meeting this goal: lack of breastfeeding knowledge, unsupportive cultural norms, limited access to lactation support, and poor self-efficacy to produce enough milk for their child, among others. The aim of this study is to assess breastfeeding needs and resources in Athens-Clarke and surrounding counties. This was a cross-sectional study of pregnant women and mothers with children 2 years or younger. Participants were recruited from WIC and other mother-child services within Athens and surrounding communities. Structured questionnaire assessing types of breastfeeding support programs and resources available to mothers was used. Participants, on average, were 29.3±5.71 years with an average BMI of 31.52±8.4 kg/m2 (53.1% being obese.), majority had some college education or higher, and 58.3% working full time outside the home. 42.1% identified as Black/African American while 38.6% identified as White/Caucasian. 67% reported breastfeeding was most important compared to 28.7% of participants who were very comfortable offering their babies infant formula. 41.3% and about a third of participants reported to obtain breastfeeding or infant feeding information from family and doctor, respectively. About a third reported their doctors did not talk to them about breastfeeding and breastfeeding support services in the community. Although most valued breastfeeding over formula and received some breastfeeding information from their doctors, they lack knowledge of breastfeeding support resources in the community.

A Sensitive OH Survey of a High Latitude Molecular Cloud

Elaine Gammon

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Determining the mass of interstellar molecular clouds is one of the most important parameters for understanding their structure and evolution. The mass is most often derived from observations of the CO molecule at 115 GHz, the CH molecule at 3.3 GHz, and the OH molecule at 1.6 GHz. However, a key consideration is the sensitivity of the observations of these molecular transitions. A trade-off has to be made between spatial coverage and long, sensitive observations. Archival OH observations of the high-latitude cloud, MBM 53, were used to examine whether or not improving the sensitivity of the observations by a factor of two would reveal more extended molecular emission. We achieved higher sensitivity by summing spectra in adjacent locations. This effectively trades sensitivity for spatial resolution. Our results indicate that this technique does reveal the presence of low-density, extended molecular emission.

Effects of Tretinoin on Overall Chicken Embryo and Ocular Development

Jenisa Gandhi; Rishi Patel; Dhruvi Patel

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Vitamin A is commonly applied topically in the form of tretinoin, a cream formulation of vitamin A, and pregnant women are discouraged from using it due to its possible teratogenic effect. We aimed to determine the effects of topical tretinoin application on overall and ocular development using chicken embryos as a model system. Tretinoin is typically prescribed for treatment of acne and aging, but use during pregnancy can cause abnormalities of an embryos' anatomy as well as spontaneous abortion. Three concentrations of tretinoin (0.025, 0.05, and 0.1 mg/g) were applied topically on the eggshell to mimic absorption into the skin, and the embryos' body growth and development were examined at the seven and 14-day marks. To observe the overall development and ocular development, body width, length, feature size (extremities and beak), and eyeball circumference and diameter were measured. The results are expected to show a decrease in embryo growth and eye size with increasing tretinoin concentrations. The outcomes of the study will provide more insights into the concentration of tretinoin that could be harmful to chicken embryos, and this knowledge may be applicable for pregnant women to further prevent birth defects.

Analysis of Worker Happiness Using Computer Vision Techniques

Sakshi Gandikota; Nicholas Papciak; Parker Anderson; Paul Wang; Riley Elwood

Dr. Jaime Camelio, School of Environmental, Civil, Agricultural, and Mechanical Engineering, College of Engineering

As the manufacturing industry evolves, finding ways to increase efficiency and productivity is crucial. The sensor's division of

the College of Engineering's Innovation Factory has set out to investigate the impact of worker positivity on small scale assembly lines. Our research collects data using computer vision to analyze worker happiness and its effect on productivity. The results of this study could have various implications for the future of manufacturing, by helping local manufacturers improve their processes and expand the industry without dramatically increasing costs. By shedding light on the connection between worker positivity and productivity through computer vision, this research could pave the way for more effective and efficient manufacturing practices.

A Heuristic Inquiry of Lazos Hispanos and the Effects of the COVID-19 Pandemic from the Community Health Workers/ Promotoras' Lived Experiences

America Garcia, CURO Research Assistant; Valery Huaman-Lozano
Dr. J. Maria Bermudez, Human Development & Family Science, College of Family & Consumer Sciences

Lazos Hispanos (Hispanic Links) was an interdisciplinary community-based participatory research project conducted by professors and scholars at UGA. They trained and worked with community health workers (promotoras) to promote health and well-being among Latinx people in Athens. The primary aim of Lazos Hispanos was to connect Latinx individuals and families to local resources to minimize barriers to healthcare and social services (e.g. lack of information, bilingual services, transportation). This study analyzed the effects of the COVID-19 pandemic on the Latinx community in Athens Clarke County and surrounding areas. Using the qualitative method of heuristic inquiry, we completed two waves of interviews with the five promotoras. A total of 10 interviews were conducted, transcribed verbatim in Spanish, and analyzed from a feminist and decolonizing lens. Using line-by-line coding and data immersion, we identified preliminary findings. Despite challenges heightened by the pandemic (loss of loved ones, isolation, job loss, food insecurity, financial strain, and online schooling), findings suggest that the promotoras were impacted both in challenging and beneficial ways. Themes and subthemes will be discussed answering the primary research question- How did the promotoras describe their individual, family, community, and collective lived experiences during the COVID-19 pandemic? Also, we will discuss how the team members were impacted by the program's abrupt ending due to the pandemic's effects. This was especially difficult at a time when these medical and social services were needed the most.

The Use of Pigs as a Translational Model for Studying Developing Brain in Infants

Samantha Garcia, CURO Honors Scholar, CURO Research Assistant
Dr. Hea Jin Park, Nutritional Sciences, College of Family & Consumer Sciences

The pigs have been suggested as a robust animal model for investigating early brain development in humans due to their similarity of brain maturation patterns compared to humans. Additionally, both human and pigs have a gyrencephalic brain, which contributes to the overall complexity of the brain and similar brain size. In this study, we measured the protein expression of immunohistochemical markers of brain function in the hippocampus region of piglet brain, a structure largely associated with learning and memory. Brain tissues were collected from piglets at birth (n=12) or weaning (n=7) and the hippocampus were stained with OLIG2 (Oligodendrocyte transcription factor-2, oligodendrocyte differentiation), IBA1 (Ionized calcium-binding adaptor molecule 1, microglia marker), GFAP (Glial fibrillary acidic protein, identifies astrocytes), DCX (Doublecortin, marker of immature migrating neurons), and NeuN (Hexaribonucleotide Binding Protein-3, marker of mature neurons). We observed the expression of DCX was lower at weaning compared to that at birth in the hippocampal CA1 (204857±34671 cells/mm2 or 114306±8971 cells/mm2 at birth or weaning, respectively, p=0.0679) and CA3 (244823±31425 cells/mm2 or 153853±12367cells/mm2 at birth or weaning, respectively, p=0.0478). No significant differences in the expression of GFAP, NeuN, Iba1 and Oligo2 were observed between birth and weaning in this preliminary study. The findings from this study provide preliminary evidence on the maturation patterns of immunohistochemical markers of brain function in the developing pig brain. Future studies with larger number of animals is warranted to gather a solid information and will provide useful tools to study brain development.

The Dynamic Formation of Nuclear RNA Foci in Proliferating Fibroblast Cells Derived from ALS Patients

Kade Garrard, CURO Summer Fellow, CURO Research Assistant
Dr. Yao Yao, Animal & Diary Science, College of Agricultural & Environmental Sciences

Amyotrophic lateral sclerosis (ALS) is a progressive and fatal neurodegenerative disease characterized by the death of motor neurons. RNA foci are a phenotypic hallmark of ALS caused by the accumulation of repeat-containing RNAs transcribed from the expanded GGCCCC (G2C4) hexanucleotide repeats in the chromosome 9 open reading frame (C9orf72). However, the formation and toxicity of ALS-relevant RNA foci are still largely unknown. In our previous studies, we normalized ALS fibroblast cells in proliferating and non-proliferating conditions via Mitomycin-C (MMC) treatment and examined RNA foci via immuno-FISH staining. Our results indicated that MMC treatment can optimize a stable cellular condition to detect RNA foci in ALS fibroblast cells for therapeutic efficacy evaluation and are dependent on three key parameters. In this study, we plan to examine the potential changes of RNA foci number between cells in G0 and interphase (G1/S/G2 phases) of the cell cycle and elucidate the mechanism behind the foci characterizations by looking for differences in TDP-43, p53, FUS, and TBK1 protein level expression. These findings will lead to a further understanding of RNA foci formation which is essential to learn disease mechanisms and uncover novel therapy for ALS. We also plan to extrapolate our stable cellular readout to detect RNA foci after delivering antisense oligonucleotide (ASO) mediated therapy via extracellular vesicles (EVs) to ALS fibroblasts to obtain a more accurate readout of the therapy's performance.

Characterization of M. tuberculosis Protein PE17 and its Effect on Host Lipid Droplets

Sophia Theodora Gavalas, CURO Summer Fellow, CURO Research Assistant
Dr. Vincent Joseph Starai, Microbiology, Franklin College of Arts & Sciences

Mycobacterium tuberculosis is a pathogenic, intracellular bacterium that causes the respiratory disease tuberculosis. M. tuberculosis remains the 2nd leading infectious killer behind COVID-19, killing an estimated 1.5 million individuals in 2020. With resistance to antibiotics increasing, standard treatments to combat M. tuberculosis have become less effective, escalating the urgency to better understand its mechanisms of pathogenesis. The ability of M. tuberculosis to evade the immune response, persist, and replicate within host cells relies on secreted "effector proteins" that modify host cell functions. One such effector is PE17, which belongs to the PE/PPE family and has been linked to the intracellular survival of other Mycobacterium bacteria. Previous and current research show that PE17 binds to lipid droplets, which serves as a carbon-rich nutrient source for intracellular M. tuberculosis. To characterize this protein, experimentation using strains of the yeast S. cerevisiae that harbor truncated versions of PE17 were conducted to identify the lipid droplet-binding domain of the protein. It is anticipated

that a truncation at G220 will alter the localization of PE17 when compared to the full-length protein. Additional experimentation will include examining the effects of PE17 on lipid droplet consumption. Samples will be treated with cerulenin, an antifungal drug that inhibits fatty acid and sterol synthesis, causing cells to consume lipid stores. It is anticipated that when incubated with cerulenin, the PE17-harboring strain will contain more lipid droplets than the control strain due to the localization of the protein rendering lipid droplets inaccessible to the host for consumption.

Dimensions of Child Maltreatment and Adolescent Internalizing Symptoms; Investigating Cognitive, Social, and Biological Mechanisms of Resilience

Abir Ghallab
Dr. Assaf Oshri, Human Development & Family Science, College of Family & Consumer Sciences

Child maltreatment is associated with the development of internalizing symptoms such as anxiety and depression. Internalizing symptoms during adolescence can significantly compromise development, extending risk factors into adulthood. Resilience mechanisms serve as potential moderators that can protect adolescents from adverse effects of threat and deprivation. The current study looked at resilience factors at multiple ecological levels including social, cognitive, and physiological in an effort to inform diverse interventions. The present study used data from a longitudinal study of 142 adolescents (Mage = 12.89, SD = 0.85; 52% female) from rural communities in the Southeastern United States. Using multidimensional assessments of child maltreatment (threat vs. deprivation), we tested the moderation of family/friend support, shift and persist cognitive coping strategies, and respiratory sinus arrhythmia (RSA) on the pathway from childhood experiences of threat and deprivation to adolescent internalizing problems. Johnson-Neyman plots were generated to isolate significance. We found that friend support significantly moderates the link between threat and internalizing symptoms in, that low levels of friend support exacerbated the link between threat and internalizing symptoms. RSA significantly moderates the link between deprivation and internalizing symptoms, in which low levels of RSA exacerbate this link, and high levels partially ameliorate this link. Our findings inform diverse, multilevel intervention and prevention efforts aimed at promoting resilience for youth who have experienced maltreatment.

Understanding the Acquisition of English VACs by Speakers of Two Typologically Similar L1s: Brazilian Portuguese and Italian

Cullen Trace Giddens; Sarah Kudyba
Dr. Vera Lee-Schoenfeld, Linguistics, Franklin College of Arts & Sciences

This study expands upon previous research on the emergence of Verb-Argument Constructions (VAC) in two typologically distinct languages: Spanish and German. Our goal is to isolate the typological effects by contrasting the production of VACs by L2 English learners from L1 Brazilian Portuguese and L1 Italian backgrounds. We expect that the strictness of the VAC construction in the learner's L1 will influence the rate of acquisition of English VACs. We anticipate that due to the higher degree of inflexibility in Italian VACs, Italian L1 participants will display patterns in their L2 English writings that approximate those of monolingual speakers. On the contrary, the flexible nature of VACs in Brazilian Portuguese may reflect a slower process in the acquisition of English VACs. Strictness, in this context, consists of the number of prepositions/particles that can collocate with a verb. While Brazilian Portuguese allows multiple preposition-per-verb associations, Italian seems to be more restrictive, allowing fewer verb+preposition collocations. We hypothesize that L1 speakers of a language with strict verb+prepositions in VACs, like Italian, will demonstrate VAC patterns of production that are similar to those of L1 English speakers. To conduct this research, we draw data from three language corpora. The first one, the EF-Cambridge Database, specializes in learner language. The other two corpora are the Contemporary Corpus of American English (COCA) and the British National Corpus (BNC) which focus on monolingual speech. Results in this study could assist in understanding the relationship between learners' L1 and L2, that is, the effects of crosslinguistic influence.

The Impact of Perceived Self-Control Failures on Food Choices and Eating Justifications

Reese Caillet Giddens, CURO Research Assistant
Dr. Michelle R. vanDellen, Psychology, Franklin College of Arts & Sciences

Interpersonal licensing is a phenomenon in which people exaggerate the self-control failures of others when they are facing a self-control conflict. In the current follow-up study, we are investigating whether interpersonal licensing is amplified among participants with low self-control or low commitment to weight loss goals in the domain of eating. Participants will be presented with a hypothetical plate of food at the beginning of an online survey. They will be randomly assigned to view either an unhealthy plate consisting mostly of carbs and sweets, or a healthy plate consisting mostly of greens and protein. After imagining themselves eating this food, they will be asked to create a plate for another individual. They will be able to assign the other percentages of protein, carbs, greens, and sweets. Participants will report individual differences including self-control, commitment to weight loss goals, eating restraint, and nutritional literacy. We expect participants who were assigned to an unhealthy plate of food to subsequently assign the other person an unhealthy plate of food as well. This effect should be larger for participants with high self-control, goal-commitment, and nutritional literacy. These findings will contribute to knowledge of licensing effects and potential proactive and reactive cognitive processes of individuals with high self-control.

Demographic Differences in Couple Relationship Education Program Effectiveness

Abbie Gilbert, CURO Summer Fellow, CURO Research Assistant
Dr. Ted Futris, Human Development & Family Science, College of Family & Consumer Sciences

Compiled evidence supports couples and relationship education (CRE) as beneficial to improving relationship quality, including benefits to couples' communication, understanding, warmth and support. Relationship quality improvement is dependent upon program attendance however, where greater attendance results in greater improvement in relationship quality. Additionally, program participants who attend with their partners are more likely to experience greater improvements in the targeted relationship outcomes. However, research on the participant and programmatic characteristics that are most strongly associated with higher attendance rates is limited. As low-income individuals experience greater barriers to regular attendance (i.e., transportation limitations, childcare needs, and less flexibility in work scheduling), and are more likely to experience detrimental effects to their relationship quality and stability due to their economic hardship, exploring their specific needs in CRE engagement is imperative. The current study explores the challenges and outcomes experienced by at-risk, predominately low resource, married and unmarried coupled participants receiving CRE intervention provided by the federally funded project. This presentation will share results examining the predictors of individual and dyadic attendance of CRE program participants and the association between attendance and post-program relationship outcomes. Variations based on participants'

gender and marital status will be explored.

Optical Steganography inspired by Marine Hatcherfish
Benjamin Gily, CURO Research Assistant
Dr. Mable Fok, School of Electrical and Computer Engineering, College of Engineering
In our research, we propose and experimentally demonstrate a novel optical steganography method that is inspired by the camouflage strategies in Marine Hatchetfish. Our method allows the private channel to remain "stealth" and undetectable within the noise of the Erbium-doped fiber amplifiers (EDFAs) generated in the transmission system. The optical phenomenon we used in the stealth approach is interference, which is same as what the Marine Hatchetfish is using to stay invisible in the deep ocean. Only the color that is same as the ocean will be constructively interfered, while any other color that reveal the presence of the fish will be destructively interfered. Our approach does not just hide the stealth signal, but will also destroy the stealth signal if it is in a eavesdropper's hand. Our experimental results confirm the feasibility of this technique and suggest that it could be used in secure communication systems where privacy and security are top priorities. We believe that our research can contribute to the development of more robust and effective steganography methods in optical communication systems. Therefore, we would like to present our findings at this research convention to share our results and promote further discussion on this topic.

A Meta-Analytic Investigation of the Associations Between Partner Support and Smoking Cessation
Kate Margaret Glennon
Dr. Michelle R. vanDellen, Psychology, Franklin College of Arts & Sciences
Intimate partner support, both from the provider and recipient's perspectives, are related to smoking cessation outcomes. Variations of support include positive, negative, or global perceptions. In the current project, we are conducting a meta-analysis to evaluate the literature on the relationships between support from an intimate partner and smoking cessation. We predicted that positive support, for example encouraging words or physical rewards, from the smoker's significant other would be associated with higher levels of success in cessation attempts among the smokers than would negative support. We conducted a comprehensive literature review of articles to identify the empirical research reports r effect sizes between the variables of intimate partners' support and smoking cessation outcomes (e.g., point prevalence abstinence, continuous abstinence, or the number of cigarettes smoked). We are coding each study to characterize the type of support, type of smoking outcome, and other variables including time of outcome and measure of support. We will conduct a meta-analysis to evaluate the average effect size across the literature and identify possible moderators of those effect sizes. These findings will contribute to knowledge of the effects of social support and direct future efforts to improve social support interventions for smoking cessation.

DNA-Sequence Based Identification of Ciliate Species
Alexis Gonzalez, CURO Research Assistant
Dr. Branson W. Ritchie, Small Animal Medicine &Surgery, College of Veterinary Medicine
We are interested in cloning ciliate species from local environments. Here, we report a DNA-based method to identify ciliate species. Ciliates are a diverse category of aquatic, and occasionally terrestrial, protozoa. They are categorized and named after their hair-like structures called cilia, their primary means of motility and feeding. Because molecular identification is more specific than morphological identification, we used PCR amplified 18S ribosomal DNA sequence for identification method of the ciliate. The ciliate species in the old discharge from UGA Biopolymer Center was collected using a 10-micron cell strainer. The genomic DNA was extracted and the 18S rRNA region was amplified by PCR. The amplified DNA was sequenced, and a homologous sequence was searched for in the BLAST database. The 303bp PCR product had 100% identity with 92% query coverage with Colpoda aspera. The above-described method can be applied to identify the species once ciliates are cloned.

The Impact of Environmental INGO Presence on Ecological Terrorism Activity
Emma Griffin
Dr. Amanda Murdie, International Affairs, School of Public & International Affairs
To answer the question of how environmental INGOs impact the likelihood of ecological terrorism, we used updated datasets to conduct two empirical tests: a logistic regression model and a rare events logistic regression model. We found that increased environmental INGO activity does indeed lead to higher rates of ecoterrorism. This phenomenon occurs regardless of a country's level of democracy or number of overall terrorist attacks. Furthermore, with increased population size and GDP, eco terrorist attacks are more common. To expand on these findings, we ran multiple negative binomial regression models to explore a political opportunity structure approach, testing our secondary hypothesis that a weak, closed government would increase eco terrorist attack frequency, given increased NGO presence. We examined numerous variables, focusing on the electoral process, representation in the legislature, unitary or federal government structure, and level of corruption. We found that free and fair elections and a legislature with proportional representation both independently lessened the likelihood of eco terrorist attacks, while a federal system and increased corruption both individually increased the likelihood. Interestingly, factors such as an independent judiciary and political rights had little significant effect. Using pre-existing and newly created datasets with over 1,500 observations spanning from 1989 to 2011, these findings offer insight into how these variables might interrelate and the primary factors driving this phenomenon.

Hormonally Mediated Functions of Ras Homolog Family Member A (RhoA) in Uterus of Ovariectomized Mice
Hope Grismer
Dr. Xiaoqin Ye, Phsiology & Pharmacology, College of Veterinary Medicine
The female reproductive system and the events of early pregnancy are primarily regulated by two hormones, progesterone (P4) and estrogen (E2). Ras homolog family member A (RhoA) is a GTPase protein widely expressed throughout many tissues in the body, including the female reproductive tract. Microarray data previously demonstrated that RhoA is highly expressed in luminal epithelium cells of the uterus during the peri-implantation period in mice. RhoA was discovered to be important in corpus luteum development and function in the ovary and deletion of RhoA in the ovary can result in progesterone (P4) deficiency. Preliminary data indicates that RhoA expression is high in early pregnancy in days 3.5 (D3.5) and 4.5 (D4.5) post-coitum. There is a significant knowledge gap regarding the functions of RhoA in the uterus. To study RhoA in the female reproductive tract, we utilized a conditional deletion of RhoA using a Cre-LoxP system. I hypothesize that RhoA mediates hormonal effects on the uterus and overall function of the uterus. To test this hypothesis, we ovariectomized wildtype (Pgr+/+RhoAf/f) and conditional knockout mice (Pgrcre/+RhoAf/f) and subcutaneously injected with 0.1mL of either oil, E2 (100ng), P4 (2mg), or E2+P4 and dissected 24 hours later. Uterine sections were collected and

stained for histology using hematoxylin and eosin. Histological analysis revealed uterine effects of ovarian sex hormones in wildtype and RhoA conditional knockout mice. Future plans include evaluating differential gene expression in the uterus by using mRNA sequencing to further explore RhoA's function in the uterus.

Burden of Mental, Behavioral and Neurodevelopmental Disorders among Children Exposed to Adverse Childhood Experiences in US
Ansley Grace Groen
Dr. Janani Rajbhandari-Thapa, Health Policy & Management, College of Public Health
Adverse Childhood Experiences (ACEs) are potentially traumatic events that occur in childhood. Examples of ACEs include domestic violence in a household, substance abuse by a parent or guardian, bullying, sexual/physical/emotional abuse, and incarceration of a family member or guardian. ACEs can be risk factors for negative physical, mental, and behavioral outcomes. This research project aims to determine protective factors against mental, behavioral, and neurodevelopmental disorders (MNBDs) among children exposed to ACEs in the United States. This research also aims to determine the overall burden of MNBDs in the United States, including examining ACE exposure as a potential risk factor for early death. It is already known that one in three mental disorders worldwide can be attributed to ACE exposure, yet large proportions of children and young adults do not have access to necessary behavioral health services. It is expected that the development of resilience through trauma-informed care will be a promising mediator between exposure to ACEs and future health outcomes. It is also expected that the overall burden of MNDBs on society is moderate to severe, and that ACEs are indeed a cumulative risk factor for premature mortality. Future work should include increasing awareness of ACEs and their potentially negative impacts, as well as increasing prevalence of resilience-building programs for high-risk populations.

Osmotic and Thermal Stability of Cells and Viruses with Altered Levels of Phosphatidylserine
Hannah Gunter
Dr. Melinda Brindley, Infectious Diseases, College of Veterinary Medicine
The infectivity of viruses is dependent upon the overall stability of viral particles. For enveloped viruses, the phospholipid composition of the viral envelope contributes to their overall stability. These phospholipids are obtained from the cellular membrane upon viral budding from infected cells. Previous research found that enveloped viruses that bud from cells with increased levels of the cellular phospholipid, phosphatidylserine (PS), were more capable of binding and initiating viral entry than wild-type cells. However, a follow-up study with vesicular stomatitis virus found that viral particles that bud from cells with higher levels of phosphatidylserine were less infectious. The research suggests that increased levels of phosphatidylserine increase membrane curvature and permeability due to its anionic nature and too much may reduce viral stability. To test viral stability, various enveloped viruses produced in ΔCDC50A cells (PS high) will be compared with viruses produced from wild-type cells. WT and ΔCDC50A-produced viruses will be placed under thermal or osmotic stress, and then titrated to determine if the loss of infectivity differs between the PS high and traditional virions. It is anticipated that with high PS, ΔCDC50A viruses subjected to increased temperatures and an increased hypotonic environment, their viral titers will experience a greater decrease compared to virus produced in wild-type cells. This research can lead to a better understanding of how the cellular membrane composition can play a role in the infectivity and stability of enveloped viruses, which could aid in the development of therapeutics against these agents of significant human healthcare burden.

Increasing the Effectiveness and Accuracy of Acoustic Tweezers
Berek Yahu Ha, CURO Research Assistant
Dr. Mable Fok, School of Electrical & Computer Engineering, College of Engineering
Acoustic tweezers have been studied at length for many years, yet its uses are still within its infancy stage. The primary fascination amongst the scientific community is its ability to suspend and manipulate objects from a distance in both liquid and air mediums using acoustic radiation force. Acoustic tweezers provide a touch-less approach to manipulate objects, which are useful in drug delivery, cell sorting, and tissue engineering in particular. Acoustic tweezers do have limitations in that where the particles can move is solely dependent on the shape of the acoustic array. In this study, we start with an in-depth study of the operation principle, then investigate the current development of acoustic tweezers, which would help us to determine acoustic array shapes that would allow for a greater degree of movement while exploring methods to help increase accuracy and stability of suspended particles.

Identification of the Origin of Pediatric Glioblastomas using Human Embryonic Stem Cells
Autumn Brooke Hampton, CURO Honors Scholar
Dr. Kosuke Funato, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences
Glioblastomas are highly aggressive tumors that affect the central nervous system (CNS), and these tumors occur mainly in adults but also impact children and young adults. There are many brain tumor entities, and each entity exhibits a distinctive molecular profile. Our objective is to understand the differences between these brain tumor entities, particularly in children. In this project, we focus on the BCOR-subtype, in which the BCOR gene is overexpressed, and the p53 pathway is inactivated. The BCOR gene encodes the protein BCL-6, a corepressor that does not attach itself to DNA but interacts with other proteins that bind to DNA and suppress the activity of a variety of genes. However, neither the cell of origin of this subtype nor the role of BCOR in glioblastoma is known. To address these questions, we utilize human embryonic stem (hES) cells as a model system. Our plan is to derive particular types of neuronal cells from hES cells by controlling developmental signaling pathways using combinations of growth factors and small molecule inhibitors. We then introduce the mutations to evaluate if the mutations transform particular cell types. More specifically, we knock out the p53 gene in hES cells by CRISPR/Cas9 system and introduce mutant BCOR gene into hES cell-derived neural progenitor cells by the "Sleeping Beauty" transposon system. Our study will provide us an important insight into the molecular mechanisms underlying the formation of glioblastoma in children and facilitate the development of diagnosis and appropriate therapies for glioblastomas and patients with these tumors.

Preschoolers' Language Use during Virtual and Face-to-Face Shared Book Reading
Claire Hampton, CURO Research Assistant
Dr. Hannah Krimm, Communication Sciences & Special Education, Mary Frances Early College of Education
Dialogic reading is an evidence-based method of shared book reading that can be used to prompt language use in children. Considering the increase in remote and online learning, it is important to investigate the effectiveness of dialogic reading during online learning sessions. This investigation compares the language use of preschool children in virtual and face-to-face dialogic reading sessions. Children were recruited from preschools in the Athens area and online platforms. Individual shared book reading sessions were conducted face-to-face in a research lab and online via Zoom with the child and research personnel. The same book was read in

both sessions and throughout the story the child was prompted with various scripted questions. Order of administration of virtual and face-to-face sessions was counterbalanced across participants. Data currently are being transcribed, coded, and analyzed to compare the number of child utterances produced in each setting. We expect that children will use substantially more language in the face-to-face setting than in the virtual setting. Understanding the difference between settings may prompt refinement of strategies to promote children's language use via telehealth platforms.

An Investigation of Vocalizations when Functional Communication Training is Device Based Versus Voice Based

Claire Hampton; Kat Archer; Lauren McKay; Kara Scoggins; Abby Shainberg
Dr. Sandie Bass-Ringdahl, Communication Sciences and Special Education, Mary Frances Early College of Education

Autism Spectrum Disorder (ASD) is a developmental disorder characterized by deficits in social communication and restricted, repetitive patterns of behavior. Functional communication training (FCT) is an intervention aimed at replacing challenge behaviors by identifying and reinforcing the most appropriate alternative response. FCT has shown to be an effective method for establishing a mode of communication for individuals with ASD and incorporates AAC. Augmentative Alternative Communication (AAC) is an alternative way of communication by either adding to speech or being used instead of speech. A type of AAC used in this study was a microswitch which is a small, sensitive switch and when activated, vocalizes a word. Another type of AAC used in this study is picture cards with pictures and symbols that can be used to facilitate communication. This study's primary purpose is to evaluate vocalizations across different phases of FCT-based intervention. A secondary purpose of this study is to examine the therapists use of FLT techniques in the context of FCT with impact on vocalization use of participants. Research assistants have been trained in a child vocalization coding scheme and will use this to code for vocalizations of the participant across different phases of FCT. Vocalizations will be evaluated and compared across device based and voice based intervention sessions. We expect to find that child vocalizations will increase as a result of FCT-based intervention. These findings will benefit clinicians and caregivers by helping to understand child vocalizations in different settings and what may lead to an increase in production.

Crater Saturation of Asteroid 4 Vesta

Davis Gray Hardin
Dr. Christian Klimczak, Geology, Franklin College of Arts & Sciences

Crater saturation occurs when a planetary surface area is heavily cratered and has reached its physical limit so that new crater impacts do not have an effect on the overall crater density. Vesta is a heavily cratered asteroid in the Main Asteroid Belt. We conducted crater counting on the Vestalia Terra, a heavily cratered irregular highland that is the oldest terrain of Vesta. All craters within the area of 58142.03 m2 were mapped and marked as certain or uncertain. A total of 3972 craters were mapped ranging from 0.6 km to ~30 km in diameter (D) with 772 of them marked as uncertain. We determined the best-fit isochrons for the Vestalia Terra craters of D ⩾ 4.5 km to be ½2.6⅓(-0.9)^(+0.6) to ⅓3.3⅓(-0.08)^(+0.06) Ga. The isochrons predict the number of craters with D = 1 km to be 2517 to 4540. The counted number of craters with D = 1 km is 187, which is much fewer than the prediction and indicates crater saturation has been reached on the Vestalia Terra. To further investigate crater saturation on Vesta, we will conduct crater counting on younger areas on Vesta and compare the results. The crater statistics of surfaces of various ages will provide insight into the cratering history and saturation of Vesta and the Main Asteroid Belt.

Understanding the Role of Phosphatidylserine in Vesicular Stomatitis Virus Budding

Sarah Anne Harrison
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Vesicular Stomatitis Virus (VSV) is an enveloped negative-sense single stranded RNA virus that is transmitted through direct contact or insect vectors, such as sandflies. Phosphatidylserine (PS) is a phospholipid primarily found on the inner leaflet of the cellular membrane but during apoptosis is flipped to the outside of the cell. To understand the role of phosphatidylserine during VSV budding, we performed budding assays using a virus tagged with luciferase and measuring the luminescence produced in the supernatants in comparison to the cell lysates. We have evaluated the release efficiency of the VSV-M-NLuc virus in HAP1, Vero, and 293T cell lines knocked out flippases subunit (CDC50a) and scramblases (XKR8) as well as Vero cells lacking PS receptors (TIM and AXL),. We have observed a correlation between altered translocation of PS between the outer and inner leaflet of the plasma membrane and virus release. Cells knocked out for CDC50a subunit display an increase in exposed outer leaflet PS and result in an increase in VSV virus budding. In contrast, a decrease in outer leaflet PS in cells knocked out for XKR8, causes a reduction in budding in virions. This research is important to understand how enveloped viruses, like VSV, can utilize properties of the cell, like phosphatidylserine, to successfully infect the cells

How Thin-Ideal Versus Plus-size Models Influence Perceived Brand Authenticity and Brand Outcomes

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Marketers often feature models whose physical appearances are considered aspirational or "ideal" in their promotion of appearance-related products. Recently, there has been a rise in featuring "real" models whose physical appearances deviate from idealized beauty standards. This paper examines the impact of plus-size (vs. thin-ideal) models on the consumer desire for appearance-related products. An archival analysis of beauty brand sales revealed that the use of plus-size (vs. thin-ideal) models was associated with increased financial performance. Across four preregistered experiments, we replicated these effects, finding that this increase is explained by enhanced brand authenticity. We theorize that this increase in brand authenticity is driven by consumers' preference for how beauty should be defined in relation to the human form. Beauty can align with a form that is considered the "most beautiful" (i.e., the ideal form) or the "most representative" (i.e., the average form). We posit that consumers tend to prefer to define beauty in relation to the average over the ideal. Thus, plus-size models enhance brand authenticity as they fit consumers' definitional alignment between beauty and typicality, thereby increasing brand outcomes. This preference for plus-size (vs. thin-ideal) models is moderated by whether the thin-ideal model is featured alongside plus-size models and by the degree to which the model's body deviates from the thin-ideal. This work holds theoretical implications at the intersection of aesthetics and authenticity and offers a set of managerial recommendations.

The Evolution of Agricultural Sectors in the Growth South: Agriculture to Agribusiness

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In the field of Southern politics, the South is split into two categories: the growth states (GA, FL, NC, TN, TX, VA) and the

stagnant states (AL, AR, LA, MS, SC). The objective of this paper is to determine how both growth states and stagnant states in the South rely on the agricultural sector to drive their economies, yet the growth states are more successful. The hypothesis tested is as follows: if a state relies purely on agricultural production in its agricultural sector, it will remain stagnant in overall economic growth, but if a state develops agribusiness, it will become a growth state. First, patterns of production reliance between growth and stagnant states are examined. Next, state-level variations are evaluated, defining the early transitioning states of South Carolina, Alabama, and Louisiana, as the states most likely to become growth states, due to their agribusiness developments. The case study of poultry in Georgia models successful development of processing infrastructure. Alternative explanations for agricultural sector growth, such as farm size, causality of the economy, and political externalities are evaluated, determining that the lack of processing within the agricultural sector in stagnant states is the main hindrance to success. The advancement of stagnant states' agricultural sectors towards the economic levels of growth states is compared with the states' lack of political realignment, determining that they transition economically, but not politically. Developing agribusiness infrastructure is then suggested as a development strategy for stagnant states in the South.

A Content Analysis of Women in Families from Intersectional, Contextual, and Global Perspectives

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The purpose of this research project is to gain a broad understanding of the scholarly literature related to diversity among women and families from intersectional, contextual, and global perspectives. Our study has three primary aims: 1) to review the scholarly works in the Cognella University Library database specifically related to women and families; 2) to select articles that are diverse, compelling, and pertinent to today's issues, and lastly, 3) to organize them thematically and conduct a preliminary content analysis of the articles chosen from the Cognella library. These articles cover intersectional and contextual issues (e.g. gender, race, nationality, social class, sexual orientation, immigration, ability status, and age) that impact women and families. Efforts will be made to examine how social issues such as the effects of technology, employment, education, political power, wars, natural disasters, and social determinants of health, among other things, intersect to influence the lives of women and their families. The final objective of the study will be to identify themes in the literature review, then based on those themes, curate and organize scholarly works into chapters for an anthology that will be published and used for a split-level course at UGA—HDFS 4620/6620—titled Women and Families in Society. Our hope is that this much-needed text will reflect the most current and relevant themes among women and families from cross-cultural and diverse societies and subcultures within societies.

Bordetella Glycans Involved in Infection

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Bordetella is a serious, human pathogenic bacteria that causes whooping cough. There are different types of Bordetella sp.; human (pertussis) and animal agents. Bordetella produces different types of glycans (sugar-based polymers) that are often found on the outer surface of the bacteria. Growing this pathogen in different conditions and with specific antibiotics is known to modify glycan structure(s). These sugar-modifications are likely essential to their survival. We study specific Bordetella glycans required for 'infection'. The genes in the operon involved in this glycan production have been discovered. However, the specific function of each gene-encoded enzyme is largely unknown. In this study we analyze mutants that have gene modifications. A gene knockout for one of the genes expressed results in no production of the glycan. A knockout of the entire operon results in faulty or delayed-infection. Here we analyze mutants in closely related bacteria with the same glycan structure. Through analyzing 74 different mutants and a wildtype, we are able to see exactly which genes are involved in the production of this specific glycan, and understand the pathway of the production. A parallel study is carried out to determine the molecular mechanism and biochemical route of the glycan production. For this the Bordetella operon is made and reconstituted in E.coli. This reconstitution is done by cloning individual Bordetella genes using PCR into expression plasmid. Subsequently, the different plasmids are co-transformed to E.coli. The study has potential to make a new, more equipped vaccine against Bordetella.

Bisphenol Exposure Disrupts Meiotic Spindle Organization and a Unique Liquid-Like Spindle Domain in Oocytes

Areeba Hashmi, CURO Research Assistant

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An abnormal chromosome number (aneuploidy) in developing embryos is the leading cause of congenital birth defects and pregnancy loss in women. Most aneuploidies are attributed to errors in chromosome segregation during meiotic division in oocytes. High rates of aneuploidy in oocytes were observed in studies following exposure to environmental toxicants, such as Bisphenols that are widely used in plastics manufacture. Previous studies from the Viveiros laboratory showed that even a brief exposure to Bisphenol A (BPA) in-vitro disrupts meiotic spindle organization and stability in ovulated mouse oocytes. The aim of this project is to better assess the disruptive effects of bisphenols by exposing mouse oocytes to increasing concentrations of BPA and its common replacement, Bisphenol F (BPF), during an 8h culture. The cells were then fixed for immunofluorescence analysis of meiotic spindle structure and chromosome alignment. Both, BPA and BPF exposure disrupted meiotic spindle organization, leading to significantly shorter spindle length, wider poles and an elongated metaphase chromosome configuration. Interestingly, these meiotic spindle defects were associated with disruption of a unique 'liquid-like spindle domain" (LISD) that is important for spindle formation and stability. This analysis focused on metaphase -II (MII), the critical period when ovulated oocytes are fertilized. Disruption of the MII spindle by bisphenol exposure could, therefore, potentially perturb the genomic stability of the oocyte and even embryo development, after fertilization. This is an important area of study with important implications for both maternal and child health.

Does Social Capital and Social Cohesion Influence Mental Distress Levels in a Community in Southwestern Madagascar?

Areeba Hashmi, CURO Research Assistant

Dr. Bram Tucker, Anthropology, Franklin College of Arts & Sciences

Cultural knowledge is an emerging topic in health care discussions, specifically surrounding mental health. The basis of public health endeavors is understanding how different communities disseminate resources and education about health. This research aims to analyze quantitative studies done in southwestern Madagascar and examine the association between social capital and mental distress. This research is based on data sets from two National Science Foundation-funded projects. One dataset consists of questionnaire responses across multiple different sites. This set of

data (BCS 1733917, PI Tucker) explores the relationship between people's cultural knowledge and socioeconomic responses. The other data (BCS-1743019, PIs J. Koster, U. Cincinnati, et al.) stems from questionnaires being asked in one site in Madagascar and comparing it to 40 distinct places across the world. This data set is examining the interconnectedness of genealogical relationships, wealth, and social networks. I will utilize multi-level regression models to identify if there is an association with household social capital scores and the average of two spouses' mental health scores. This will utilize data from a social capital questionnaire construct and number of ties in a social network analysis as well as the data collected on individuals' mental distress. This will be done across all the sites in the data set and will be used to compare sites to each other as well as these sites as a whole. Additionally, this research will look for a correlation between the wife's mental health and the husband's mental health, to determine if one influences the other.

Derivatization of Acidic Oligosaccharides to Investigate Degrees of Acetylation

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Rhamnogalacturonan I (RGI) is a complex polysaccharide that can be found in the primary walls of all vascular plants. Due to its structural complexity, there is not much that is known about RG-I, including its degree of O-acetylation. The purpose of this project is to investigate different derivatization procedures to investigate the location of O-acetylation in RG-I. The initial step is to partially acetylate an oligosaccharide and then use propionylation to derivatize the acetylated oligosaccharide and determine if the O-acetyl groups can be acquired after the procedure. The three methods to partially acetylate the polysaccharide are pyridine/acetic anhydride, trifluoroacetic acid/acetic anhydride, and methylimidazole/acetic anhydride. This combination of derivatizations will be used to investigate mass spectrometry methods to distinguish the location of O-acetyl groups in oligosaccharides and polysaccharides derived from the compound, RG-I. The derivatized oligosaccharides will be analyzed by mass spectrometry and the data will be interpreted to determine the percentage of fully acetylated compound compared to the percentage of the partially acetylated compound.

Utilizing Transparency Reports: An Analysis of the Surveillance Relationship between the United States Government and Big Tech

Chris Haswell, CURO Honors Scholar

Dr. Andrew Whitford, Public Administration & Policy, School of Public & International Affairs

Transparency reports are public documents released by Big Tech companies such as Google, Facebook, and Verizon, which detail the number of times each company has received a request for user information from various international governments. Due to the vast amounts of information that many companies provide in these reports, transparency reports are an untapped and vital tool necessary to gain a complete understanding of United States surveillance practices through third-party Big Tech corporations. Based on an extensive review of the scholarly conversation, this project is the first comprehensive analysis of 15 Big Tech companies' transparency reports spanning from 2010 to 2022 regarding the United States government's requests for user information. I compiled the information from hundreds of reports into categories: legal requests, FISA requests/ national security requests, location requests (when applicable), and users affected by requests to understand how the surveillance relationship between the United States government and Big Tech companies has changed over time. In total, over 10.5 million legal requests were compiled, detailing an average 738% increase in requests for information from each company's first reporting period to the end of 2021. In addition to legal requests, FISA requests were analyzed, however this analysis is still in progress due to the convoluted nature of these requests based on their connection to terrorism or other national security threats. Nevertheless, it appears as though users affected by National security requests has steadily increased over time, alluding to either an increase of national security threats to the United States or an increased reliance on filing these requests.

Development of Transgenic P. vivax Parasites for Isolation and Study of Dormant Hypnozoites

Grace Hawkins

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Plasmodium vivax malaria causes significant morbidity and socioeconomic hardships globally and has remained resilient in the face of control and elimination efforts. The ability of P. vivax to persist is due to the ability to form hypnozoites, a dormant form of the parasite that resides in the liver. Hypnozoites can persist for weeks to years after an initial infection is cleared before existing dormancy and causing a subsequent infection known as a relapse. Relapses are responsible for 60- 90% of P. vivax infections, yet treatments to eliminate hypnozoites are limited and not widely available. The long-term goal of this project is to facilitate the development of new therapies to treat hypnozoites by developing transgenic P. vivax parasites that will allow isolation and study of hypnozoites using primary human hepatocyte cultures. Here, we designed and assembled recombinant DNA plasmids with reporter genes that will be used to generate fluorescent, transgenic P. vivax. We constructed two plasmids containing fluorescent reporter genes that will integrate into non-essential genes in the parasite life-cycle and be constitutively expressed to facilitate isolation by fluorescence activated cell sorting (FACS). Currently, these plasmids are on track to be tested using in vitro culture systems before transfections are performed to generate the fluorescent parasites. If successful, these approaches will enable the isolation of hypnozoites and study their biology, thereby providing new avenues for new therapies.

Black Holes of Information: The State of Local News in Southeast Georgia

Ireland Hayes, CURO Research Assistant

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The rural South has been particularly hard hit by the disappearance of local news sources. In South Georgia, the lack of access to local news is compounded by spotty broadband access. If local news outlets do exist, they often have little to no access to resources needed for quality reporting on the area. Local newspapers continue to be published, but the scope, frequency, and depth of their coverage have significantly declined; many are considered ghost papers, and broadcast news stations rarely venture into the small communities to provide coverage. This study aims to quantify this dearth in news coverage, to understand how members of this rural community define their specific information needs, if they think those needs are currently being met, and how they fill these real and perceived information holes. In this case study of a rural Southeast Georgia community that is located in between the Jacksonville, FL and Brunswick, GA designated media areas (DMA), I hypothesize that, while Charlton County appears, at least on the map, to be ideally situated, it falls into a kind of information no-man's-land, too small and far away for any outlet to reliably cover. By exploring the availability of local news and how the community consumes and shares local news, I hope to contribute to the growing literature on the state of local news in the United States. This mixed methods study containing a quantitative data analysis and qualitative survey

will utilize a two-part analysis to understand the needs of Charlton County.

The Efficacy of Psychedelics in the Reduction of Symptoms of Anxiety and Depression
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Dr. Lillian T. Eby, Psychology, Franklin College of Arts & Sciences
Psychedelics are a class of psychoactive substances that have the potential to impact the treatment methods of various mental illnesses (Vargas et al., 2021). Examples of psychedelic substances include, but are not limited to LSD, ayahuasca, and psilocybin. The research question this literature review aims to answer is: Do psychedelic substances reduce the symptoms of anxiety and depression? Early clinical trials have shown that psychedelic compounds offer promising results for depression, addiction, and anxiety (Zeifman et al., 2020). This literature review aims to summarize 15-20 studies in relation to the efficacy of psychedelic substances in reducing symptoms of anxiety and depressive disorders. We anticipate finding results that indicate psychedelics reduce symptoms of anxiety and depression. GALILEO will be used as the primary search engine to find scholarly articles for this review. The keywords are psychedelics, mental illness, mental health treatment, depression, and anxiety. The inclusion/exclusion criteria for this review are as follows: the articles must be written in English, the articles must be from scholarly journals, and the data must be empirical and limited to clinical trials. According to the ADA, anxiety is the most common mental illness in the U.S., affecting around 40 million adults. Major depressive disorder affects approximately 17.3 million American adults in a given year, according to NIH. Investigating the relationship between psychedelics and mental illness symptom outcomes could provide important insight into new and effective treatment options for mental illness and could have positive outcomes in the context of clinical prognosis.

Effects of Positive Psych Interventions on First-Generation American
Aila Herenda
Dr. Wendy Harris Biddle, Division of Academic Enhancement, VP for Instruction Units
Immigration definitively alters a family's direction for generations, affecting not only those moving, but those left behind. Children of these families experience specific traumas, learning from a young-age harsh-truths about struggles for land, power, and freedom. According to the American Psychiatric Association, one in every three refugees experiences high levels of mental illness; children of refugees are likely to inherit circumstantial trauma and perpetuate a cycle of negative mental health behaviors Positive psychology behavioral interventions build out stronger mental health practices, application of interventions to immigration-related trauma can improve the experience of first-generation Americans. Grounded in Sonia Lyubormirsky's (2007) well-being intervention research, participants will be given two months to implement one of the twelve available interventions. The methodology for this research will consist of two surveys, one distributed before implementing a well-being practice, and one after. In the before-treatment assessment survey, participants will describe the impacts from being children of refugees. After participation in the study, they will retake the survey to assess any observed change from the intervention This research project will focus on applying the power of positive psychology interventions in breaking cycles of behaviors and attitudes resulting from forced displacement. Based on previous literature, I hypothesize there will be a positive correlation linked with well-being interventions and that participants will feel lesser degrees of anxiety, depression, paranoia, and social comparison. Given current global politics and policies surrounding refugees, I think that the applicability of this research is heightened.

Ketenimines as Diels–Alder Dienophiles
Mary Stuart Herlihy, CURO Research Assistant
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Ketenimines, the nitrogen analog of ketenes, are a vastly understudied functional group with respect to Diels–Alder reactions. Our group has demonstrated the stability of several electron rich ketenimines and is working to uncover their reactivity. We believe that, like their oxygen analogs, ketenimines can be powerful synthetic intermediates. We have demonstrated their utility as dienophiles in both chiral and achiral Diels–Alder reactions and achieved the first catalytic enantioselective Diels–Alder reaction of a ketenimine dienophile. These reactions are conducted in the presence of a copper (I) catalyst and methyl DuPhos, a commercially available chiral ligand. In addition to the chiral Diels–Alder reactions, we are continuing to probe the utility of ketenimines by exploring their reactivity in achiral Diels–Alder reactions with bissilyoxy furans. These reactions proceed at elevated temperatures readily affords oxidized pyridines with yields as high as 81%. We have also been able to demonstrate the utility of the Diels–Alder adducts by subjecting them to several successful derivatization studies.

Tracking and Understanding Migration Patterns in Asian Needle Ants
Birkley Heynen, CURO Research Assistant
Dr. Taka Sasaki, Odum School of Ecology
Asian Needle Ants have a unique migration behavior called tandem carrying, where ants pick up colony members and bring them to a new nest. Understanding this behavior is important since this species is invasive, and understanding this behavior will help scientists better eradicate them. Many holes exist in the literature surrounding these migrations, in particular the act of tandem carrying. In order to better understand these migrations we replicated controlled migration events. To run these experiments we painted a colony of ants, each with a unique color combination, and set them up in an arena. In the arena we set up their already established home nest on one side, and an uninhabited target nest on the opposite side. The arena had visual markers to aid in the migrations events. We hypothesized that individuals who got transported to the new sites by tandem carrying would not be able to recruit new ants, and that recruiters use visual markers during migrations. The controlled lab experiments were also in collaboration with field studies to better understand the natural progression of these migrations. The experiment was able to find that the speed of migrations increased, and an increased number of tandem carries occurred with visual markers. We were also able to see that a majority of the tandem carriers in a migration are executed by the same ants. To continue this study we are running more migrations to get more concise results, and are collecting data looking at footage from the home nests.

Ecological Factors Influencing Chagas Disease Infection in Domestic Dogs from Rural Communities in Panama
Fareena Hisamuddin
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Chagas disease, caused by the parasite Trypanosoma cruzi, is a zoonotic disease that is spread to humans and animals through vector-borne transmission altered by changes in land use. Latin America has suffered the highest burden of Chagas disease, where domestic and wild mammals are competent hosts for T. cruzi. Domestic dogs, while not significant reservoirs of Chagas in Panama, primarily transmitted to humans via a kissing bug vector-wild animal reservoirs cycle, are considered sentinels for T. cruzi transmission near human dwellings. This study evaluates extrinsic and intrinsic ecological factors associated with Chagas disease

infection in dogs. We hypothesize that dog infection will be more prevalent in areas surrounded by a predominance of secondary forest growth with the presence of Attalea butyracea palm trees, which are primary habitats of the Chagas disease vector. Physical examinations and blood samples were collected from 144 dogs from three communities in rural Panama surrounded by different land use types: Cutevilla (N=54), Molejon (N=48), and El Cocal (N=41). We performed conventional PCR on DNA extracted from dog blood using primers targeting the T. cruzi kinetoplast with an expected length of 330 bp. In addition to testing dogs for T. cruzi infection, we evaluated dog body condition and hematological indices (complete blood count with differential white blood cell count). Preliminary PCR shows that 9/144 dogs are positive for T. cruzi, a 6.25% (2.90-11.53, 95% CI) infection rate. Our results suggest that land use type and the presence of Attalea palms near the household influence T. cruzi prevalence.

Optimization of a 1-Propanol Producing Pyrococcus furiosus Strain through Deletion of a Native Alcohol Dehydrogenase

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Mesophilic microorganisms such as Escherichia coli have been engineered to produce a wide variety of chemical products, but research shows that utilizing extreme thermophilic microorganisms brings several advantages, such as reducing contamination risk, minimizing cooling costs, and enhancing product collection. One such organism is the archaeon Pyrococcus furiosus that grows at temperatures up to 100°C. It has been previously engineered to produce 3-hydroxypropionate, a precursor to 1-propanol, which can be manufactured into pharmaceuticals, pigments, other chemical compounds, and most importantly, fuel for engines. Lowering the cost of 1-propanol production could make it into an efficient biofuel alternative to fossil fuels. The 3-HP producing P. furiosus strain was engineered to contain three additional enzymes from Metallosphaera sedula and an alcohol dehydrogenase from Thermoanaerobacter sp. X514. The new strain produced an average of 0.5 mM of 1-propanol at 75°C. However, the ratio of side ethanol production to 1-propanol production was 15:1. To optimize 1-propanol production, one of the native alcohol dehydrogenases, AdhF, which is a major contributor to native ethanol production, was targeted for deletion. Comparison to the parent strain showed the absence of the native AdhF did not have a major effect on ethanol or 1-propanol concentrations. Other options, such as substituting the AdhA from T. sp. X514 for one with higher specificity for 1-propanol, are currently being explored. Therefore, this study informs future strategies to increase P. furiosus production of the industrially useful chemical 1-propanol rather than the side product ethanol.

Catalytic Variants of O-GlcNAc Transferase and Their Role in X-Linked Intellectual Disability

Laura Kate Holden, CURO Honors Scholar
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The OGT gene encodes for the enzyme O-GlcNAc Transferase that is essential for human and most multicellular organism's life and is responsible for the addition of O-GlcNAc onto target cellular proteins. The O-GlcNAc modification plays a role in numerous processes and diseases including diabetes, cancer, neurodegeneration, and neural development. Previously reported mutations in the N terminal Tetratricopepti Repeat (TPR) domain of OGT have been found to cause X-Linked Intellectual Disability (XLID). More recently, clinicians have identified 3 mutations in the C terminal catalytic domain of OGT. We hypothesize, based on molecular modeling, that the enzyme will not be able to efficiently bind the sugar nucleotide and transfer O-GlcNAc to proteins. Thus, the variants will alter the O-GlcNAc levels on intracellular proteins. To test this hypothesis, we will express the variants, T570A, Y835C, and A952V, in human cell lines to better understand the effects of the mutations in comparison to our positive control, wildtype, and negative control, catalytically inactive K852M. We have created plasmids via site-directed mutagenesis to express the recombinant OGT enzyme variants. We will use western blots to assess the levels of O-GlcNAc normalized to the amount of recombinant OGT expressed in mammalian cells. This can help us better understand the role that these mutations play in the intellectual disability phenotype. By understanding how the variants alter O-GlcNAc levels and enzyme function, potential therapeutics can be created, and we will better understand the role these mutations play in the phenotype of XLID.

Evaluating the Role of Phosphatidylserine in Chikungunya Budding

Ashley Hoover
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Chikungunya virus (CHIKV) is an enveloped, single-stranded positive-sense RNA virus in the Togaviridae family. It is primarily transmitted through the bite of infected mosquitoes. The purpose of this study was to study the role phosphatidylserine (PS) plays during CHIKV budding. Phosphatidylserine is a negatively charged glycerophospholipid that is synthesized in the endoplasmic reticulum and is involved with many cellular processes, but it is most well-known as a marker for apoptotic cells. Previous experiments using Vesicular Stomatitis virus showed that altered PS localization in the plasma membrane by knocking out the genes encoding CDC50a flippase subunits or XKR8 scramblase affected the budding efficiency of VSV. We evaluated the role of phospholipids in CHIKV budding by infecting ΔCDC50a and ΔXKR8 cells with a luciferase-tagged virus. We also evaluated CHIKV budding in other cell lines such as Vero cells knocked out for PS receptors (TIM and AXL). Our results suggest that the presence of the PS receptor TIM on the cell surface prevented newly budded virions from being efficiently released. Increased PS in the outer leaflet of the plasma membrane resulted in increased budding efficiency of CHIKV in ΔCDC50a cells. While previous work has focused on the cellular proteins important for viral budding, this is the first study exploring the role of lipids in CHIKV budding.

Examining Predictors of Educational Accommodation Attitudes Among College Peers

Carter Jordan Horvath
Dr. Ashley J. Harrison, Educational Psychology & Instructional Technology, Mary Frances Early College of Education

When it comes to disability accessibility in higher education, colleges and universities provide students with disabilities educational accommodations in order to provide a level academic playing field. The use of accommodations has proven to effectively aid students with disabilities to succeed in college; however, the utilization has drawn mixed attitudes from peers. Studies investigating how the characteristics of students relate to their attitudes of accommodation use have clearly identified the sociodemographic characteristics related to accommodation use attitudes, however, other variables are absent or underrepresented in the scholarship. The current study intends to investigate whether knowledge of mental health, quality and quantity of contact with differently abled persons, as well as sociodemographic factors, relate to the attitudes college peers carry towards educational accommodation use. This analysis will occur among a sample of 405 university students. This study will use the General Attitudes toward College Educational Accommodations measure to assess attitudes

toward accommodations. Predictor variables will be assessed using a general mental health literacy vignette-based questionnaire and two quality and quantity of contact measures. It is predicted that a linear regression analysis will reveal that participants with higher mental health literacy and greater quality/quantity of contact would be more likely to demonstrate more positive attitudes of educational accommodation usage. We aim to replicate and extend previous sociodemographic findings. Gaining more knowledge on the variables associated with negative accommodation attitudes can provide specific targets for future interventions to increase the likelihood of building a more inclusive educational environment.

Oxidation of Droplet Interface Bilayer Membranes
Daniel Hossack
Dr. Eric Freeman, School of Environmental, Civil, Agricultural, and Mechanical Engineering, College of Engineering
Lipid membranes are critical structures that govern the exchange and compartmentalization of various membrane-impermeable molecules within the cell. However, collections of unsaturated lipids within these membranes are prone to oxidation, where reactive oxygen species (ROS) induces their reorganization and subsequent loss of function through peroxidation. Studying the mechanics of lipid peroxidation may enable new approaches to cancer therapy (amplification of oxidation) or potential antioxidants (inhibition of oxidation). It is possible to recreate cell membranes in a controlled model environment for further study by using droplet interface bilayers (DIBs) which are two droplets with lipid monolayers in a solvent-like oil that form a lipid bilayer at their point of contact. Oxidation may be induced by including methylene blue within the droplets, which generates ROS in response to light. Regarding the information, what would occur when a DIB containing unsaturated lipids reacts with ROS generated from methylene blue? For the procedure, Lipid solutions of 4:1 DOPC: Cholesterol DIBs will be created containing methylene blue. After the formation of the lipid membrane, oxidation will be induced through light exposure and the degradation in the membrane properties will be measured as a function of the membrane energetics. These changes are then compared to control cases containing fully saturated lipids to isolate the influence of lipid peroxidation.

Optimal Design for Ordinal Categorical Regression on Milk Fiber Strength
Yiren Hou, CURO Summer Fellow, CURO Research Assistant
Dr. Abhyuday Mandal, Statistics, Franklin College of Arts & Sciences
Milk and clothing industries produce substantial waste. However, this wasted or expired milk can be reused through its constituent, casein, a milk protein. The milk fiber created from casein is a sustainable alternative to other textiles, and its strength is important for textile manufacturing. This research aims to find the optimal process for making solid milk fiber. Following environmental-friendly steps in creating the milk fiber, different additives are utilized in the dope that is used for fiber extrusion. These additives or predictors assigned with varying concentrations of weight are casein powder, nanofibrillated cellulose, beeswax, and corn protein zein. An orthogonal array-based Maximin design was identified for this project. Experiments were conducted following this plan. Qualitative observations of the extruded fiber were recorded and are classified as ordinal categorical response with three levels of strength. Under ordinal logistic regression, beeswax and casein exhibited greater effects on the strength whereas NFC had a quadratic relationship with the strength of fiber. This gave evidence to limiting and using appropriate constituents in dope for further investigation of the milk fiber, which includes using less weight concentration of beeswax, such as around 1 to 2 percent weight per weight and paying attention to cellulose weight concentration since too much or too little compared to the total weight concentration can influence the strength of the fiber. (Joint research with Dr. Abhyuday Mandal from the Department of Statistics and Dr. Suraj Sharma and Md Mazbah Uddin from the Department of Textiles, Merchandising, and Interiors)

Overall Ranking of Small Area Means using Bayesian Method
Yiren Hou, CURO Summer Fellow, CURO Research Assistant
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Methods that provide measure of uncertainty in estimating overall ranking of small area means are few compared to estimating individual ranks. Knowledge of uncertainty in overall ranking is useful for effective policy decisions. Motivated by Klein, Wright, and Wieczorek's (KWW) frequentist solution of uncertainty for an overall ranking of states based on 2011 average travel time to work using a joint confidence region, a hierarchical Bayesian method is developed to improve such expression and is applied to the same example based on data collected by the US Census Bureau. Posterior probability distribution of rank for an individual state and that of any rank over the states are created from an asymptotically optimal joint credible region for the vector of state means. Our nearly optimal credible region is constructed using noninformative prior; it has the same level of posterior coverage as the KWW method has, but the credible region is more "informative and compact". Using joint posterior distribution of the state means, the proposed Bayesian method provides probabilities of various ranks a state may have and that of various states may occupy a particular rank. Additionally, there is a significant reduction in the volume of the "elliptical" credible set for the vector of means compared to the "rectangular" frequentist confidence set. This improved method is found to be useful in other small area estimation applications such as ranking of counties within a state based on their poverty rates.

The Environmental and Economic Consequences of Fast Fashion: How SHEIN is Altering the Fashion Industry
Maisy Hufford
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This study aims to identify factors contributing to SHEIN's success and raise awareness around both the economic and environmental impacts of the fast fashion industry. Earlier this year, SHEIN officially became the largest fashion retailer in the world, producing between 2,000-10,000 articles of clothing daily. At the rate the fast fashion industry is growing, it is estimated that by the year 2030 roughly 132 million tons of textiles will be discarded annually. In this study, I will identify factors leading the college demographic to support the industry, evaluate the environmental and economic impacts of companies such as SHEIN, and create solutions to raise awareness around campus. With roughly half of SHEIN's audience demographic under the age of 30, my study begins by surveying the population of UGA undergraduate students to determine SHEIN's popularity here on campus. Additionally, I investigate eco-friendly alternatives to fast fashion that can be found locally or online. I believe that with proper education and the provision of alternatives, we can see both a shift in where Athens students choose to shop as well as the frequency students are shopping at.

Effects of Melatonin on Expression of Genes Related to Competence and Oxidative Status of Cumulus Oocyte Complexes Obtained from Postmortem Ovaries of Pregnant and Non-Pregnant Cattle
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Pregnancy outcomes obtained with in vitro produced (IVP) bovine embryos are low due to oxidative stress and reduced oocyte

competence. Melatonin is an antioxidant of the female reproductive system. The objective was to evaluate the effects of melatonin supplementation during IVM on the expression of genes related to oxidative status and competence of cumulus oocyte complexes (COCs) obtained from postmortem ovaries of pregnant and non-pregnant cattle. A total of 480 ovaries from pregnant and non-pregnant cattle were used. Follicles (3-8 mm) were aspirated using 18G needles and 12 mL syringes, and the COCs were submitted to IVM on six replicates (100 COCs each). During each replicate, 50 COCs from pregnant and 50 COCs from non-pregnant cattle were submitted to IVM (24h 38.5C, 5% C02) in media containing melatonin (0.01 nM; 25 COCs per well) or not (25 COCs per well). After IVM, total RNA was extracted and cDNA was produced by reverse transcription. Real time PCR was performed using specific primers for genes related to apoptosis (BCL2A-1), oxidative status (SOD1, GPX), and oocyte competence (OCT4, SOX2, GDF9, HAS2) using HPRT1 as an internal control. In COCs from non-pregnant cattle, melatonin tended to increase the mRNA expression of the antioxidant enzymes SOD1 (P=0.11) and GPX (P=0.12) as well as the oocyte competence gene HAS2 (P=0.08). However, melatonin did not increase the expression of the studied genes in COCs from pregnant cows. Melatonin may be a potential supplement to improve the oxidative status and competence of COCs collected from non-pregnant cattle.

Culturing MCF-7 and MCF-10A Cells for Development of a Cancer Detection Wicking Fiber Device

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Current cancer detection techniques employed by veterinarians rely on assessing a physical tissue sample from the patient, such as that obtained via needle biopsy, then analyzing the sample through pathology. This process can require follow up appointments, which delay treatment. Hence, a rapid test was envisioned to detect cancer cells in a tissue. Specifically, a wicking fiber device was proposed to separate cells in a chromatography-like manner, using differentiators of cell populations such as cell surface receptors and cell adhesion molecules. Fibers were produced and surface treated to increase their hydrophilicity and maximize wicking potential. Protocols were developed, using MCF-7 cancerous and MCF-10A noncancerous cells, to test the wicking fiber treatments. Further, standard operating procedures included housekeeping and cell labeling experiments to ensure that the cells are suitable for wicking, including passaging to establish new cell cultures and staining to allow for visualization of cell morphology. Wicking experiments were performed to analyze the efficiency of the fibers in separating cells. After fiber fabrication and surface modification, the wicking time was shortened to 6.5s and the cell distribution tripled on the top of the treated fibers compared to the untreated fiber controls. Ongoing experiments are focused on exploring the addition of a hydrophobic coating at the base of the fiber bundle to preferentially retain the noncancerous cells and maximize cell type separation.

Drug Discovery for Mucopolysaccharidosis Type IIIA

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Mucopolysaccharidosis Type IIIA (MPS IIIA) is an autosomal recessive disorder that impacts 1 in 70,000 children worldwide. MPS IIIA is classified as a lysosomal storage disorder in which patients have inherited mutations in the gene that encodes for the lysosomal enzyme N-sulfoglucosamine sulfohydrolase (SGSH). This enzyme is involved in catabolizing the cellular polysaccharide, heparan sulfate (HS), and a deficiency leads to intra-lysosomal storage and accumulation of HS, causing severe neurological implications in patients, including progressive dementia, behavior problems, hearing loss, decline in motor functioning, and often early mortality. To date, there is no cure for MPS IIIA, and current treatment strategies are focused on symptom management, thus demonstrating the need to find novel therapies. In our studies, we utilized high-throughput drug screening in human cells to investigate small molecule agents for their potential to reduce HS biosynthesis in cells as a form of substrate reduction therapy for MPS IIIA. We hypothesized that small molecule inhibitors of a key enzyme involved in HS biosynthesis, Exostosin-1 (EXT1), would reduce HS levels and lysosomal accumulation in MPS IIIA cells. To screen for inhibitors, we generated a CRISPR-engineered EXT1 reporter cell line to measure EXT1 expression upon treatment with an FDA-approved drug library. Top hits from the drug screen with >40% inhibition of EXT1 expression are currently being further validated for their impact on HS biosynthesis and lysosomal storage in patient-derived fibroblasts. Overall, these experiments could lead to a novel therapy for MPS IIIA and improve our knowledge about the causes of this disease.

Characterization and Comparison of Dipropylhexanediamine Incorporated Nitric Oxide Releasing Medical Grade Polymers with Varying Water Uptakes

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Blood-contacting medical devices are frequently challenged with thrombosis and life-threatening infections. Current treatments are becoming insufficient due to a lack of prophylactic action and the ever-growing antimicrobial resistance to common antibiotics. Nitric oxide (NO)-incorporated polymers present the opportunity for medical devices to be antimicrobial, antithrombotic, and opposed to resistances. In this work, we explore the effects of a medical-grade polymer's water uptake on NO release from a proton-driven catalyzed NO donor, dipropylhexanediamine (DPHD). The high levels of NO release and extended period of application can be applied to various polymeric medical devices (e.g., catheters, extracorporeal circuit tubing, etc.,) preventing bacterial adhesion, biofilm formation, platelet activation, and thrombosis on the medical device surface. The straightforwardness of application for this material on current polymeric medical devices presents a facile, beneficial commercial process to be adopted. Using an uncharacterized NO donor, known as DPHD, studies were conducted to examine the release mechanism and biological properties.

Next Generation Organoids: Root Vascularization and Accurate Organ Shape

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Organoids are 3D, miniature cultures made from stem cells or primary tissue that mimic the function of native organs, making them a useful platform to study the organ pathology of a disease or determine how drugs can impact a whole organ system. One issue in organoid culture is the development of a necrotic core because the diffusion of nutrients and oxygen through passive diffusion is limited to the periphery. Most organoids lack vascularization, which in-vivo is essential to supply nutrients, oxygen, and remove waste. Additionally, organoids are usually spheroid-shaped. However, in vivo, there is an immense variety in organ shapes across the animal kingdom. In the human body, there is evidence that organ shape dictates function. We aim to improve organoid function in three aims. First, I will learn the techniques to make several organoids and spheroids. Second, I will investigate the shape and dimensions of the human adrenal gland to bio-print 3D scaffolds in the ideal

adrenal gland shape and seed them with human stem cell-derived cells. The goal will be to compare such engineered organoids to the original organoids to determine if there is improved function. Third, to address the organoids' necrotic core, I will use an interdisciplinary approach to combine plant biology and stem cell cultures. I will use Arabidopsis roots as vasculature scaffolds that will be surrounded by the stem-cell derived cells to form organoids with improved nutrient/oxygen transportation. My ultimate goal is to optimize organoid function through accurate native shape and root-based vascularization.

Anti-microbial Coating on Urinary Catheters to Eliminate Bacterial Fouling

Maxwell Jani
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Antibacterial and antifungal coatings are an enticing approach to prevent infectious fouling of blood-contacting medical devices. Over one million cases of healthcare-associated infections (HCAIs) are reported in the United States every year, roughly 17% being catheter related. The most common source of HCAIs is the Staphylococcus family, which is associated with the formation of biofilms on these medical devices. To date, different variations of antimicrobial coatings have been examined including the use of metal nanoparticles, polysaccharides, hydrogels, and alloys. Each of these materials have benefits and disadvantages regarding their binding capability and antibacterial effectiveness. In this study, we evaluate antibacterial coatings and their ability to prevent catheter associated bacterial infections.

Lowering the Incidence of Nosocomial Urinary Catheter Biofilm Accumulation Through Antibacterial Coatings

Raymond Christopher Jarvis
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Urinary catheters are used in the hospital setting to control patients' urine output. This is done by inserting a small tube through the patient's urethra into their bladder and inflating a small balloon on the end to keep it in place. Urinary catheter-associated urinary tract infections (CAUTI) are one of the most common nosocomial infections, partly due to their long-term use. The risk of infection goes up 10% with each additional day the catheter is in use. These infections can go on to cause encrustation in the form of a biofilm layer inside the catheter lumen, leading to occlusion. This can lead to a number of complications including bladder stones, septicemia and endotoxic shock. CAUTIs also cause financial stress on hospitals. In 2019 alone, over 19,000 CAUTIs were reported, each of which cost the hospitals an estimated 896 dollars per incident. One way to address biofilm formation is to apply an antibacterial film to the catheter lumen. Recent studies have shown that silver nanoparticle-based coatings provide antibacterial and anti-encrustation properties, which ultimately reduce the biofilm accumulation and its associated complications. Our research will aim to explore other forms of metal-based antibacterial coatings that can be used to lower incidence of CAUTIs.

Overview of Variables Affecting Loss to Follow-Up in the Newborn Hearing Screening Process

Natalia Mia Jimenez; Margaret Hill; Madeline Franz; Mary Elizabeth David
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Newborn hearing screening is a critical first step in the process of identifying hearing loss. The Joint Committee on Infant Hearing (JCIH) recommends a 1-3-6 guideline, which includes screening by 1 month, diagnosis by 3 months, and entry into early intervention by 6 months. Meeting these goals allow for the most desirable outcomes, including communication and linguistic competence, for children with hearing loss. Although the United States is consistently screening 95% of babies in the hospital (initial screen), we have fallen short of the subsequent benchmarks, rescreen, identification and entry into early intervention. Social determinants of health oftentimes play a role in whether or not a family follows up after a failed newborn screening, but it has been unclear what the exact variables preventing this follow-up and potential identification of hearing loss are. To investigate this, we performed a systematic review of the literature to identify which social determinants of health could be the cause for this loss to follow-up. Results showed a range of variables that affect loss to follow-up. Knowing these specific social determinants of health will allow researchers to conduct future studies that further specify the impact of these factors on loss to follow up which could lead to a lower loss to follow up and better adherence to the JCIH standards ultimately leading to better outcomes for children with hearing loss.

Correlations between Parent Affect, Autonomy-Supportive and Controlling Behaviors in Elementary Math Learning

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In elementary school math contexts, children often seek assistance with their homework from parents, despite some parents' unfamiliarity with instructional strategies for complex topics like probability. Previous studies have shown that controlling and autonomy-supportive behaviors from adults during learning scenarios are detrimental and beneficial, respectively, to students' ability to learn. However, they have also shown that parents' emotional affect has the potential to mitigate some of these negative effects. In this study, 201 parent-child dyads were recorded playing a dice game intended to allow the parent to teach probability to their child. We investigated the frequencies of controlling/autonomy-supportive behavior, intensities of positive/negative affect, and relationships between all four of these variables. There was a very strong correlation between controlling behavior and negative affect, as well as between autonomy-supportive behavior and positive affect. Controlling and autonomy-supportive behavior had a slight negative correlation, while positive and negative affect had none. Understanding how adults tend to express their emotions in association with certain behaviors may help better explain why controlling/autonomy-supportive behaviors have previously been shown to affect children's learning. This consideration brings nuance to the idea that specific behaviors are unilaterally helpful or harmful, and suggests that adults' implicit social cues may play a significant role in the efficacy of their explicit behaviors.

Cerium Oxide Nanoparticles: A Thermodynamic and Colorimetric Study of their Effects on Cellular Metabolism

Stephen Joseph & Maxwell Jani
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The accumulation of reactive oxidative species beyond the neutralizing capacity of cells results in oxidative stress, which is associated with various health conditions. Cells often use ROS decomposing enzymes to combat this stress, such as superoxide dismutase and catalase. Nanoceria has been shown to function similarly to these enzymes and can assist in reducing oxidative stress. The goal of this experiment was to examine the effect of nanoceria on cells from a thermodynamic standpoint, and compare it to another well-known antioxidant. We hypothesized that treating

cells under oxidative stress with nanoceria would return their heat generation to normal levels at a more efficient rate than other antioxidants. Isothermal microcalorimetry in a closed ampoule was employed to measure the heat output of RAW264.7 cell line murine macrophages, which were cultured in supplemented DMEM. Heat output for the healthy cells was established using a TAM-III isothermal microcalorimeter, before it was also measured for cells under oxidative stress. Additionally, a colorimetric assay using Trolox, a well-known antioxidant, was conducted to compare it to nanoceria. The heat flow in cells under oxidative stress was considerably lower, and the results of the colorimetric assay were consistent with this finding. However, the colorimetric assay revealed that Trolox was more effective than nanoceria in its antioxidative capabilities. Although the results did not fully elucidate the reactions of nanoceria in cells, they established a foundation for future studies. Examining the thermodynamic response of cells to nanoceria can assist in evaluating its medical applications.

Predicting Chemotherapy Resistance from Biomarker Expression and Underlying DNA Mutations

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Cancer is a genetic disease where 6-10 "driver mutations" accumulate over 10-20 years, causing uncontrolled growth in human tissue. Since the 2001 Human Genome Project, these extensively studied mutations have been found to disrupt "tumor-suppressor" genes, which limit cell growth and activate "oncogenes," which accelerate cell growth. Although the role of these mutations in cancer development is well-known, their role in how cancer responds to chemotherapy is controversial. Cytotoxic chemotherapies act by inducing cancer cell death; however, they can also activate stress-response pathways that lead to drug resistance. This study explores how these stress-response pathways interact with driver mutations to produce variations in chemotherapy sensitivity. Our approach applies machine learning to genomic screening data to determine the logic behind malignant cellular responses to doxorubicin, a widely used anthracycline chemotherapy. We developed a model that predicts doxorubicin sensitivity for a particular cancer line. In addition to the expression of stress-related biomarkers, the model incorporates the TP53 mutations, a tumor suppressor mutation found in around 50% of all cancers. The model captured a significant proportion of sensitivity variation after taking both expression and mutation into account. This suggests that genetic and epigenetic mechanisms act parallelly to determine cancer-specific drug responses. To validate model predictions, the expression of clinically significant biomarkers will be modified in lines with varied TP53 mutation statuses. This follow-up experimentation will help produce biologically relevant insights into the genetic landscape of chemotherapy resistance, informing the development of diagnostic tools that select personalized chemotherapeutic regimens for patients.

Students' Experience of the Transition from Online to In-Person Teaching-Learning During the Covid-19 Pandemic

Sanika Joshi
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During the Covid-19 pandemic, universities had to divert the teaching-learning methods that exposed students to a new learning environment by imposing in-person to online or hybrid instruction. This sudden change caught many students and instructors off guard and instigated changes in learning. In fall 2021, many courses transitioned to hybrid or entirely in-person instructions. This study collected data using an online survey to grasp the expectation vs. the reality of how the transition affected students. Undergraduates in introductory STEM classes were asked about their learning experiences during and expectations after the pandemic. In this poster, we compare students' pre and post-pandemic learning experiences, stress levels, and performance to understand further what teaching methods are effective and what aspects of the transition helped students the most. This comparison will help instructors identify what aspects of in-person teaching are helpful and incorporate the tools of online education students liked best.

Transcription Factor GATA4 Acts as a Regulator of Heparan Sulfate Biosynthesis in Hepatocellular Carcinoma Cells

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Heparan sulfate (HS) is a long, linear polysaccharide that is covalently linked to proteoglycan core proteins at the cell surface and in the extracellular matrix of all animal cells. These complex carbohydrates are involved in many important biological processes, including development and cell signaling, due to their ability to bind growth factors and other protein ligands. While much is known about the biosynthesis of HS, the mechanisms by which HS is spatiotemporally regulated remain poorly understood. The aim of this work is to define transcriptional regulatory mechanisms of HS assembly. We used the bioinformatics tool, LISA, to mine publicly available cistrome data and identify regulatory factors enriched at the promoters of genes involved in HS assembly. The top hit from this analysis was GATA4, a member of the GATA family of zinc finger transcription factors. We targeted expression of GATA4 using a silencing RNA in a human hepatocellular carcinoma (HCC) cell line, Hep3B, to assess this factor's role in HS biosynthesis. Quantitative PCR and flow cytometry experiments revealed alterations in expression of multiple HS biosynthetic enzymes, such as HS3ST1 and HS6ST3, as well as specific HS proteoglycans, including perlecan and agrin. Ablation of GATA4 expression in HCC cells also resulted in an increase in anti-thrombin III binding and changes in the overall level of cell surface proteoglycans. Collectively, our results suggest that GATA4 regulates HS fine structure and proteoglycan expression. Future experiments will delineate the molecular mechanisms of regulation and downstream impact on human disease.

Uterine Epithelial Estrogen Receptor α Conditional Knockout Mice Have Defective Uterine Fluid Regulation during Early Pregnancy

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During early pregnancy, uterine fluid volume in the uterine cavity is dynamic. Ovarian hormone estrogen stimulates uterine fluid accumulation, while progesterone reduces uterine fluid volume. Estrogen mainly acts via estrogen receptor alpha (ERα/Esr1) in the uterus. ERα is present in different uterine compartments, including uterine epithelium, stroma, and myometrium. Recent publications have demonstrated that mice with uterine epithelial deletion of ERα (epiERαKO / Esr1fl/-Wnt7aCre/+) have reduced uterine fluid and cannot liquify semen for fertilization on day 0.5 post-coitum (D0.5) ultimately leading to infertility. However, the mechanisms involved remain unknown. Our lab established the same epiERαKO mouse model with Esr1fl/fl females as the control. In our preliminary study, Esr1fl/fl females and epiERαKO females were mated with males. On D0.5, the mated females were dissected. We observed that Esr1fl/fl uteri were distended and filled with clear uterine fluid while the epiERαKO uteri were not distended and often had viscous content within. Histological analysis of D0.5 uterine cross sections showed epiERαKO mice had altered LE morphology. Our lab developed a specific technique to observe uterine fluid absorption in the Esr1fl/

fl and epiERαKO mice. This technique uses intraluminal injection of Alexa hydrazide (AH), a fluorescent dye that enters the cell via osmotic gradient to fluoresce LE cytoplasm. Preliminary data suggests epiERαKO mice have increased fluorescent LE cells on D3.5. We will expand the AH injection dataset and investigate proteins involved in fluid movement. Our research will fill the knowledge gap of the molecular mechanisms of ERα in regulating uterine fluid movement during early pregnancy.

Using minION™ Sequencing to Improve Avian Infectious Laryngotracheitis Virus (ILTV) Genotyping Assays

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Infectious laryngotracheitis (ILT) is a respiratory disease of poultry caused by Infectious laryngotracheitis virus (ILTV) a double stranded DNA virus that belongs to the Herpesviridae family with a genome range of 150 to 155 kilo base pairs (kbp). The purpose of this research is to improve ILTV genotyping assays by increasing the genome coverage and sequencing depth from a clinical sample while maintaining and discriminating among the six known genotypes of ILTV. The current genotyping method relies on multiallelic PCR Sanger sequencing which covers around 4 kbp of the genome. Compared to Sanger sequencing, minION™, a next generation sequencing method developed by Oxford Nanopore Technologies (ONT) (Oxford, UK), generates greater sequencing depth. Sixteen overlapping primers pairs were designed to amplify 13 kbp of the viral genome in a multiplex PCR and library preparation for minION™ sequencing followed ONT's protocols. To validate the multiplex PCR minION™ genotype assay, three viral stocks that belong to known genotypes II, IV and V, and two viral stocks that belong to genotype VI were tested. The sequence reads from the minION™ provided a coverage of 13 kbp and an increase in depth which ranged from 50,000 to 83,000 reads per sample. Sequence reads were curated into a consensus and compared to known ILTV sequences. All five samples were correctly genotyped and provided greater coverage and sequencing depth compared to Sanger sequencing. For future research, applying this technology to clinical samples will help to monitor and identify current and new strains of ILTV.

Expectation Versus Reality: How Crisis Statement Essentials Are Evaluated by Gen Z Stakeholders and Crisis Managers

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Crisis statements are among the most essential writings for an organization responding to a crisis incident, setting the initial stance and laying the first layer of communicative foundation for managing publics' expectations and organization-stakeholder relationships. This study compares similarities and differences in the "essentials" of an initial crisis statement as perceived by crisis managers and Gen Z stakeholders. The "essentials" refer to what individuals consider necessary in an initial statement from an organization. We conduct an online survey among crisis managers (based on a large communication trade publication's subscribers) and Gen Z individuals (based on a large university's student population). Participants of both groups are presented with an organizational crisis scenario and asked to prioritize what they regard as "most essential" elements in a crisis statement through point allocation. Crisis "essentials" include: leadership, mission statement, action steps, statement of the crisis, expert quote, timeline, parties involved, crisis history, attribution, apology, and further information. This study gauges differences between Gen Z crisis communication expectations (what an organization should do in their eyes) and crisis managers' assessment of crisis communication realities (what an organization can do based on threat and resource assessment), assessing (1) how future generations of business and communication leaders prioritize crisis communication essentials, and (2) how expectations of aspiring professionals and current professionals differ. Findings of this comparative assessment provide crisis managers insight for understanding Gen Z stakeholders' expectations in organizational crisis communication and identify opportunities for expectation management by closing the gap between decision-making and responsible public communication.

Antibacterial Properties of Nitric Oxide Releasing Hydrophilic Polymers Surface

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Hospital-acquired infections (HAI) are a major cause of illness among patients in the U.S., accounting for over 100,000 deaths yearly. These infections are often caused by bacterial colonization of introduced foreign objects in the body, such as implanted medical devices. Thus far, the leading treatment for HAIs is antibiotic regimens, often ineffective due to antibiotic-resistant bacterial strains. To address this issue, we developed a novel nitric oxide (NO) releasing polymer using polyethyleneimine (PEI) to prevent the initial infection of nosocomial bacteria. PEI is a hyperbranched molecule, which was conjugated with nap-thiolactone (NAP) and nitrosated to create the Nitric oxide (NO)-releasing PEI-SNAP molecule. NO is known to have antibacterial properties, making it favorable to supplement implantable medical devices and combat associated bacterial infections. We blended the PEI-SNAP molecule into three synthetic hydrophilic polymers of differing water uptake potentials and determined the best pair for longevity of NO release. Hydrophilic polymers are hemocompatible and have anti-fouling properties, thus resisting bacterial adhesion. We tested the PEI-SNAP blended polymers for cytocompatibility, NO release, and bacterial adhesion to determine efficacy in resisting bacterial formation. In previous studies, researchers have had little success in combining NO donors with hydrophilic polymers due to the inability of these polymers to retain the donors. The branched pattern of PEI-SNAP makes the molecule extremely bulky, decreasing its likelihood of being leached out of the polymer. We envision this novel polymer to retain the PEI-SNAP molecule and have extended NO release, thus increasing its antibacterial properties.

Venturia canescens and Virus-Like Particles

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Venturia canescens are parasitic wasps that produce virus-like particles (VLPs) in a specialized region of their ovaries, called calyx cells. These VLPs are composed of wasp-derived virulence proteins enclosed in an envelope of alphanudiviral origin, the genes of which are integrated as endogenous viral elements (EVEs) in the wasps. Each VLP contains virulence proteins of eukaryotic origin and differs from other nudivirus-wasp systems in that they do not contain nucleic acids. These VLPs are injected into the host caterpillar, Ephestia kuehniella, alongside the wasp's eggs during parasitism. The function of each specific virulence protein is unknown. However, it is hypothesized that the VLPs work inside the caterpillar host to cloak the wasp's eggs from the host's hemocytes to avoid detection and destruction of the eggs by the host's immune system. Three proteins of host origin have been identified within the VLPs, but it is unknown whether these proteins are the only ones packaged in the VLPs. We have utilized techniques including genomic analysis, comparative transcriptomics, proteomics, and RNAi to investigate

the composition of these VLPs and to determine the role of the vlp proteins in the cloaking mechanism. We hypothesize that there are more than three vlp proteins, and that these proteins may not play as significant of a role in hemocyte evasion as previously thought. This investigation will further the understanding of the host-parasitism relationship between the Venturia canescens and the caterpillar hosts, as well as the relationship between the Venturia canescens, EVEs, and VLPs.

Structural and Functional Analysis of pZX-like Spore Glycan in Priestia

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Sporulating cells of pathogenic Bacillus species belonging to the cereus group produce an exopolysaccharide called pZX. The pZX operon, chemical structure, and enzymes involved in its production were recently discovered in our laboratory. A related group of non-pathogenic Priestia species contain a similar operon with a slight difference. The spore's glycan structure produced by Priestia is coined pZX-like glycan and is the focal point of this research. I will first discuss the organization of pZX operon from Bacillus cereus with Priestia strains. Next, I will present progress to identify and compare pZX from five Bacillus cereus strains with pZX-like from three different Priestia strains. For the isolation of pZX, all bacteria were grown in nutrient medium Msgg-2. Analysis of pZX and pZX-like glycans is carried out after hydrolysis and sugar derivatization by mass spectrometry (MS) using GC-MS. A separate analysis of pZX sugar precursors is carried out by LC-MS analysis. The first round of spore glycan purification and analysis showed promising results, with XylNAcA appearing as a main sugar signal on the GC-MS in the B. cereus strains but not in Priestia as expected. This confirms the hypothesis that Priestia strains have a slightly different spore glycan structure. Isolation and structural analysis of Priestia pZX-like glycan will require further work. As spores are the vehicle of disease infection in this class of pathogenic bacteria, this research will allow for a more in-depth analysis and functional look at the role of the pZX-like glycan in the sporulation mechanism in the future.

Got Caffeine? The Association Between Caffeine Intake and Walking Levels Among UGA Students

Madeline Catherine Kerestman
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Iced coffee, soda, and energy drinks… What is something that all of these beverages have in common? They all contain significant levels of caffeine. The natural stimulant is often used to promote wakefulness and fight feelings of tiredness. Rigorous academic coursework, busy schedules, and other life stressors leave college students as the perfect candidate for regularly consuming caffeine. This cross-sectional study examines caffeine intake/consumption and its association with different health behaviors. We hypothesized that students with higher average walking levels would consume more caffeine, on average, than students with lower walking levels. A sample of college students was recruited from the University of Georgia beginning in spring 2023. Participants self-reported demographic factors, daily caffeine intake, intentions, physical activity levels, and academic background. The preliminary findings suggest that nearly three-quarters (72.6%) of the sample (~350) consume caffeine on a daily basis. Most students either consume it once (33.7%) or even twice daily (32.0%). This study contributes to idea that physical activity levels may be impacted by different levels of caffeine consumption. Future studies should explore these research questions on different college campuses throughout the United States or in different age populations.

Race and Motherhood in Politics: How News Media Coverage Differs Based on Intersecting Identities

Lilly Kersh
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Women running for office, especially mothers, have different experiences in the media than men, which can be further analyzed with an intersectional lens on racial identity. This paper researches the difference in news media coverage received by Black and white mothers campaigning for office by comparing the experiences of candidates in the 2022 Georgia District 7 Democratic primary for the U.S. House of Representatives. Through an analysis of this race, this paper tests if women receive negative coverage on their motherhood status and investigates the difference in coverage between Black mothers and white mothers. The results found almost no negative coverage of the candidate's personal information, gender identity, or motherhood status. However, Lucy McBath, a Black mother in the primary, received much greater mention of her status as a mother than Carolyn Bourdeaux, a white mother running against her. The results suggest that motherhood may play a larger role in news media coverage for Black women than for white women, as this identity may be more relevant to the campaigns of Black women. This implies that Black women politicians have unique experiences in the media and in politics that focus on their personal experiences and identities, which may affect political outcomes.

The Populist Radical Right: A Threat to Human Rights

Hannah Kesner & Inaara Lalani
Dr. K. Chad Clay, International Affairs, School of Public & International Affairs

Recent years have seen the rise of populist radical right-wing leaders in government, specifically in democratic countries. These leaders are often characterized by their discriminatory behavior and blunt rhetoric toward minority groups and groups they perceive as the "other." In this research paper, we aim to understand the effect of populist radical right leaders on a democracy's respect for human rights and if certain democratic structures aid them in implementing that effect. We argue that presidential democracies with populist radical right leaders, due to their structure of government and prominence of a majority political party, abuse human rights more than parliamentary democracies with similar leaders. To execute this research, we will look at populist radical right leaders who gained power from 2000-2020 and examine their effect on the right to impartial enforcement and respect for civil liberties such as freedom of discussion, religion, and academic and cultural expression.
We expect to find that presidential democracies with populist radical right leaders abuse human rights more than parliamentary democracies, as the combination of authoritarian and nativist ideals and majority party rule allows the leader to exert more influence over the country. This work is essential in understanding which institutions or political structures allow these leaders more executive power to intentionally focus human rights advocacy to governments with that structure.

Effect of Pecan Consumption on Perceived and Physiologic Appetite Control

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Tree nuts have been proven to be satiating, yet no studies have examined how pecan consumption affects appetite in older adults. To examine the effect of a pecan-enriched diet on physiologic and subjective appetite. This is a randomized control trial of 44 older adults (50-75y). Participants consumed 68g pecans daily (PECAN;

n=21) or abstained from nuts for 4 weeks (CON; n=23). At pre- (V1) and post-(V2) diet visits, subjective and physiological appetite were measured using 100mm visual-analog scales and blood samples taken at fasting and every 30min for 4h following a high-fat meal. Energy intake (EI) at an ad libitum buffet meal was also assessed. From V1 to V2, fasting (PECAN:77.0±4.6 to 93.5±6.1 vs. CON:76.0±5.0 to 72.5±5.0pg/mL; p=0.01) and postprandial satiety hormone peptide YY (PYY) increased more for PECAN vs. CON (p=0.04). Subjective appetite ratings improved from V1 to V2 for both groups, with no differences between groups. However, peak desire to eat was suppressed for PECAN vs. CON (PECAN:67.9±4.6 to 57.1±5.2 vs. CON:61.9±4.2 to 60.6±4.3mm; p=0.04). Further, increased fasting PYY for pecan correlated with postprandial suppression of prospective consumption (r=-0.55, p=0.02) and overall appetite (r=0.51, p=0.03). Change in EI showed a trend between groups, with an increase of 137±86kcal for CON vs. -45±77kcal for PECAN (p=0.11). A 4-week pecan-enriched diet improved secretion of the satiety hormone PYY and reduced appetite intensity, potentially influencing EI in older adults. Thus, the inclusion of pecan in the diet may be important for appetite control in aging adults.

Effects of Different Eye Movements on Motion Perception and Interceptive Timing

Asher Riaz Khan
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We use different eye movements to aid in perceiving our environment and performing skilled actions throughout the day. This can be exemplified through athletics such as baseball, where the batter must keep his eye on the ball and estimate the speed of the approaching object to contact it with the swing of their bat. In addition, swinging the bat may simultaneously lead to improved estimated of the ball's speed. In the present study, we evaluated how different types of eye movements influenced both motion perception and interceptive timing. Participants were invited into a laboratory setting where they would take part in an experiment. In the Move condition, participants used their index finger and try to intercept a moving target within a marked interception zone. In the Perception condition, participants did not move their hand but rather just followed the target with their eyes until it reached the interception zone. The target moved at varied velocities across trials. At the end of each trial, participants were asked to rank the speed of the target. We hypothesized that rating of target speed would be more accurate in the Move condition relative to the Perceive condition. Also, we hypothesized that speed ratings would become more accurate over time as the task is repeatedly performed, and the rate of improvement would be greater for the Move condition. This could possibly be because physically intercepting the target requires more input from the user which means that the participants were more engaged during the conditions.

Entrained Auditory Stimuli Presentation Decreases Dual-Task Cost

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Dual-task methods reveal gait parameter alterations as individuals walk while encoding words into long-term memory. Factors that mitigate gait costs are understudied. Entrainment research suggests that the synchronization of cognitive processes and motor movements may alleviate dual-task costs and encourage gait stability. To evaluate how the predictability of word presentation affects gait pattern. We hypothesize that gait variability will be more stable when word presentation is synchronously timed to step pattern than when word presentation is unrelated to step pattern. METHODS: A within-subjects counterbalanced design, 21 young adults (22.56 y/o; 64% F) walked on a treadmill at a preferred pace (< 3.0 mph) while listening to lists of words presented via headphones. A 40-item word list was presented in two trials during each session; each trial lasted ~ 4 minutes and was separated by ~ 2 minutes. Sessions were separated by 24 hrs. In one session (predicted), a word was presented every fourth step; in the other session (unpredicted), a word was presented randomly between 2 and 6 steps. Using commercial insole sensors, 10 gait parameters were measured during dual-task testing and a baseline walking session. Gait parameters were indexed via coefficient of variation (CoV). Data were analyzed using linear mixed modeling and post hoc pairwise comparisons. Significant differences ($p<0.05$) were seen across conditions in swing phase, single support, and stance duration. Gait during the predicted condition was more stable when compared to baseline and the unpredicted condition, as shown by consistently negative CoV mean differences. Dual-task costs were greatest when words were presented unpredictably while walking at a preferred pace. CoV difference scores suggest that predicted word presentation resulted in superior gait stability when compared to baseline and unpredicted gait measurements. The findings support entrainment theories of movement, which predict that auditory-motor coupling will stabilize the gait cycle.

Russian Iconography in Hollywood and Its Impact on Media Consumers

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Dr. Olga Thomason, Germanic & Slavic Studies, Franklin College of Arts & Sciences

Russian stereotypes have always been prevalent in film, dating back to the Pre-Cold War era where Russian characters were portrayed as savages. Due to the hostilities between Russia and the United States during the Cold War, those character stereotypes have shifted from an exotic otherness to a more violent, terroristic disposition. For instance, the crazy Russian cowboy buffoon in Rhythm on the Range (1936) changed to an unemotional assassin in The Living Daylights (1987). This study will analyze the effect of Hollywood's representation of Russian characters on media consumers and their knowledge on the Russian culture. The goal is to investigate Russian character archetypes in the three main movie franchises — James Bond, Fast and Furious, and Marvel (along with other randomly selected standalone films that were filmed during the post-Cold War period) — and to determine the impact that these characters have on viewers. Having examined previous studies on Russian stereotypes in Hollywood movies, this project will carry out a survey evaluating the participant's reactions to selected movie clips with Russian characters to obtain further in-depth understanding on participant's knowledge and perception of the Russian culture and its people. The prediction is that a continuous exposure of media consumers to a one-dimensional character will lead to assumptions that Russians in real life will act similarly to the movie characters. For example, if participants watch a clip from Golden Eye (1995) that shows a Russian villain constantly drinking alcohol, they would likely assume that alcoholism correlates to being Russian.

Crystallization of Serine Hydroxymethyltransferase from Thermus thermophilus

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In lab, I have grown, crystallized, and modeled several confirmations of serine hydroxymethyltransferase (SHMT) from Thermus thermophilus (Tth), a thermophilic bacterium that is widely used in biotechnology research. SHMT is part of the folate cycle in the cell, which is correlated with rapid cell growth due to its role in the synthesis of purines and pyrimidines. Generating the precise molecular structure of Tth SHMT may lead to the creation of

inhibitors that slow or prevent the growth of bacteria during certain steps of a biotechnical process. X-ray crystallography is a technique in which researchers shoot a beam of x-rays at a crystallized biomolecule, resulting in the scattering of the x-ray beam. They then analyze this diffraction pattern using a computer to generate the precise location of amino acids, ligands, and other molecules within the enzyme. By analyzing the positioning of the enzyme in each conformation, researchers can predict chemicals that may inhibit the enzyme.I have finalized two confirmations - Folinate-SHMT and PLP-Gly-SHMT - with a third being modified currently - the SHMT enzyme alone. We have collected data on PLP-Gly-Folinate-SHMT as well. The binding of folate to the apoenzyme is an interesting event as typically the enzyme requires the binding of the coenzyme PLP before a substrate may bind. In the future, I plan to finalize all current structures and maybe collect PLP-SHMT and even Gly-SHMT if possible. After the structures are finalized, I will perform kinetics experiments to gain a better understanding of the rate of the bindings of each substrate.

Predicting Cis-Regulatory Interactions in the Human Kinome through Structural Prediction Models

Nathan Kleber

Dr. Natarajan Kannan, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Although our understanding of the human kinome has greatly improved in recent decades, our knowledge of the structure of kinases and the impact that this structure has on intermolecular and intramolecular (cis-regulatory) interactions is still very limited. If we are able to find a systematic way to elucidate these interactions in a structural and biological context, then our ability to understand and treat numerous diseases will be greatly augmented. If we are able to predict high-confidence kinase/substrate phosphorylation interactions and evaluate the plausibility of these interactions using structural models, we can hopefully generate meaningful predictions for novel phosphorylation interactions in a structural context. With our current, most refined approach, we have filtered and sorted through millions of potential interactions to identify only those in which the active site of a given kinase has a high likelihood to undergo a phosphorylation interaction with another region within that same kinase. We are now in the process of generating and analyzing structural prediction models, and we hope that this process will prove effective for discovering previously unknown cis-regulatory interactions or explaining known interactions in a structural context within the human kinome, both of which would have major implications for the treatment of diseases such as cancer.

"It's a social thing that brings us together" A Qualitative Study of Peer Influence and Substance Use in College

Ethan Korn

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Substance use poses a significant threat to college students' wellbeing in the U.S. While existing literature suggests that peers can shape one's substance use, it does not fully explain the specific mechanisms of their influence. Building on the social learning theory, this study investigates the process by which peers influence students' substance use behaviors at college. Eleven current college students were interviewed about their substance use behavior and peer groups. The transcripts were analyzed for common themes. Findings indicate that the college social environment primes students to use substances because parental control largely disappears and substances are readily available. Participants used substances, most commonly alcohol, socially and sought social rewards from their peers. Moreover, they adjusted their substance use to align with their perception of their peers' norms, attitudes, and behaviors. The primary reasons for quitting or reducing substance use were experiencing strong negative outcomes and changing peer groups. Accordingly, substance use in college may be understood as a learned social behavior that can be reinforced and deterred. This knowledge can be used to create policies and interventions to reduce substance use among college students.

Development of an In Vitro Bone Metastatic Niche for Assessing Early-Stage Interactions of Osteoblasts and Metastatic Breast Cancer Cells

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Understanding breast cancer metastasis in bone is an ongoing challenge in breast cancer treatment. The vicious cycle between osteoclasts and tumor cells in bone metastasis is well studied; however, there is little understanding of the role of osteoblasts. We seek to build an in vitro biomimetic bone niche using a polymer composite. The composite comprises polylactide with varying concentrations of embedded tricalcium phosphate (β-TCP) granules. The aim of this study is to optimize the composite for the attachment of two different cell types, MC-3T3 osteoblasts and MCF-7 metastatic breast cancer cells, in preparation for studying the interaction of the two cell types. The two cell types were cultured independently on varying concentrations of the composite and stained for cell counting. Cell attachment increased with an increased concentration of β-TCP; the 60% β-TCP composite had the highest cell number of both cell types. To understand these results, a water contact angle study was performed. The results showed the angle decreased as the percent β-TCP increased, with 60% β-TCP having the lowest water contact angle. Composites with a β-TCP concentration greater than 60% were brittle and inhomogeneous and thus deemed unsatisfactory for use. Further studies will now be conducted to measure the proliferation rate of co-cultured cells and observe cell-to-cell interactions between the bone and tumor cells on the 60% β-TCP composites.

Social Polarization and Parent Support for Child Physical Activity and Cardiovascular Health

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Dr. Allan David Tate, Epidemiology & Biostatistics, College of Public Health

Determinants of physical activity (PA) occur at individual, household, and neighborhood levels yet little is known about how geospatial risk factors (neighborhood segregation and income inequity) interact with parental influences on child PA. The study explored associations between index of concentration of extremes (ICE) and child cardiovascular health outcomes, and whether parent PA and parent support of child PA modified associations with multivariable linear regressions. A subsample of parent-child dyads from the Family Matters Phase II cohort study (n=350) participated in a multi-method follow-up study in Minneapolis-St. Paul, MN (2019-2022), including survey of parent self-reported PA, child PA, parent support of child PA, and sociodemographic characteristics; geospatial data; and clinical biomarker data of children's height, weight, pulse, and systolic [SBP] and diastolic [DBP] blood pressure. ICE was operationalized into tertiles: concentrated deprivation, middle, and concentrated privilege. Increased parent engagement in light- and moderate-intensity PA (~30-45-minute increments) were associated with -2.65 mmHg lower child DBP ($P<0.001$) and -2.39 mmHg lower SBP ($P=0.001$) in least privileged tracts. The overall interaction of the relationship depended on census tract privilege (Int. $P=0.014$), without evidence of a favorable parent PA relationship in medium and most privileged tracts. Parent limiting of screen time had favorable interaction effects for child moderate PA in medium

privilege tracts but not at the extremes (Int. P=0.024). Interventions targeting structural disadvantages should consider multilevel components integrating parent support and modeling of PA to address cardiovascular health disparities in pre-adolescent children. In privileged contexts, alternative interventions may be needed to improve child PA.

A Moving Watercolor Illusion

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The watercolor illusion (WCI) was first demonstrated by Pinna and colleagues in 2001. Since then, the strength and spread of the WCI have been tested in numerous static conditions, most recently by Hale and Brown (2021). The aim of the present study was to determine if the WCI could be replicated in spatiotemporally dynamic stimuli, and if so, to gain insight into how global context and local surface and edge properties might constrain or enhance such spreading. To accomplish this, we measured the strength and spread of the WCI using motion-induced contour (MIC) stimuli first described by Klymenko & Weisstein (1981) and recently revisited by Erlikhman & Caplovitz (2018) and colleagues (2019). When an outlined cube is rotated back and forth in depth minus the line representing the front corner, an illusory corner is perceived. Removing the lines representing the cube's sides and top edges creates a simpler MIC stimulus, two chevrons with illusory contours visible along their sides perceived as two rotating illusory surfaces and the MIC. To test for a moving WCI, simpler versions of MIC stimuli were constructed with purple lines and an inner orange fringe along all or part of the purple lines. We also tested simpler versions where the orange fringe extended out alone, past the purple lines, creating local regions where the WCI should not occur. Participants rated WCI magnitude on a 7-point scale, then indicated where orange color was perceived. For all versions, participants reported the WCI between the orange fringe bordered by purple lines, establishing a moving WCI. Interestingly, the WCI was perceived between the orange fringe in versions where it extended beyond the purple lines, suggesting that the global context influenced the color filling-in to the point of overriding the necessity of adjacent purple lines, contrary to the WCI literature.

The Acquisition of VAC Patterns by L2 English Learners from L1 Mandarin Chinese and L1 Japanese Backgrounds

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The present study investigates the patterns in Verb-Argument Constructions (VACs) produced by L2 English learners from L1 Mandarin Chinese and L1 Japanese backgrounds. We compare written production in writing samples from the EF-Cambridge Database – a large corpus of learner language, with data from the British National Corpus (BNC) and the Contemporary Corpus of American English (COCA). We opt for two monolingual corpora to account for pedagogical differences in English instruction in China and Japan. The two L1s were chosen due to their typological distance from English as well as from each other. We expect that the strictness of verb+preposition/particle constructions will have an impact in L2 acquisition. Strictness is defined as the number of prepositions/particles that can acceptably collocate with a verb. Japanese allows very limited particle-per-verb associations while Chinese does not display similar restrictions. We posit that speakers of a language with strict verb+prepositions in VAC constructions, such as Japanese, will demonstrate VAC patterns of production that are more similar to those of monolingual English speakers than Chinese learners. We hypothesize that this occurs due to crosslinguistic influence and positive transfer from the L1.

Nitric Oxide Release from S-Nitroso-N-acetylpenicillamine through Cerium Oxide Nanoparticles

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Hospital associated infections (HAIs) are one of the leading causes of patient illness in the United States, with 31 cases being reported daily. In an effort to combat this, this project is looking at using nitric oxide (NO) as a way to reduce microbial resistance in catheters. Cerium oxide has previously been shown to be an effective fungicidal agent. The goal of this project is to see if the combined use of cerium oxide (nanoceria) with a NO releasing compound S-Nitroso-N-acetylpenicillamine (SNAP) will help increase the range of antimicrobial capabilities of these newly created films. The films will be made by adding SNAP to an Elasteon polymer and dip coating it in nanoceria solutions of different concentrations. The material characterizations of these films will be done through nitric oxide analysis (NOA), SNAP and nanoceria leaching, and contact angle analysis. We expect that there will be steady NO release from the control and experimental films, and that there will be little SNAP and nanoceria leaching. These characterizations will ensure that the surface of the new material is functioning as intended with minimal structural changes and maximum longevity. The biological impact of these films will be tested through in vitro bacterial adhesion assays and cytotoxicity assays. We expect that the new material will be an antimicrobial agent to both gram positive and gram negative bacteria. Furthermore, we anticipate that the combination of nanoceria with SNAP will prove to not be cytotoxic to mice fibroblast cells.

Developing a Three-Dimensional (3D) Printed Piezoelectric Breast Cancer Bone Metastasis Model

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Bone has been identified as the most prevalent site for breast cancer metastasis; however, the cause is not fully understood. The mechanosensitive property of bone cells has been shown to play an important role in breast cancer metastasis to bone. In vivo, bone tissue experiences mechanical loading and creates electrical signaling as a result of this piezoelectric effect. Evidence suggests that breast cancer cells undergo increased proliferation and migration in the presence of electrical fields caused by the electrical signaling of bone cells. Three-dimensional (3D) in vitro models are widely used in cancer research; however, current models lack this piezoelectric component. To better understand the process of breast cancer metastasis to bone, it is essential to have an accurate, biomimetic model that mimics the in vivo signaling, which may be accomplished by introducing a piezoelectric polymer into the model. This study aims to develop a 3D in vitro piezoelectric breast cancer bone metastasis model to more accurately observe the interactions between breast cancer cells and the bone microenvironment. Our model consists of a 3D-printed scaffold made of polycaprolactone, demineralized bone matrix, and polyvinylidene fluoride (PVDF). Preliminary studies were conducted to determine the piezoelectric properties of PVDF-loaded scaffolds. Results showed that piezoelectric properties increased when precipitation printing was used for scaffold fabrication, as correlated to the presence of increased b-phase PVDF peaks when assessed with FTIR. Ongoing work will include the development of protocols for fabricating the 3D composite model and investigating breast cancer cell behavior with and without electrical stimuli.

Developing a Series of Intrabodies to Selectively Inhibit Atypical p38 MAPK Signaling

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Mitogen-activated protein kinase (MAPK) p38 is a key protein in a variety of cell signaling activities. Typically, p38 signaling is triggered by a three-tiered MAPK phosphorylation cascade. However, there is an atypical signaling pathway where TAB1 binds to p38 and triggers autophosphorylation. This atypical pathway is implicated in a variety of pathologies, from ischemia to viral infection. Developing a p38 inhibitor to be used clinically is of great interest, however, the typical functions of p38 are vital to cellular growth and survival. Complete inhibition of p38 phosphorylation is detrimental to cells. So how can we target only the pathological effects of the atypical pathway? Our aim is to create and characterize a p38 inhibitor that selectively inhibits atypical signaling while allowing for normative signaling to occur. We have developed and screened a set of intrabodies-- intracellularly expressing antibody fragments with the ability to bind to TAB1 at the site of p38-TAB1 binding-- that could inhibit the atypical signaling pathway. We have previously shown that the intrabodies can inhibit p38 phosphorylation after GPCR stimulation of the atypical pathway. We have also shown our intrabodies bind to TAB1. We are working to generate an ideal delivery mechanism and to characterize cellular behavior with intrabody-transfected cells. Ideally, this selective inhibition in robustly transfected cells would inhibit only atypical p38 signaling with little side effects on other signaling pathways. Once our intrabodies are properly characterized, they have the potential to become an ideal therapeutic in a variety of pathologies.

Church Exploration

Dylan Marie Lao
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In a Christian-dense population like the University of Georgia, we recognized that the church exploration process for college students who either identify or do not identify as Christian can be intimidating. In our research, we will collect data surrounding churches in the Athens area that cater to university students. A survey will be given to students regarding how they currently view their faith and if applicable, how they search for and select a church home. Though we understand not everyone has a church home or has explored the different churches in Athens, we desire to know more about the interest in looking for a church along with the behavioral, psychological, or physical parameters that could be hindering students' potential desire to expand on their religious beliefs. Analyzing church participation and exploration will hopefully guide us to solutions and provide resources to deepen students' relationships with God, create a more effective church experience, and potentially help other Christian-dense populations.

The Mission for Education and Multimedia Engagement: Breaking the Barriers to Satellite Education

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The Mission for Education and Multimedia Engagement Satellite (MEMESat-1) is a 2U satellite built by a team of twenty-two multidisciplinary undergraduate students at the University of Georgia Small Satellite Research Laboratory. The mission client is Let's Go To Space Inc., a non-profit organization dedicated to K-12 outreach; this mission is funded by donations to Let's Go To Space Inc. and a grant titled the Mission for Education and Multimedia Engagement from the Georgia Space Grant Consortium. MEMESat-1 helps solve the barrier-to-entry problem in aerospace development by giving undergraduate students first-hand experience with developing a small spacecraft from the ground up, expanding K-12 accessibility to aerospace education, and providing a public platform for satellite interaction. It serves to educate college students on the intricacies of satellite development. Each subsystem team is led and fully staffed by undergraduate students who are responsible for every stage of stack development, from conception to launch. Development, assembly, testing, and validation of the avionics stack are done almost entirely in-house, cultivating a deeper understanding of otherwise black-box subsystems. Let's Go To Space will host an online portal for K-12 students to interact with and learn about MEMESat-1 while providing related educational information about space, physics, and radios. MEMESat-1 uses the open-source Little Free Radio in collaboration with the University of Buffalo Nanosatellite Laboratory. The Little Free Radio will transmit and receive images and audio over amateur radio bands, serve as a digital transceiver for the amateur radio community, and allow amateur radio users to interact with the satellite.

A Comparative Study of Bee Genus Diversity and Abundance in Urban Food Production Sites versus Urban Ornamental Sites in Athens, GA

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Over the past decade, urban areas have seen a significant increase in agricultural operations focused on food production and community health. As humans enjoy the convenience and beauty of urban food production systems, it is important to ask how and if these food systems are benefitting other members of the urban ecosystem. This study investigates the biodiversity of bee populations in urban farms and gardens growing food versus growing ornamentals via a survey of bees caught in tri-color pan traps set out at 10 sites across Athens, GA over the span of 6 weeks in the summer. Using genus diversity and abundance as metrics, this study yielded significant results showing that urban food production sites encourage healthy diversity amongst urban bee populations. The visitation of specialist pollinators such as the squash bee and hibiscus bee to food-producing sites is thought to be a main driver of this support.

Effects of Habitat on Painted Bunting (Passerina ciris) Abundance and Space Use on a Southeastern Barrier Island

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Due to human-induced pressures, songbird populations are significantly declining worldwide. Songbirds serve as important indicators for the health of the ecosystems they inhabit; thus, shrinking populations can alert us to the deteriorating health of our planet. One North American songbird experiencing notable declines is the iconic Painted Bunting, a brilliantly colored, sparrow-sized inhabitant of the southeastern coastal plain. Painted Buntings are migratory, breeding as far north as North Carolina and overwintering in Caribbean. In this study, we aimed to determine how Painted Buntings use space during the breeding season, including estimating home range size and abundance across habitats. We hypothesize 1) buntings will be more abundant in less recently burned areas and maritime grassland given their affinity for grass seeds as a food resource, and 2) home range size will be smaller in maritime grassland for the same reason. We conducted this study on Little St. Simons Island, GA. We tracked radio tagged buntings to estimate territory size and conducted point counts (n = 28 sites) across multiple habitat types on the island. Kernel density estimations of home range size resulted in an average size of 1.3 ha among male buntings. Estimates from distance sampling models to determine the abundance of Painted Buntings at each point resulted in 3.09 birds per point ($p < 0.001$). There was no significant relationship

between time since burn and Painted Bunting abundance, nor was there a significant relationship between two primary habitat types (maritime grassland and maritime forest). However, detection covariates need to be included before final conclusions about abundance across habitats can be made. In conclusion, the average territory size was much smaller than that found in a study on nearby Sapelo Island (Springborn et al. 2010), suggesting that habitat on Little St. Simons Island is higher quality. Similar habitat should be maintained along the coast to help reverse the decline of Painted Buntings in this portion of their range.

Surviving Drought: Phenological and Water Use Tradeoffs in Helianthus Porteri

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As climate change intensifies, it is increasingly important to understand how natural plant populations respond to drought events. Drought stress may induce water use and phenological responses which may differentially impact survival and reproduction, resulting in drought response tradeoffs. In this study, we examine these tradeoffs in Helianthus porteri, a native Georgia sunflower, to better understand the species' capacity to respond to drought. The species is endemic to granite outcrops which are characterized by shallow soil and high light intensity, making H. porteri susceptible to variable yet intense droughts. We ask: Does H. porteri exhibit tradeoffs in DFF and SLA? If so, how do these tradeoffs compare across drought and well-watered environments? To answer these questions, we conducted a greenhouse water limitation experiment in which we measured specific leaf area (SLA), days to first flower (DFF), headcount, and survival of H. porteri. We found a positive relationship between DFF and SLA, suggesting that plants with less dense leaves flowered later in both environments. Further, we did not find SLA to be a good predictor of survival or headcount. Notably, DFF and treatment had strong effects on headcount, indicating that drought intensified the tradeoff between later flowering time and fewer flowering heads. While controls had on average higher headcount and survival, both treatments responded similarly suggesting similar tradeoffs across environments. Overall, these findings suggest that DFF response to drought comes at the cost of reduced headcount and that these tradeoffs have evolved to similarly affect populations independent of their drought stress.

Understanding the Situation: The Dynamic of Human Rights Violations in Ukraine

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The human rights situation in Ukraine has become a concern for human rights activists. Multiple nonprofit organizations and journalists have recorded human rights violations (HRVs) and analyzed their political effects. Understanding the dynamics of the Ukrainian case is key in improving Ukrainian human and civil rights once the war ends. The goal of this research project is to analyze how HRVs in Ukraine have transformed from the end of the Maidan Uprising on February 23, 2014, to current days. The research will examine data from human rights organizations including Humans Rights Watch and UNHCR to compare and contrast empirical data on the type and scale of violations. The expected findings will show that human rights violations of civil, social, and economic liberties are present in the period directly after the Maidan Revolution and moving forward. In the Donbas region, the results will show that HRVs of rights to life, liberty, and security were threatened at a larger scale. Since the start of the war, data will show the scale of the increase of violations of the right to life and liberty, and social, civil, and economic rights in all regions of Ukraine in comparison with their pre-war counterparts. The results of this project will contextualize the global significance of Russia's actions in Ukraine and the precedence that is set by western aid to Ukraine. The findings will also show the areas that Ukraine needs to focus on during the post-war period for the effective improvement of its human rights situation.

How Do You Feel When You Shop Online, Miss Brain?

Alexandra Mary Lee
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This study aims to look deeper into consumers' psychology when shopping online for a hedonic fashion product versus a utilitarian fashion product using Electroencephalography (EEG) data. Previous studies in this field have been conducted using survey-based methods. In survey methods, researchers ask participants to recall their prior emotions with the stimuli, which can create bias in the participants' answers because they answer after the stimuli has been shown and are only aware of their conscious level of emotions, not their real-time emotions. Therefore, this study will use EEG data to explore consumers' subconscious emotions while online shopping. Through the stimuli development process, we selected sneakers as the utilitarian fashion item and cocktail dresses as the hedonic fashion item. Next, the participants were asked to give examples of their favorite shoe (utilitarian item) and cocktail dress (hedonic item) brands. Lulu's and Nike were the top-noted brands for each category. After the pre-test, each participant watched a five-minute video of the Nike and Lulu websites while wearing an EEG headset. The headset tracked six emotions (excitement, engagement, focus, stress, interest, and relaxation) while the participants viewed the videos. The participants were then asked to complete a post-survey to gauge their conscious emotional level compared to the six emotions documented by the EEG headset. This ongoing study hopes to find meaningful results that will improve online shoppers' experience while also seeing the difference between the subconscious and conscious emotional states of online shoppers.

A Genetic Approach to Exploring the Relationship Between Heterochromatin Disruption, Genome Instability, and Disease

Shaelin Lee
Dr. Mary Goll, Genetics, Franklin College of Arts & Sciences

Epigenetics describes heritable differences not caused by changes to the nucleotide sequence that can be mediated through modifications to the chromatin template, including methylation of DNA and histone proteins. DNA methylation and methylation of Histone H3 lysine 9 (H3K9me3) both promote the formation of a repressive, compacted chromatin structure called heterochromatin. Heterochromatin disruption has been associated with genome instability in cancer. In the rare disease ICF syndrome, loss of DNA methylation in the pericentromeric region of chromosomes is associated with developmental and chromosomal abnormalities under stress conditions. However, most individuals are able to survive into adolescence, suggesting that additional mechanisms may help promote genome stability under normal conditions. In this study, we take a genetic approach to examine the combined loss of H3K9me3 and DNA methylation during development using zebrafish as a model system. The research will investigate the combined loss of these two modifications on development by comparing levels of DNA damage and aneuploidy associated with one or both modifications. Overall, the aim of this study is to gain a deeper understanding of how heterochromatin disruption promotes genome instability in diseases.

Construction of Reporter Plasmids Useful for Determining Farnesyltransferase Specificity
Ethan Roman Leoni, CURO Research Assistant
Dr. Walter K Schmidt, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences
Post-translational modifications (PTMs) allow a protein to perform various functions within a cell. Isoprenylation is a PTM that adds a C15 or C20 isoprenoid group to proteins, facilitating membrane attachment and/or protein-protein interaction. Carboxyl terminal tetrapeptide sequences comprised of a Cysteine, two aliphatic amino acids, and a fourth amino acid of varying identity, historically referred to as a CaaX motif, are targets for isoprenylation, but recent evidence points to a wide range of CXXX motifs that can be isoprenylated, many of which have not been appreciated (OR have not been identified as prenylatable). Whereas prenylated CaaX sequences are subsequently modified by proteolysis and carboxymethylation, CXXX sequences are only prenylated. Saccharomyces cerevisiae Hsp40 Ydj1p is farnesylated (C15) on a CASQ sequence that avoids the steps of proteolysis and carboxymethylation. This study reports on the construction of plasmids encoding Ydj1 with CXXX sequences that are distinct from the CaaX motif. The sequences were recently identified as being farnesylated by a population-based genetic method. The follow-up studies reported here are designed to confirm the farnesylation of these sequences on an individual basis. Preliminary genetic evidence points to the farnesylation of these sequences, and future studies involving a biochemical assay are planned to further confirm their isoprenylation. These results are expected to provide strong support that the farnesyltransferase has expanded specificity relative to that currently reported in the literature.

Benefits of Biophilic Design in Campus Greenspaces
Ezra Lewis, CURO Honors Scholar
Prof. Alfie Vick, College of Environment & Design
Biophilic Design is the deliberate attempt to design for the inherent human affinity for nature in the built environment (Kellert). Biophilic design has shown to be an influencer on stress reduction and recovery time for hospital patients. Our objective is to understand the relationship between biophilic design and health in students on UGA's campus. In this study, we identified 20 spaces on campus to rank (1=low; 5=high) based on quality for each of the 15 biophilic patterns outlined in the book Nature Inside by William D. Browning and Catherine O. Ryan. Some of these patterns are Dynamic and Diffuse Light, Material Connection with Nature, and Thermal and Airflow variability. We then are conducting two surveys, the Perceived Restorativeness Scale and State-Trait Anxiety Inventory to determine if we could find a relationship between higher rankings of greenspaces on campus and positive results from these surveys. Our study will provide insight into the level of importance of biophilic design on UGA's campus and if there is any benefit for the health of students, faculty, and community members. This research is ongoing.

Assessing Coastal Inundation around the Caribbean Islands
Hannah Lim
Dr. Felix Luis Santiago Collazo, School of Environmental, Civil, Agricultural, and Mechanical Engineering, College of Engineering
Coastal inundation models have been developed and applied around the world in rich-data regions. However, there are many places, like in the Caribbean, where coastal hydrodynamics has not been studied in full detail. For example, Cuba is next to the Florida Panhandle, and their corresponding inundation hydrodynamics could be very similar or not during the same meteorological event. Tropical cyclones form near the west coast of Africa and travel through the Atlantic Ocean. Some potential hurricane tracks could affect the Caribbean islands while also impacting the US East Coast or the Gulf of Mexico. I will strive to answer the question of coastal inundation along two different regions of Cuba: La Habana (northwest region) and the Gulf of Batabano (southwest region), which are separated only by 56 km or a 1-hour drive. As part of my methods, I will develop an unstructured mesh around this region using the programming language MATLAB. Also, Geospatial Information Systems, such as ArcMap, will be used to create the required inputs, such as bathymetric and topographic data, in the area of study. After successfully creating the model ocean mesh, I will move on to the next step of the project: using the ADvanced CIRCulation (ADCIRC) hydrodynamic model to simulate a single hurricane that has affected the region. This will help predict future hurricanes for Cuba as there is no current data available for coastal flooding or studies that have been made.

The Nature of the Supernatural and Paranormal: An Exploration through Russian and American Cartoons
Shelby Landes Linton
Dr. Olga Thomason, Germanic & Slavic Studies, Franklin College of Arts & Sciences
Attitudes toward paranormal and supernatural beings offer a unique cultural perspective. In Russia, attitudes often correlate with Slavic folk traditions, culminating in the popularity of beings like the Domovoy and Baba Yaga. In the USA, this manifests as ghost tours through popular cities, an abundance of horror movies, and a love for Halloween. Though the qualities of these cultural presences differ, both countries have produced cartoons depicting the paranormal and/or supernatural. The goal of this study is to examine and compare the types of paranormal beings that appear in the selected American and Russian cartoons from the Cold War period to identify the respective exigencies for these appearances, or the extent to which they were embedded in the cultural landscape of the time, as well as the messages they convey. Additionally, the paranormal beings will be sorted based on their benevolent, malevolent, or indifferent goals. For example, the Russian ghost trio of It's Not Scary At All becomes helpful once the children they try to scare are revealed to be brave. Conversely, in Scooby-Doo's first episode, What a Night for a Knight!, the being that is perceived to be supernatural is consistent in scaring cowards, exemplifying a more malevolent character. The findings that result from such comparisons will add to the attempts to elucidate the fascination with the paranormal in Russia and the USA, further aiding in building bridges for cross-cultural communication.

Effects of Maternal Diet and Prebiotic Supplementation on Offspring Body Weight, Food Intake, and Feeding Patterns
Rachel Lippincott
Dr. Claire de La Serre, Nutritional Sciences, College of Family & Consumer Sciences
Obesity is a major public health concern and evidence suggests maternal obesity increases the risk of offspring metabolic disease. In rat models, high fat (HF) diets have been shown to induce chronic inflammation associated with changes in feeding patterns, increased caloric intake and increased fat accumulation. Diet-driven inflammation originates from gastrointestinal microbiota where prebiotics such as resistance starch can be used to alleviate the effects of HF feeding. The goal of this project is to evaluate the effects of maternal prebiotic supplementation on feeding patterns and body weight gain of adult offspring fed a HF diet. Male and female rats born to dams fed regular chow, 45% HF diet, or 45% HF diet supplemented with resistant starch were placed on a 45% HF diet for six weeks starting at sixteen weeks of age. 24-hr feeding patterns were analyzed using a Biodaq system. We further used progressive ratio responding to evaluate the animals' motivation

for caloric dense food. Male rats born to HF dams consumed more energy than those born to HF+RS or chow dams. Male rats born to HF dams gained more body weight than males born to HF+RS or chow dams. Female rat energy consumption was comparable for the three maternal diet groups; however, female rats born to HF dams gained more body weight than those born to HF+RS or chow dams. We conclude that maternal prebiotic supplementation has beneficial effects on offspring metabolic risk, especially in males.

Examining the Needs of Rural Georgians for Dementia Education, Diagnostic Services, and Post-Diagnosis Support

Elise Marie Lodde
Dr. Jenay M Beer, Gerontology, College of Public Health

What are the needs of rural Georgians in dementia education, diagnostic services, and continued support after diagnosis? Alzheimer's Disease and Related-Dementias (ADRD) are a leading cause of death in older adults in Georgia. CDC data indicates that Georgia has one of the highest ADRD mortality rates nationally. This disproportionately affects rural Georgians who have reduced access to healthcare services and higher risk factors for dementia than their urban counterparts. The University of Georgia's (UGA) Cognitive Aging Research and Education (CARE) Center has partnered with UGA Archway partnership and UGA Cooperative Extension to explore the county-specific needs to access dementia diagnosis, support services, and awareness in medically under-served communities in rural Georgia. The CARE Dementia Community Needs Assessment questionnaire was developed to examine attitudes toward and access to diagnostic services, telehealth, and dementia education. The questionnaire was administered in two rural counties, Washington and Hart County, among persons living with dementia and their caregivers. Results from the assessment revealed 22% of residents travel outside of their county to see a primary care physician, and only 32% expressed they would be comfortable using telehealth for screenings. Although the majority of respondents reported being over 45 years of age, 61% have never had their primary doctor suggest a cognitive screening. Furthermore, 63% reported interest in educational programming on living with dementia and caregiver support topics. The preliminary evidence from this needs assessment highlights disparities for rural Georgians in accessing dementia services and resources. Findings inform the priority resources needed to improve equity in ADRD diagnostic services, caregiver support, and education in rural communities.

Changes in Bone Parameters and Expression of Genes Related to Calcium Absorption in the Ileum of Laying Hens in Early Production

Kendall Madison Long, CURO Research Assistant
Dr. Laura Ellestad, Poultry Science, College of Agricultural & Environmental Sciences

Hens have a 24-hour egg-laying cycle, typically producing one egg a day. During eggshell calcification, calcium may be derived from the diet via the ileum or from the bone, which acts as a labile calcium source. The purpose of this project was to identify changes in intestinal physiology associated with calcium uptake and utilization during early production and to determine if 1-α vitamin D3 supplementation affects bone development as hens reach sexual maturity. A comparison of bone strength using the tibia and humerus extracted before (18 weeks) and after the onset of lay (31 weeks) as well as mRNA expression of calcium and phosphorus transporter genes were conducted at early production (25 weeks) at 1:30, 6:00, 15:00, and 21:00 hours post oviposition (HPOP). Levels of mRNA were determined using real-time qPCR, and a bending test, followed by measurements of cortical thickness was used to evaluate bone quality. Calcium transporter genes ATP2B1($P \leq 0.001$) and CALB1 ($P \leq 0.028$) exhibited elevated expression at 15 and 21HPOP in the ileum, during the period when hens require calcium for eggshell calcification. Bone development was positively influenced by 1-α vitamin D3 as an improved breaking strength ($P \leq 0.0133$) was noted at 31 weeks compared to the control diet. The 1-α vitamin D3 supplement reduced structural bone losses associated with the start of egg laying and there was increased capacity to absorb calcium during eggshell formation. This information can be utilized to develop feeds and genetic selection strategies that improve bone strength of hens as they age beyond 86 weeks.

Target Identification of a Novel Series of Compounds Targeting Plasmodium Parasites

Will Long
Dr. Dennis Kyle, Cellular Biology, Franklin College of Arts & Sciences

Worldwide, there were 247 million cases of malaria in 2022, of which 619,000 resulted in death. Despite global efforts to reduce the burden of malaria, over half the world's population remains at risk, and the rise of resistance to antimalarials has placed paramount importance on efforts toward the discovery of novel drugs targeting the parasite. Of the five species of malaria-causing parasites, P. falciparum and P. vivax represent the greatest threat to human health. We have recently identified a compound (MMV1900472) with submicromolar potency in various Plasmodium species and across various stages of the parasite's life cycle, including P. vivax dormant liver forms; however, the molecular target(s) of this compound remains unknown. To elucidate the target(s) of MMV1900472, we generated four resistant clones in P. falciparum. Using an in vitro activity assay against blood-stage parasites we observed a 30-fold shift in the half-maximal effective concentration (EC50) of MMV1900472 in resistant parasites compared to wild-type parasites. We also observe a 12-fold and 9-fold increase in EC50 in MMV1900472-resistant clones for two known inhibitors of the P. falciparum ATP4, KAE609 and SJ733, respectively. These findings indicate cross-resistance in the resistant parasites and suggest that PfATP4 may be one target of MMV1900472. Whole genome sequencing and chemoproteomic analyses are currently underway. Using these methods, we predict that we will identify the compound's target(s). Our results will provide insights into the compound's mechanism of action and will provide a framework for future investigations of putative drug candidates.

Nonlinear Structured Illumination Microscopy with rsEGFP2

William Lord
Dr. Peter Kner, School of Electrical and Computer Engineering, College of Engineering

Super-resolution fluorescence microscopy allows for the resolution of an image to surpass the diffraction limit and give more detail about a biological sample. Among the many techniques available today, structured illumination microscopy (SIM) stands out as a super-resolution technique since it is compatible with live-cell imaging. SIM can enhance the resolution by a factor of two, achieving a resolution to about 120 nm. Nonlinear SIM (NLSIM) takes this a step further by incorporating reversible fluorophores that have a photo switching property, allowing for the collection of higher spatial frequency information and theoretically infinite resolution. Our research is focused on implementing the reversible photo-switchable fluorescent protein, rsEGFP2, and pattern depletion method to achieve fast live imaging with high resolution. We capitalize on the rapid photo switching property of the rsEGFP2 protein to enhance imaging speed. Moreover, by utilizing the low laser intensity imaging to further reduce the photo damage of the biological sample, our NLSIM can be promoted to a wider application range in subcellular imaging. Through experimentation of imaging U2OS cell, we have demonstrated the desired nonlinearity under low light intensity and achieved a lateral of 80nm laterally.

The Role of Exercise on Cognitive-Motor Control in a Spatial Stroop Task

Madison Elizabeth Lowe, CURO Research Assistant
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Extensive previous research has established that exercise has beneficial effects on a variety of neurocognitive functions. For example, moderate intensity exercise can amplify executive function processes such as cognitive control, which is associated with enhanced academic attainment, analogical reasoning, and emotional regulation. Cognitive control is commonly measured in laboratory settings using the Stroop or similar tasks. Several studies have suggested a positive correlation between acute exercise and performance on the Stroop task; however, it is unclear how individual differences in physical activity levels relate to Stroop task performance. This study will use a sample of healthy males and females ages 18-40 years with normal or corrected-to-normal vision performing a spatial version of the Stroop task. Participants will first learn to associate a symbol with either the left or right direction. Then, participants are instructed to move to the left or right based on the identity of the symbol. On different trials, the symbol will appear on the left or the right side so that the spatial location is either matched (congruent) or mismatched (incongruent) with the symbol identity. Across blocks, participants will respond by using reaching, stepping, or jumping movements. We will measure magnitude of the effect that congruent versus incongruent trials have on reaction time and how this differs across movement types and individuals. We hypothesize that the level of physical activity reported in a pre-experimental survey will be associated with differences in reaction time, especially for more complex movement types. Determining this effect can divulge the potential implication that exercise has on improving cognitive-motor interactions, especially as a line of treatment for individuals with deficits in cognitive function.

The Effect of Cis-regulatory Variation on Chromatin Accessibility in the Maize Genome

Kelly Luo
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Cis-regulatory elements (CREs) are regions of non-coding DNA that regulate gene expression of nearby genes by allowing certain transcription factors to bind there. Genetic variation that affects cis-regulatory functions are thought to influence patterns of genetic expression, leading to phenotypic changes over time. To investigate this relationship, we set out to examine the effects of cis-regulatory variation between three maize genomes. With transcription factors requiring open chromatin to be able to bind to DNA, CREs are generally found within regions of accessible chromatin, so we identified areas of accessible chromatin regions (ACRs) as potential CREs. We also identified and analyzed areas of variation in single nucleotide polymorphisms (SNPs) with regards to ACRs and CREs to better examine a potential correlation between genetic variation and chromatin accessibility within maize. Further research should analyze data using a greater number of maize genomes as well as maize samples mapped to different reference genomes.

Understanding Animal Responses to Invasive Species using Wildlife Camera Traps

Caitlin Lyons
Dr. Lizzie King, School of Ecology

Invasive species generally outcompete native flora, which have negative impacts on forests. Surrounding wildlife are dependent on native plants to acquire food and shelter, so they can be heavily impacted by invasive species which can change the understory diversity. However, the negative, or positive, relationship between wildlife and the invasive flora are not always clear. In this study, we investigated wildlife presence before and after the removal of invasive Chinese privet (Ligustrum sinense) and bush honeysuckle (Lonicera mackii) in Oconee Forest Park to understand this relationship. I hypothesize that after the initial removal of berry producing invasive species, wildlife sightings will decrease, but as time progresses and if native flora repopulates the area, animal visits will increase in these sites. I used 7 Spartan wildlife cameras spread amongst three treatment sites: one with invasive removal from a year prior, one with new removal, and one with no treatment. The first data set was from October 16th-November 28th, 2022, and another set of data was from December 13th, 2022- February 19th, 2023. This project has captured at least 14 different species, including predators and prey. Rare species such as the Gray fox and the Eastern Screech Owl were identified. Coyotes, deer, raccoons, and rabbits were active at night, while squirrels and chipmunks were seen at high levels during the day. This research is significant for management decisions, so that the introductions of native plants, or the removal of invasive ones, are not detrimental to the wildlife.

A Black Spatial Imaginary: Footprints in the Urban South

Catalina Macedo Giang
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The history of Georgia's Metropolitan Atlanta Rapid Transit Authority (MARTA) is tumultuous and rooted in stark and strident racism designed to keep people apart. After the 1960's "white flight" from Atlanta's urban districts, the white suburban county communities surrounding metro Atlanta by and large refused to link up with MARTA because of its origins in serving as a public transit system provider for the mainly working-class Black communities in Atlanta's inner city. In the present-day, this attitude has continued to shape the development and management of MARTA, in addition to the racial economic systems and dynamics at play in metro Atlanta. For example, in 2019 and 2020, Gwinnett County hosted referendums to decide whether to invest in a tax-funded public transit expansion, specifically with county connection to MARTA through heavy rail. Both referendums failed, and though there were a variety of reasons why, a significant factor was the belief that transit connection to the city would bring crime and danger to Gwinnett's so-called "peaceful" suburbs. Ultimately these beliefs and their subsequent impact on the referendum outcomes are merely one of many examples of the push and pull relationship between Atlanta's inner city and Georgia's major suburbs. As a student researcher, I plan to investigate this push and pull relationship surrounding Atlanta's urban and suburban areas. I will build an original case study that critically examines MARTA's early history and development to the present-day through the analytical frameworks of "chocolate cities" and the primary interests of the Black spatial imaginary. During the Spring semester, I will complete a literature review on a variety of sources that explore and apply these subjects. Following this literature review, I will also be the primary responsible author for constructing the original case study on MARTA in question that examines these social dimensions, which includes research on the case, the application of the aforementioned theoretical frameworks, and analysis of the link between the two.

Starvation as an Act of Resistance: Force Feeding as a Tool of Torture

Shrika Madivanan
Dr. Leah Carmichael, International Affairs, School of Public & International Affairs

While there are many reported instances of starvation being used as a tool of warfare, we still know relatively little regarding the long history of starvation being reclaimed as an act of rebellion in response to oppression. The first purpose of this study is to examine trends where imprisoned communities have used or are using food

strikes as a means of protests to conditions. A systematic review of literature was utilized, and the methodology of this study includes the employment of qualitative to examine conditions under which people choose self-starvation as response to political oppression while imprisoned. This project will also review the use of large-scale force-feeding within prisons as a means for denying prisoners their only opportunities to exercise control over their own bodies. This study advocates for policy changes, such as the requirement for prison officials and the government to reprimand and criminally prosecute force-feeding of prisoners.

Developing Rho1 as a Naturally Geranylgeranylated Reporter to Investigate GGTase-I Specificity

Emily Mai, CURO Research Assistant

Dr. Walter K. Schmidt, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Eukaryotic CaaX proteins contain a tetrapeptide cysteine – aliphatic – aliphatic – and varied (X) amino acid sequence at the C-terminus. They are typically modified post-translation in a three-step pathway: prenylation, in which a 15-carbon (farnesyl) or a 20-carbon (geranylgeranyl) lipid is attached, removal of the -aaX ending through proteolysis, and methylation of the COOH terminus by isoprenyl cysteine methyltransferase. Prenylation is catalyzed by either FTase or yeast GGTase-I, in which both enzymes recognize specific CaaX sequences. According to literature, GGTase-I prenylates proteins with a sequence motif CaaL/I/F/M. However, preliminary studies from the Schmidt lab have demonstrated geranylgeranylation outside of this consensus motif using Ydj1 as a reporter, which is a naturally farnesylated reporter but was expressed in an engineered yeast strain where geranylgeranylation is the only prenylation event possible. The naturally geranylgeranylated Rho1 protein was thus developed in this study as a reporter to confirm the broader specificity of GGTase-I predicted by preliminary studies. This study focuses on generating Rho1 plasmids with different Cxxx sequences through molecular biology techniques. Resulting plasmids are being used for a functional assay (plasmid loss on 5-FOA media) and a biochemical assay (i.e., SDS-PAGE gel-shift) to determine the specificity of GGTase-I. Findings can be applied to cancer treatment development due to the significant impact of Rho proteins in the regulation of cell carcinogenesis.

Sex-Difference in the Levels of O-GlcNAcylation in Neurons

Rebecca Lee Mai, CURO Research Assistant

Dr. Gerald W. Hart, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Sex differences have been observed in the incidence, prevalence, and clinical manifestations of various neurodegenerative diseases, including Alzheimer's disease and Parkinson's disease. However, the underlying mechanisms for these differences are not yet fully understood. O-GlcNAcylation, a monosaccharide post-translational modification on serine and threonine residues of cytosolic, mitochondrial, and nuclear proteins, is a nutrient sensor and is an area of interest in studying neurological disorders. Enzymes O-GlcNAc Transferase (OGT) facilitates the addition of O-GlcNAc onto proteins, and O-GlcNAcase (OGA) removes this modification. Dysregulated O-GlcNAcylation levels have been observed in degenerative brains and have been implicated in disease progression. While emerging research suggests that the regulation of the O-GlcNAcylation might be sex-dependent, the potential sex differences in O-GlcNAcylation in neurons and its connection with neurodegeneration are not clearly known. This project aims to determine whether there is a sex difference in the levels of O-GlcNAcylation, OGT, and OGA in male and female mouse brains, as well as in cortical neurons derived from induced pluripotent stem cells (iPSCs). Our preliminary Western blot results suggest that there might be sex differences in O-GlcNAcylation, OGT, OGA, and OGT/OGA ratio. Because OGT is a X-linked gene, we are interested in examining whether the OGT gene in neurons escape X-inactivation using 5-azacytidine, an inhibitor of DNA methylation responsible for Xi-silencing. Through the evaluation of protein and gene expression levels of O-GlcNAcylation, OGA, and OGT, my novel project seeks to better understand the risk associated with neurodegenerative diseases in males and females.

Investigating Drug-Drug Interactions of Novel Triple-Drug Combinations for Treating Relapsing Malaria

Sarah Mai

Dr. Dennis Kyle, Cellular Biology, Franklin College of Arts & Sciences

The injection of Plasmodium vivax or Plasmodium falciparum sporozoites into the bloodstream by infected female Anopheline mosquitoes results in malaria. Sporozoites subsequently infect hepatocytes in the liver for several days then enter the blood to further replicate, inducing hemolysis and malarial symptoms. P. falciparum and P. vivax share most of this lifecycle, but P. vivax differs by forming hypnozoites in the liver that remains dormant for 2 weeks to 10 months after initial infection. Because hypnozoites are drug-insensitive, many successful antimalarials deployed to target the Plasmodium blood stage, such as Dihydroartemisinin (DHA) and Chloroquine (CQ), are ineffective against P. vivax. Tafenoquine (TQ) paired with chloroquine (CQ) was one of the few drug combinations used to effectively eliminate hypnozoites in the liver using a single dose. However, due to geographical resistance, clinical trials are underway to replace CQ with Piperaquine/Dihydroartemisinin (PQP-DHA), as the new partner drug of TQ. Surprisingly, results showed a lack in clinically relevant reduction in malaria relapse for unknown reasons. Herein we aim to investigate the drug-drug interactions in TQ-PQP-DHA and discover new triple-drug combinations for a safer, more efficacious hypnozonticidal treatment. Alternate partner drugs tested include Artesunate/Pyronaridine and Artemether/Lumefantrine. Their interactions will be assessed through isobolograms plotting FIC index calculated from EC50s of different combinations. If these combinations show synergy or antagonism in P. falciparum asexual blood stage cultures, we should see the same interaction in P. vivax liver stage cultures, allowing for further confirmation of which combinations are ideal for future clinical trials.

The Dynamic Formation of Nuclear RNA Foci in Proliferating Fibroblasts Cells Derived from ALS Patients

Carly Major

Dr. Yao Yao, Animal & Diary Science, College of Agricultural & Environmental Sciences

Amyotrophic lateral sclerosis (ALS) is a fatal neurodegenerative disease characterized by a progressive loss of muscle control due to the breakdown of motor neurons. Familial ALS is often genetic, and the most common genetic cause of ALS is a mutation in the C9orf72 gene, which results in expanded pathogenic GGCCCC (G2C4) hexanucleotide repeats. One of the observable phenotypes associated with this mutation is the accumulation of repeat-containing RNAs transcribed from the expansion in the form of RNA foci. However, the mechanism underlying RNA foci formation and toxicity are not fully understood. A previous study suggests that RNA foci were inconsistent across the cell cycle, with increased accumulation in prophase, interphase, and G0. Consistently, our preliminary results showed that mitomycin-C treatment, which DNA synthesis and causes cell cycle arrest, leads to optimized conditions to measure the number and size of RNA foci in human-derived fibroblasts using fluorescence in situ hybridization. This study aims to examine the potential changes in RNA foci formation between cells in G0 and interphase of the cell cycle with the goal to

reveal the mechanisms underlying RNA foci formation. Specifically, we will look for differences in the expression of certain RNA binding proteins, TDP-43, p53, FUS, and TBK1, which are known to be associated with familial ALS, raising the possibility of RNA metabolism in neurons for ALS pathogenesis. This study is expected to further our understanding of RNA foci formation and provide novel paradigm for ALS treatment.

Physics Students' Use of the Taylor Series Approximation in Upper-level Physics Courses

Jared Ian Maller

Dr. Craig Wiegert, Physics & Astronomy, Franklin College of Arts & Sciences

The purpose of our study is to examine upper-level undergraduate physics majors' use of the Taylor series approximation in physical contexts. We propose to explore what prompts students to use Taylor series when working on a physics problem, and what mathematical and physical resources students make use of to understand a Taylor Series approximation in a physical context. A review of the literature showed that very little research has been conducted regarding this topic. Preliminary data will be collected from experts (graduate students and faculty) regarding their conceptualization of the Taylor series and in what physical contexts they deem it to be useful. Then, we will conduct interviews of upper-level physics students in which they solve physics problems designed from results of the expert interviews, which require the use of Taylor Series. We expect that problems suggesting the use of an estimated value will prompt students to spontaneously make use of the Taylor series approximation. We also hope to see what resources a student uses to effectively use Taylor series as an approximation in a physical system, how they use their Taylor series result to reason about the physical problem's limiting or asymptotic behavior, and just as importantly we hope to see what resources lead a student to use Taylor series ineffectively. The exact nature of this interview is still a work in progress. This study will provide insight into an area with very little literature discussing it and guide effective teaching regarding Taylor series in physics courses.

Integration of Natural and Nature-Based Features: A Case Study for Tybee Island

Sara Mallon

Dr. Felix Luis Santiago Collazo, School of Environmental, Civil, Agricultural, and Mechanical Engineering, College of Engineering

The flooding frequency in Tybee Island, GA is increasing due to rising sea levels and aging stormwater infrastructure. Various natural and nature-based features (NNBF) are being designed to reduce the impact of intense storms and high tides on the island. In particular, a horizontal levee is being proposed along the back-end coastline, mitigating flood and enhancing marsh migration for future climate scenarios. The slope of the levee will balance both flood and marsh protection along with minimizing the impact on the current landscape and boosting the wildlife and habitat. The slope will also take into account the existing piers and the minimum clearance level allowable for construction and maintenance on the horizontal levee. The main driver in reducing flooding is the combination with gray infrastructure, such as raising an adjacent road to provide a barrier between the rising sea level and the island itself. Since living shorelines will not appear naturally with gray infrastructure, we will intentionally place a living shoreline at the toe of the levee to avoid coastal erosion. Moving forward, we will assess the horizontal levee through a hydrodynamic model (ICPR) to assess the flood reduction as well as through a geometric concept to assess the marsh migration to ensure it is functioning properly.

Sweet Taste Exposure in Adults with Obesity Leads to Differential Cephalic Phase Responses

Sydney Arin Mance, CURO Research Assistant

Dr. Jamie A. Cooper, Nutritional Sciences, College of Family & Consumer Sciences

Cephalic phase responses (CPRs), such as increased heart rate (HR) or early insulin release, prepare the body for meals. Although not well documented, preliminary evidence suggests that obesity blunts CPRs. To compare CPRs stimulated by mouth rinses varying in sweetness and energy content in adults with normal weight versus obesity. In this randomized, double-blind, crossover study, CPRs were assessed in 39 adults (18-45y) with a body mass index (BMI) between 18.5-24.9 (normal weight, NW; n=21) or >30 kg/m2 (obese, OB; n=18). At each testing visit, blood draws and HRs were obtained at fasting (-5) and at 1, 3, 5, 7, 10, and 15min post-rinse to assess insulin and glucose. Mouth rinses (labeled A-D) contained sucrose, maltodextrin, sucralose, or water and were rinsed for 2min. Sweetness was rated immediately post-rinse on a 100mm visual analog scale. Sweetness ratings were significantly higher for rinses B (74±6mm) and C (70±3mm) compared to A (14±6mm) and D (11±6mm) ($p<0.001$). In the NW group, participants displayed increased HR with rinse A (16.1±4.9bpm) vs. both B (2.3±6.5bpm) and D (-1.0±3.3bpm/min) ($p<0.05$). For insulin, there was a decrease with B vs. increase with C (B:-1.4±1.0 vs. C:1.7±1.6μU/mL/min; $p=0.02$) for OB only vs. no rinse differences for NW ($p>0.05$). Finally, there was a greater glucose response for rinse A vs. D (A:4.7±4.1 vs. D:-4.0±3.3mg/dL/min; $p=0.03$), but no difference by BMI ($p=0.80$). Sweet taste exposure may elicit CPRs differently by BMI. Un-blinding of treatment groups and final analysis will occur in March 2023.

Establishing a Quantitative Relationship between Carcinogens in Cigarettes and Lung Squamous Cell Carcinoma

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The association between smoking and lung cancer is known, but details about the microenvironmental factors that may enhance this relationship are not well understood. This project investigates why smoking can contribute to lung and other cancers by analyzing the gene expressions of different groups and looking for possible trends. Since smoking is already known to be strongly correlated with lung cancer, lung squamous cell carcinoma is the focus of this study. The TCGA database provided the demographic and biological information of patients and gene expression counts. Patient demographics were matched with their smoking statuses and the duration of their smoking. In one testing group, patients were divided into smokers and non-smokers. In another testing group, patients were divided into bins based on the severity of their smoking, which was quantified by pack years. R Studio and Excel were used to sort through the data and perform multiple differential expression analyses and GSEA enrichment analyses with the GO and REACTOME databases. Significant differences in metabolisms between patients that have partaken in varying levels of smoking are being investigated. Pathways have been grouped into their seven respective categories (ex. cell polarity, proliferation/differentiation/development, etc.). Known carcinogens in cigarette smoke are being linked to their effects on tumors through these pathways, to find a more holistic explanation. The goal is to find a statistically significant relationship that may explain which metabolism smoking affects, and its contribution to cancer, while using supporting details from known and potentially find unknown chemical carcinogens from cigarettes.

Addressing Energy Security Misunderstandings in Georgia: A Statewide Educational Approach

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As state energy security has been complicated by climate change, supply chain inefficiencies, and global conflicts, policymakers in democratic states have not only had to figure out how to adapt their state energy security plans, but also how to convince their populaces of policy acceptability. Consumer misunderstanding negatively influences energy security because misinformed consumers may inadvertently negatively affect energy security. States have previously used and continue to use education to increase energy security but how can that be applied to the U.S. state of Georgia? This research includes an extensive history of energy education for security purposes followed by a synthesis and condensation of past energy education methods. Drawing from successful programs in Brazil and Greece, this work plugs tried formats into Georgia, adjusting for changes in policy expectations and politics. This policy paper specifically analyzes the use of PSA campaigns related to nuclear energy, efficiency reinforcement in elementary schools, and incorporation of energy concepts in high school curriculums. Usage of energy education has been analytically proven to be one of the most cost effective non-infrastructural investments in energy security. This research utilizes a thorough background of energy education and delineation of successes and flaws in comparable policies for application to Georgia.

Transendothelial Electrical Resistance

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Transendothelial Electrical Resistance (TEER) is an in vitro technique used to evaluate the integrity of intercellular junctions, typically prior to being evaluated for the transport of drugs or chemicals. Cell barrier strength is evaluated by measuring the ohmic resistance across a transwell cellular barrier model system. This is typically accomplished by passing an alternating current through a layer of cells in a culture and measuring the voltage difference using a pair of concentric electrodes. This research applies TEER techniques to Human Umbilical Vein Endothelial Cells (HUVECs) cultured on a semipermeable membrane. Using low-cost materials I have developed and tested a programmable TEER device to measure HUVEC cell barrier integrity.

Effects of Salinity on the Feeding and Development of the Rhizostome Jellyfish Cassiopea Xamachana

Jayce Marino
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The upside-down jellyfish, Cassiopea xamachana, is one of many South Florida species whose life history appears to be regulated by environmental conditions, including salinity. Salinity off South Florida can change during rainstorms, hurricanes, freshwater egress, and droughts. Such conditions may alter the life stages and development of C. xamachana. This study explored the impact of salinity on the life history of C. xamachana, with the hypothesis that capture of food would be normal under typical ocean salinity (35 ppt), but vary in altered salinities (i.e., tentacles would be the longest relative to the calyx and feeding behaviors would be completed under normal salinity). Scyphistomae had the longest tentacle per calyx diameter and completed feeding in 25, 35, and 45 ppt. Scyphistomae had markedly shorter sizes, were able to fire their nematocysts, and could not transfer food to the mouth in 15 and 55 ppt, during the first month in the new salinities. After two months (long-term acclimation), three out of five polyps died in each of the 15 and 55 ppt, but the two that survived had longer tentacle/calyx ratios which exhibited normal feeding behaviors. The ability to settle and metamorphose was hypothesized to be equally euryhaline and occurred at all salinities tested. Thus, C. xamachana was found to be euryhaline for most physiologies tested for, perhaps explaining the remarkable success of this species of jellyfish.

In Vitro Stability Analysis of POM-L-BHDU in Homogenized Mouse Liver

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POM-L-BHDU (POM) is a prodrug with antiviral activity (EC50 = 0.0356 mM) and inhibits varicella-zoster virus (VZV) in human skin. When administered orally, POM results in a 2.2-fold increase in the L-BHDU plasma concentrations compared to an equivalent dose of L-BHDU. To understand this increase in L-BHDU levels after administration of the prodrug, we conducted studies in homogenized mouse liver to evaluate the stability of POM over 60 minutes. The samples were spiked with 95 mL of homogenized liver, 5 mL of internal standard, and 5 mL of prodrug. We treated the samples with methanol at each time point to stop enzymatic degradation. The samples were vortexed and centrifuged, and then the supernatant was dried and reconstituted with a methanol/water solution. The concentrations of POM, L-BHDU, and L-BHDU-MP (L-BHDU-monophosphate) were determined using mass spectrometry. L-BHDU-MP is a metabolite of L-BHDU, the first step in the reaction sequence that produces the active component, L-BHDU-triphosphate. The concentrations of L-BHDU steadily rose over the incubation of POM, reaching 1961 ng/mL at 60 minutes. L-BHDU-MP concentrations peaked at 4 minutes, yielding a concentration of 4569 ng/mL (32-fold higher than L-BHDU). At the later time points, L-BHDU-MP concentrations were only 1 to 3-fold higher than L-BHDU (2261 vs. 1961 ng/mL, respectively, at 60 minutes), suggesting saturation of this metabolic pathway, further sequential metabolism, or both. Future experiments will explore this finding and include studies conducted in gastric fluid, intestinal fluid, and plasma to gain a deeper understanding of the in vitro stability of POM.

Developing an Early Diagnostic Biomarker for Parkinson's Disease Using Skin Samples

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The significant clinical need for early diagnostic biomarkers to detect Parkinson's disease (PD) remains unfulfilled. Skin shows promise as such a biomarker due primarily to its non-invasive method of collection. Immunohistochemical studies have already shown that pathological α-synuclein (αSyn) is present in skin biopsies of PD patients. This research aims to optimize a diagnostic seed amplification assay (SAA), named real-time quaking-induced conversion (RT-QuIC), to be highly sensitive and specific for the detection of pathological αSyn in the skin of PD patients. Human skin biopsies were homogenized using a modified protocol developed in our lab. Unblinded controls (n = 4) were subjected to SAA in different dilutions to optimize the assay before testing blinded samples. To validate SAA data, the concentration of αSyn in the skin biopsies was determined using an enzyme-linked immunosorbent assay (ELISA) and total protein concentration was tested using a bicinchoninic acid assay (BCA). Initial data show positive seed amplification from the positive controls and no amplification from the negative controls. Studies are still ongoing in the remaining 68 blinded samples, and the various results from RT-QuIC, BCA, and ELISA will be analyzed after unblinding these

samples. Preliminary data with unblinded controls support the hypothesis that pathological αSyn in the skin of PD patients is a viable biomarker for PD. As a simple and minimally invasive way of studying a patient's neurophysiology, skin biopsy may enable earlier and more accurate diagnosis of PD, which could lead to improved outcomes and a better understanding of PD pathogenesis.

Ghost Goals

Hailey Maxwell
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We conducted three studies introducing the phenomenon of ghost goals: goals which one person in a close relationship adopts traces of from the other. In Study 1, we compared ghost goals and parallel (shared) goals and found that ghost goals were correlated with lower personal commitment and support than parallel goals (goals that both members of the relationship have) were. In Study 2, we investigated the effects of ghost goals on mental simulation of a goal. We found that people who have a ghost goal wrote more detailed essays describing the goal pursuit than people without a ghost goal. In Study 3, we investigated antecedents of ghost goal adoption and found that effort and similarity produce ghost goal contagion. Together, these projects contribute to a better understanding of goal dynamics in close relationships.

Understanding the Combustion Chemistry of Biofuels

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Dr. Brandon Rotavera, School of Environmental, Civil, Agricultural, and Mechanical Engineering, College of Engineering

Today's transportation relies almost exclusively on non-renewable petroleum-derived resources primarily gasoline and diesel. While electric cars are considered greener options, that is entirely dependent on the source of electricity. While the actual cars do not emit CO2, increased strain on the electricity grid from increased charging demand results in emissions from coal and natural gas power plants. Other issues with electric cars include geopolitical concerns over raw materials, supply and demand economic uncertainties, and non-exhaust emissions, which are produced in larger amounts than for combustion-driven vehicles. Understanding combustion chemistry of biofuels gives scientists and engineers the knowledge and computational tools to evaluate which fuels would produce less emissions. The goal of the present research is to understand the balance of reactions unfolding at temperatures below 1000 K as a function of pressure and oxygen concentration for a next-generation biofuel, tetrahydropyran. Speciation experiments with a modified 33-cm3 jet-stirred reactor are conducted to quantify species from tetrahydropyran combustion using vacuum ultraviolet (VUV) absorption over specific photon ranges. By developing a detailed understanding of reaction mechanisms, derived from temperature-dependent species profiles, the results from the present work contribute to the ability to numerically model the chemical kinetics of the tetrahydropyran combustion.

Examining whether Marfan Syndrome Variants affect O-glucosylation of Fibrillin-1

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Marfan Syndrome (MFS) is a heritable autosomal dominant disorder that results in connective tissue defects in the body, affecting about 1 in 7500 people. MFS is caused by missense mutations in the gene which encodes fibrillin-1 (FBN1), a protein found in the extracellular matrix required for the proper development of connective tissue found in the aorta and the lungs. These missense mutations cause variations of the FBN1 primary amino acid sequence. FBN1 contains 47 epidermal growth factor (EGF)-like domains, which can be highly O-glucosylated through biologically significant O-glucosyltransferases, POGLUT2 and POGLUT3. FBN-1 EGFs are O-glucosylated within the putative consensus sequence, C-X-N-T-X-G-S-F/Y-X-C-X-C, where 'X' denotes any amino acid, and the bolded 'S' indicates the O-glucosylated serine; some MFS variants affect these residues. Currently, the status of the O-glucose modification on MFS variant FBN1 is unknown. To assess if the level of O-glucosylation changes in MFS variant FBN1, a set of primers including an MFS missense mutation were developed and utilized in PCR-mediated mutagenesis to produce an MFS variant FBN1 plasmid. DNA sequencing showed that the developed primers successfully produced the MFS variant N1134K, which replaced the wildtype asparagine with lysine in EGF17. Currently, we are transfecting the plasmid encoding this variant FBN-1 into mammalian cells to express the protein. The purified protein will be analyzed using mass spectral glycoproteomic methods to determine whether MFS variant affects O-glucosylation of FBN1 EGF17. This work is supported by NIH grant R01HL161094.

A Grain-Size Analysis of Legacy and Paleo-Sediments; Implications on the Geomorphology and Hydrology of the Region

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Centuries of exhaustive, colonial agricultural practices caused an unprecedented rate of erosion throughout the southeastern U.S. These erosion-born, upland "legacy" sediments were eventually transported down to lower watersheds, blanketing older paleosols. To better understand the relationship between these legacy sediments and the underlying paleosols, a grain-size analysis was conducted on soil cores taken within the Holcomb's Branch watershed of South Carolina, attempting to discern a grain size difference between the sediments. As the rapid deposition of legacy sediments would likely alter soil horizon development, it was hypothesized that a grain-size change may indicate the transition from paleosol deposition to legacy sediment deposition. Samples were collected, 17 cm to 170 cm deep, from a fan deposit, and sieved for sand content. Soil Core #1 was proximal to a modern fan stream and was water-saturated and shallow. Sand content in the more distal Soil Core #2 followed a decreasing-upward trend, maximizing at 17 cm deep. Soil Core #3 was sampled within a putative paleochannel, and exhibited two sand content spikes. Further research into the silt and clay content of each sample is currently being conducted. Presuming silt and clay content is complementary to sand content, the abnormal repeated sand content spike may confirm the existence of a paleochannel near this soil core. Paleochannel-based subsurface water transportation can impact moisture and nutrient fluctuations within watersheds. Using grain-size differentiation between legacy sediments and paleo-sediments to indicate possible channels may enhance our understanding of how hydrologic processes operate in areas impacted by severe erosion.

Filling the Gap: The Correlation between Particle Verbs and Transitivity in German and English

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Within linguistic inquiry, grammaticalized phrases are frequent phenomena that present unintuitive challenges for acquisition and translation. Currently, there is limited literature on the syntax of particle verbs; most centers around acquisitional corpus study. In order to investigate the patterns underlying such phrases,

this project analyzed the correlation between particle verbs and their transitivity patterns in German and English, as sampled in two corpora, the English and German TenTen20. Particle verbs are ubiquitous verb + prepositional constructions that output emergent semantic properties distinct from their constituents. German exhibits this construction in separable verbs, where the preposition prefixes to the main verb when not in clause second position. Transitivity identifies the specific number and type of objects that a verb takes. In order to investigate any statistical connections between the grammaticalization of phrasal verbs and transitivity patterns, we compiled a list of particle verbs in each language, labeling the transitivity of their non-particalized lemmas with one of five categories: monotransitivity, ditransitivity, ambitransitivity, pseudotransitivity, and intransitivity. Using the SketchEngine corpus, we then gathered the frequencies of each verb normalized per million. An ANOVA test resulted ($F5 = 0.376$, $p < 0.861$) in no significant relationship between the verb and transitivity type across both the English and German data; however, an ANOVA test on the English data approached significance ($F4 = 2.796$, $p < 0.0749$). This suggests that particalization mechanisms could differ cross-linguistically, making English transitive verbs more likely to generate particle verbs than German. Additional research may confirm this tentative conclusion.

Arctic Soil Respiration in the Community Earth System Model's Large Ensemble

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Arctic permafrost is a vast store of carbon, holding almost twice as much as the atmosphere currently does. Arctic amplification resulting in 2-4 times the temperature increases seen at the mid-latitudes for the Arctic means that the permafrost is at high risk. As permafrost temperatures increase and the ice begins to melt, this carbon starts to release in a gaseous form. The release of this carbon would be detrimental to efforts to reduce carbon emissions and would result in a permafrost-carbon feedback loop where the more carbon that is emitted from the permafrost results in warming which results in further emissions. Using a large ensemble of model runs from the Community Earth System Model v.2, we can analyze the spatial variation in these carbon emissions and the temporal variations. Having an understanding on the ways that carbon will be released from soil, and the consistency of this release, will be crucial in understanding how to prepare for future global climate change.

Madwoman Circe

Jasmine Means

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This essay explores the correlation between Madeline Miller's Circe and Brontë literature, guided through the frame of Gilbert and Gubar's The Madwoman in the Attic. Gilbert and Gubar's The Madwoman in the Attic interprets a number of texts (including but not limited to several Brontë works) through a strong feminist lens, and it discusses several female issues which are brought up in Madeline Miller's Circe. Gilbert and Gubar discuss the female gothic's exploration of the terror which swarms the idea of pregnancy, manifesting to the point of a fear of food. In the Victorian age, pregnancy may have been related to female entrapment thanks to women's general lack of power, but Pasiphaë becomes pregnant as a way of claiming power, and Circe becomes pregnant for herself– a pregnancy which leads to her ultimately freeing herself from her imprisonment. Miller therefore seems to subvert ideas about female pregnancy and empowers her female characters through their autonomy with pregnancy. The ultimate question of this essay is: what do the births performed by Circe and Pasiphaë say about their relationships to fear, power, internalized misogyny, and entrapment through the lens of Gilbert and Gubar's Madwoman?

Extending Knowledge and Skills in Disaster Management through Local Application

Jason Meng

Dr. Michelle Ritchie, Health Policy & Management, College of Public Health

This work meaningfully extends my knowledge and skills developed in classroom settings through courses offered by UGA's Institute for Disaster Management (IDM). After completing required coursework for the minor in disaster management, I worked with my faculty mentor Dr. Michelle Ritchie via a series of directed studies to continue to develop and apply my newfound knowledge and skills in ways that benefit our local communities. As a firefighter in Oglethorpe County, I work closely with the Emergency Management Agency (EMA). From this unique perspective, I was able to connect Oglethorpe EMA with UGA's IDM. I was also able to identify areas of need where applied projects could benefit our local communities. Namely, we hosted: (1) a meet-and-greet at IDM, (2) a discussion with staff about what to do in the event of an active shooter at a local nursing home, and (3) an interactive exercise for IDM students using Oglethorpe County EMA equipment and vehicles, such as ambulance and fire. I plan to continue this applied work due to the positive impact it has had on myself and our local communities.

The Detection and Quantification of Mpox Virus in Wastewater in Athens, Georgia

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Wastewater-based epidemiology is a progressive approach to tracking infectious disease transmission by detecting and quantifying pathogen abundance in wastewater to establish near-real-time community-level trends. Wastewater-based epidemiology has been employed in the public health response to Influenza A, respiratory syncytial virus, SARS-CoV-2, and more recently, mpox virus. Mpox, formerly known as monkeypox, can enter the wastewater stream after being shed in the feces of symptomatic and asymptomatic carriers or from scabs and lesions during showering or bathing. A wastewater-based epidemiology approach to tracking community-level mpox transmission may more accurately reflect epidemiological trends when contesting with potential underreporting in clinical data due to testing availability and social stigma. Wastewater samples were selected at key time points throughout the mpox 2022 outbreak from three different wastewater treatment plants in Athens, Georgia. Mpox virus and HF183, a human fecal marker, were quantified through RT-qPCR analysis to estimate viral abundance and investigate the timing and geographic history of mpox in Athens, Georgia. This retrospective analysis of the 2022 mpox outbreak could inform further wastewater surveillance efforts and improve future public health response to infectious disease outbreaks.

Agreement between Diary and Actigraphy Assessed Sleep in Women with Post-Traumatic Stress Symptoms (PTSS)

Regina Metz

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Not everyone who experiences a traumatic event develops post-traumatic stress symptoms (PTSS), but the risk for women is higher than men. After experiencing traumatic events, individuals who develop PTSS report sleep disturbances as the most prominent and debilitating symptom. However, a theory called sleep state

misperception posits that these individuals report worse sleep impairment than objective measures display. Regardless of the reason behind experiencing poor sleep, scientists expect the physiological benefits of exercise to alleviate that symptom. This experiment aims to determine if a discrepancy exists between the subjective and objective sleep quality in an individual suffering from PTSS and ascertain the effects of exercise in this regard. Because research in this subject lacks data on women, participants only include women between the ages of 18 and 39 who did not meet the recommended physical activity level and met all other qualifications for the study. Baseline testing lasts one week and consists of extensive psychological and physiological testing, including sleep actigraphy and sleep journal data each night. 6 weeks of routine high-intensity interval training on a stationary bike follow. To complete the study, the participants complete all the baseline protocol again. Data thus far indicates that individuals perceive their total sleep time during the weekdays as lower than it actually is and anticipate that exercise improves the correlation between the two measurements. Sleep disturbances severely impact the quality of life in individuals diagnosed with PTSD, so discovering a natural treatment alleviates the sufferings of that community significantly.

Communicating Uncertain Science to the Public
Caitlyn Miller
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In the wake of the "fake news wars" during the COVID-19 pandemic and the mass consumption of science-themed articles by the general public, it is apparent that reporting on scientific developments can lead to widespread panic and misinformation if not handled with care. The Communicating Uncertain Science to the Public (CUSP) lab seeks to determine the extent to which subtle wording changes alter individuals' interpretation of articles about emerging scientific studies. We predict that changes as small as what information is featured in a callout box and the degree of certainty with which the findings are framed will lead respondents to show significant differences in their interpretation of articles. While the current study is set to begin collecting data in the coming weeks, the current preparations made have been to target three themes of wide relevance to the general public (smartphone use, alcohol consumption, and climate change) and to create two versions of realistic articles (one with certain language, the other with uncertain language) reporting on emerging scientific studies related to each of the three topics. Respondents will be asked about how they interpreted the scientific discoveries. Pending survey results, we expect that our findings will impact the present understanding of journalistic best practices and provide a framework through which to evaluate which common practices lend themselves to unnecessary fearmongering or overly confident conclusions.

Reactions to Organizational Social Media Activism
Carsynn Miller, CURO Research Assistant
Dr. Brian Hoffman, Psychology, Franklin College of Arts & Sciences
After the police murder of George Floyd, many Fortune 500 companies stood in solidarity with the Black Lives Matter movement via social media. However, public reactions to such statements have a wide range, from praise to heavy criticism. What causes differential affective reactions to social justice posts made on organization's social media pages? Signaling theory proposes that organizations send out signals to receivers about organizational characteristics. With that, we have a hypothesis: Social media posts that are high on components of the message will lead to positive affective reactions and vice versa. A pilot study was launched utilizing 50 Fortune 500 companies with the goal of developing a coding scheme. In order to collect this data, social media posts from Twitter were compiled. Responses were also pulled for each social media post. To develop this coding scheme, volunteer assistants coded both the primary post and responses to the post. For the primary post, the coders identified components of the message in accordance with signaling theory. For the response posts, coders identified three affective adjectives per response to be used in the coding scheme. To provide quantitative insights, we also performed regression-based statistical analyses to view trends among the codes. It is anticipated that posts which more strongly signaled a positive corporate diversity climate will generally be received better. This study exhibits relevance through which it applies a widely accepted psychological concept to a social media context while shedding light on the role that organizations play in human rights issues.

Early Hearing Detection and Intervention in Georgia: A Survey of Strengths and Challenges
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Dr. Sandie Bass-Ringdahl, Communication Sciences and Special Education, Mary Frances Early College of Education
Around 2-6 per 1000 children are born with a hearing impairment each year. The newborn hearing screening process is critical for Early Hearing Detection and Intervention (EHDI). State EHDI programs strive to meet benchmarks recommended by The Joint Committee on Infant Hearing (JCIH) to improve outcomes for children who are deaf/hard-of-hearing (D/HH). These benchmarks include screening by 1 month, diagnosis of hearing loss by 3 months, and enrollment in early intervention by 6 months. EHDI coordinators are responsible for navigating families through the process in order to achieve these benchmarks, as well as overseeing training and community outreach. This study evaluates the factors that contribute to the strengths and challenges of the EHDI system in Georgia based on the perspectives of EHDI coordinators. To this end, a survey was developed to ascertain EHDI coordinators' perceptions on various aspects of the newborn screening process. The survey was sent out to the EHDI coordinator in each of Georgia's 18 health districts. The surveys were systematically coded to gain insight into the strengths and challenges encountered based on EHDI coordinator perceptions. The results of this survey provide insight into the current state of the EHDI system in Georgia from the firsthand knowledge provided by the coordinators. This information may be used to enhance the strengths of the system and identify barriers encountered. Targeted solutions will be discussed based on the responses obtained.

Optimizing Bioprinting Parameters for In Vitro Breast Cancer Metastasis Modeling
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Dr. Cheryl T. Gomillion, School of Chemical, Materials, and Biomedical Engineering, College of Engineering
Advanced fabrication methods such as three-dimensional (3D) bioprinting have become widely used in biomedical research. Bioprinting refers to applying 3D printing technology with materials that incorporate living cells to produce 3D structures. These 3D model tissues are more advantageous in comparison to traditional two-dimensional (2D) cultures since 3D tissue cultures are more physiologically relevant and predictive, can support fluid flow integration, enhance cell-to-cell interaction and signaling, and allow for modifications to microenvironmental conditions. The long-term objective of this work is to develop a bioprinted 3D model for studying breast cancer metastasis. Specifically, we aim to better understand the role of adipocytes in breast cancer metastasis using this approach. A CELLINK BIOX6 bioprinter was used to develop an in vitro adipocyte-based model construct using gelatin methacrylate (GELMA) as a printing medium. Printing parameters, including nozzle pressure, printhead temperature, printbed

temperature, printhead speed, pre-flow delay, and crosslinking time, were optimized to create a reproducible construct. This GELMA construct was used to evaluate the role that adipocytes play in breast cancer development and progression. For implementation, a circular polycaprolactone (PCL) scaffold template with an array of cell compartments and channels was fabricated. D1 mesenchymal stromal cells differentiated to adipocytes and triple negative breast cancer cells (HCC1806) were encapsulated in GELMA, printed, and photocrosslinked into the PCL template to create a 3D co-culture model. Cell viability and cell migration were assessed. Successful model implementation will inform future treatment options based on better understanding of adipocytes in breast cancer metastatic.

Appalachian Salamander-Parasite Interactions Respond to Forest Treatment for the Control of Invasive Tree Pests

Jess Moczulski

Dr. Sonia Altizer, School of Ecology

Imidacloprid is a neonicotinoid insecticide widely used in the southeast Appalachian region to protect hemlock trees from the hemlock woolly adelgid, an invasive insect pest. Forests affected by this pest experience the loss of hemlock trees, leaving the forest floor ecosystem exposed to new abiotic conditions, such as increased sunlight, evaporative water loss, and mechanical disturbance. Ground dwelling invertebrates, including insects and parasites, and vertebrates, such as salamanders, could be directly and indirectly affected by pesticide treatment. This study focused on terrestrial salamanders endemic to the southeast Appalachian region in areas that were treated vs untreated with imidacloprid, to ask how pesticide treatment affects parasite transmission, diversity, and abundance in salamanders. We dissected salamander digestive tracks from two lungless salamander species - Plethodon jordani and P. shermani, collected from plots with trees treated with imidacloprid and those untreated. We identified a number of previously described parasite species, including trematodes, nematodes, and cestodes, and documented host infection status and parasite load. We expect to see differences or trends in parasite abundance, diversity, or both in salamander species. Parasites in untreated plots transmitted through intermediate hosts may decrease compared to those with direct life cycles, due to changing abiotic conditions for intermediate hosts. The results of this study could provide insight into how insecticide use may impact species sensitive to climate fluctuation, such as salamanders of the Applachians, and can influence decisions on whether or not to use imidacloprid in their ecosystems.

Health Equity in South Africa and the United States in the Age of the Pandemic: The Lingering Effects of Apartheid and Jim Crow

Harper Ann Moffett

Dr. Markus Crepaz, International Affairs, School of Public and International Affairs

South Africa has a long history of discrimination and inequality, most notably characterized by apartheid. Similarly, the United States also has a history of discrimination, inequality, and inequity, most notably characterized by Jim Crow. Both countries have had both systematic and systemic policies that have favored whites over blacks, policies that continue to permeate society and the respective healthcare systems. Despite government efforts to remedy the healthcare systems, both health outcomes and healthcare remain skewed along racial lines. The COVID-19 pandemic has only served to further exacerbate and highlight discrepancies in healthcare access and provision in both the United States and South Africa. Therefore, this comparative study with the United States and South Africa will serve to determine levels of health equity in South Africa as compared to the United States, examining factors such as race, gender, and income. Initial research will be conducted through literary review, an aggregate-level analysis comparing hospitalizations and death rates per capita, and an individual-level analysis using public opinion data. This paper aims to determine if the end of apartheid/beginning of democracy has helped increase health equity in South Africa, or if there is still a divide in healthcare coverage and provision between whites and blacks. It is hypothesized that there have been more COVID-19 hospitalizations and deaths among the Black population for both the U.S. and South Africa, showing disparities in healthcare along racial and economic lines.

Anti-Counterfeiting Technologies for the Luxury Fashion Sector: Benefits and Drawbacks

Lauren Elizabeth Moise

Dr. Katalin Medvedev, Textiles, Merchandising & Interiors, College of Family and Consumer Sciences

The circulation of counterfeit luxury goods negatively impacts brand image, consumer confidence, the fashion industry, and the economy at large. To establish a robust anti-counterfeiting system, luxury fashion brands must be aware of the technologies available to assist in the authentication of their products. The purpose of this study is to discuss the benefits and drawbacks of currently available digital technology solutions for detecting counterfeit goods. We reviewed U.S. customs statistics, U.S. court cases, consumer behavior analyses, media stories, case studies, and white papers that focus on counterfeit goods. Although there is some research on luxury counterfeiting and anti-counterfeit solutions, no academic study has examined the current technologies available for combatting luxury fashion counterfeiting. To remedy this, our research explores potential solutions that could reduce counterfeiting in the luxury fashion industry. We identify existing successful solutions in fashion and other industries, such as Redpoints and MarqVision artificial intelligence (A.I.) software and AlpVision and VerifyMe invisible serialization. We also discuss ineffective attempts, such as Quick Response (Q.R.) codes and Radio-Frequency Identification (RFID) tags. We believe that our analysis of existing counterfeit methods and technologies will be beneficial to the fashion luxury industry.

Assessing Diversity in Visual Journalism through Photographer, Subject and Community Demographics

Cassidy Rose Moore, CURO Research Assistant

Dr. Kyser Lough, Journalism, Grady College of Journalism & Mass Communication

This study explores the relationship between the diversity of newsroom photojournalists and the coverage of their respective communities as represented through the lens of feature photographs. Feature photos offer a slice-of-life depiction of a given community, often based on the individual agency of the photojournalists who make the images. Newsroom representation has been connected to a more accurate representation of a community, but only in broad examples of coverage. Here, we use the feature photo as a specific window into how a community is presented visually outside of the regular news cycle, and therefore ask: RQ1a: How is a community's diversity (race and gender) represented in feature photos by the photojournalists who cover it? RQ1b: How does the diversity (race and gender) of the photojournalists moderate this? We believe that feature images will more accurately reflect a community's race and gender diversity when the photojournalists also accurately reflect that community's race and gender diversity. Our study will answer these questions through a content analysis of feature photos from 92 U.S. newspapers over a two-year time period compares the demographics of the photojournalists, the people in the photographs, and the coverage community. We ultimately aim to better understand the connection of representation within the newsroom, within the community, and within the newsroom's

coverage of the community. Our findings present a valuable opportunity to look at the feature photo as reflective of how a community's culture and identity can be influenced and defined by the agency of local newsrooms.

The Effects of Boring Sponge (Cliona celata) Infection on Eastern Oyster (Crassostrea virginica) Engineering Function

Kate Moore, CURO Research Assistant
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Eastern oysters are a key foundation species along temperate coasts and perform various ecological functions such as improving water quality. However, oysters are frequently host to various parasites that may affect biological processes, such as filtration. If filtration is affected, variation in parasite intensity and prevalence, can lead to differences in water quality across a coastline. One of the most prevalent parasites in oysters is the boring sponge (Cliona celata), that bores into the shell of the oyster, causing structural damage. This may require oysters to devote more energy towards shell repair than to other physiological processes. To examine the effects of C. celata infection on filtration rates, we conducted an experiment measuring chlorophyll-a removal by oysters with live C. celata, dead C. celata, and healthy individuals with no C. celata. Preliminary results indicate that live C. celata presence increases filtration, whereas oysters with dead C. celata have dampened filtration with lower clearance rates than non-infected individuals. Our results suggest boring sponge presence may inflate oyster filtration, possibly causing a positive effect on estuarine water quality in the short term. However, over the long term, boring sponge infection may increase oyster mortality, diminishing the impact of a short-term boost in filtration or water quality.

Association between Proactive and Reactive Aggression and Substance Use: A Meta-Analysis

Jesus Morales
Dr. Noel Card, Human Development & Family Science, College of Family & Consumer Sciences

Of United States adolescents, 2.08 million reported using drugs in the last month. Child and adolescent aggression have been identified as a strong predictor for substance use. Researchers categorize aggression as proactive or reactive. Proactive includes acts meant to lead to some desired outcome, whereas reactive occurs in response to perceived threat. The link between proactive aggression with substance use has been shown as a predictor for substance abuse into adulthood. Research examining reactive aggression and substance use produced conflicting results. Further research is needed to better understand the link between proactive and reactive aggression with substance use. With this understanding, steps may be taken to devise more efficient prevention and intervention methods. The present meta-analysis examines the association between proactive and reactive aggression with substance use during adolescence. We searched the literature for "Proactive Aggression or Instrumental Aggression", "Reactive Aggression", and "Substance Use" yielding 26 potential studies. After screening, 8 studies met inclusion criteria. We coded sample size, average participant age, race, country, and substance use measurement. Effect sizes were coded as correlations between substance use and both aggression types. The random effects weighted average effect size between proactive aggression and substance use was significant ($Mr=0.2146$, $p<0.001$), as was the that between reactive aggression and substance use ($Mr=0.2285$, $p<0.001$). Heterogeneity was significant for both models (Proactive $Q=104.8053$, $p<0.0001$, Reactive $Q=45.8058$, $p<0.0001$). These findings suggest a link between proactive and reactive aggression with substance use, although there is a need for additional research because of the presence of significant heterogeneity.

The Effect of Microbiota Transplantation on Weight Gain

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Consumption of caloric dense diet leads to increase in caloric intake and body fat mass accumulation. Diet changes microbiota composition, leading to inflammation of the gut-brain axis. Gut to brain communication plays a key role in regulating food intake. In this experiment, we investigated if microbiota transfer could normalize inflammation along the gut-brain axis and reduce weight gain in obese animals. We used two groups of rats, one fed a high fat diet (HF, 45% fat), and one fed a chow diet (low fat, LF, 13% fat). Animals from each cohorts received a microbiota transplant from a rat either on a LF or HF diets, with four final groups LF (no transplant), LF-LF, HF-LF and HF-HF. At the end of the study, nodose ganglion were collected. The nodose ganglion is where the cell bodies of the neurons innervating the gut and projecting to the brain are located. To determined inflammation levels, we stained sections of the nodose ganglia using a marker for immune cells (Iba1). In HF fed rats, colonization with a LF type microbiota reduced weight gain compared HF-HF rats. The results of from the nodose ganglia staining are still being analyzed. However, results of the study can lead to further understanding of the roles of the gut microbiome and diet in relation to gut-brain signaling via microbiota transplantation. In human's microbiota transplantation has been used to treat debilitating gastrointestinal infections, such as Clostridium difficile and is suspected to be an effective therapy in chronic conditions affecting the gut such as Crohn's disease. Continuing to explore the effects of microbiota transplantation and understanding the mechanisms involved is imperative to the treatment and prevention of chronic diseases and acute afflictions affecting countless people around the world.

Warfare at Kaman-Kalehöyük, Turkey: Isotopic Analysis of Burned Remains - Preliminary Data and Future Directions

Natalie Marie Moss, CURO Research Assistant
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The discovery of a Middle Bronze Age burned fortress at Kaman-Kalehöyük, Turkey offers the unique opportunity to add to the archaeological record of the Old Assyrian Colony via the study of the burial population within and around the fortress. Strontium stable isotopes have the potential to inform on the mobility, and thus politically driven human movements, of these individuals. During growth, strontium is partially substituted for calcium within the inorganic component of enamel. This substitution is proportionate to environmental prevalence, which varies with local geology. By first establishing a baseline for expected local values, outlier individuals can be identified as nonlocal to a given area. As such, the identification of isotopic ratios in the tooth enamel from the burial population will allow for local individuals to be distinguished from immigrants. Phase I of the analysis of these individuals has been completed at the Quaternary Isotope Paleoecology Laboratory at the University of Georgia, with the aim of receiving and interpreting strontium data in 2023. This included the destructive sampling of the molars for stable isotope analysis, as well as 3D modeling of the teeth prior to destructive sampling. Models were constructed using the photogrammetry software RealityCapture, and a best-practice methodology for reconstructing human teeth was written. Techniques such as photogrammetry are essential to the preservation of records of human remains, and should be implemented in best-practice ethical guidelines for situations involving destructive sampling.

Warfare and Isotopic Analysis as an Indicator of Violence – Construction of an Osteobiography

Natalie Marie Moss, CURO Research Assistant
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As part of a larger strontium isotope provenancing project of several sites in the Southern Levant (Kaman-Kalehöyük, Alişar Höyük, Tell al-Hayyat), an individual discovered within a clandestine grave at Tell al-Hayyat was analyzed for carbon, nitrogen, and strontium. Tell al-Hayyat was a small, Middle to Late Bronze Age village located north of the Jordan River floodplain. In analyzing the remains at Tell al-Hayyat, we aim to better understand human mobility and thus politics during the Bronze Age in Turkey, and to better understand violence in the Southern Levant as a result of those politics. The individual discovered at Tell al-Hayyat, like the other individuals included in the sample population, displayed evidence of a violent death. However, unlike the other sites, he was the singular individual buried in the area, and the nature of his burial sparked interest in the construction of a bioprofile via osteological analysis. His remains were recovered from a kiln, and consisted of bones from both hands, cervical vertebrae and vertebral fragments, and a fragmented skull. Previous interpretations hypothesized he was young male adult, and cut marks on the vertebrae suggest he was decapitated prior to being placed in the kiln. This study includes newly discovered paleopathological data, however, that may better inform on the circumstances of his death. Uncharacteristic degenerative changes to the cervical vertebrae (suggesting overuse), the state of his dentition, muscle-attachment rugosity, and treatment of the remains may suggest this individual was a Bronze Age soldier who was killed and buried at Tell al-Hayyat.

Rock-Water Interactions in Tumbling Rock Cave, Alabama, USA: Geochemical Analysis of an Underground Stream System

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Sustainable water management in karst landscapes remains a challenge due to extreme local and regional heterogeneities. Our understanding of these factors, however, is key to natural resource usage and conservation. In partnership with the Southeastern Cave Conservancy (SCCi), our reconnaissance study focused on the hydrologic characterization of Tumbling Rock Cave in Alabama, USA. The rock-water interactions component aimed to link our knowledge of local stratigraphy with modern groundwater chemistry to understand the impact of geology on the cave's stream system. Tumbling Rock is a well-explored but under-studied cave system spanning the Monteagle Limestone Formation. One major stream flows through the cave, collects water from drips and conduits, and exits as a spring. The stream and inflow locations were mapped with a traditional survey assisted by terrestrial LiDAR and preexisting maps, and a conceptual model of the stream system was developed. Water samples were collected from multiple reaches of the stream and various inflows. Suites of physicochemical measurements were recorded, including pH, electrical conductivity, and temperature. Eleven samples were analyzed for their elemental composition, specifically common ions in natural waters: Na^+, K^+, Ca^{2+}, Mg^{2+}, Cl^-, HCO_3^-, and SO_4^{2-}. These were compared by stratigraphic location, proximity and type of nearest inflow, and depth in the cave; plotted as Piper diagrams; and modeled with PHREEQC. Our analysis provided information about the state of rock-water interactions and potential for mineral dissolution and precipitation throughout the cave. This research improved our understanding of Tumbling Rock Cave and informed the natural resource management practices of SCCi.

The Association between Levels of Post-Traumatic Stress Disorder and Meaning in Life: A Meta-Analysis

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Most people who experience a traumatic event do not develop post-traumatic stress disorder (PTSD; Breslau et al., 1991; Kessler et al., 1995). This implies that there are factors that make certain people more resistant to developing PTSD. Determining these factors could have significant treatment implications and be useful in predicting outcomes for people diagnosed with PTSD. In this study, we consider that meaning in life could be a protective factor for the development of PTSD by conducting a meta-analysis on correlational data (Pearson's r) from 10 studies (N= 3,153, Mage = 37.37, 50.03% female). An initial literature search for keywords relating to meaning within articles citing the PCL-5 yielded 172 studies for inclusion. Ten of these studies included the necessary correlational data to be included in the meta-analysis and calculate effect sizes. The random effects weighted average effect size between meaning and PTSD was significant (Mr= -.512, p<.001, 95% CI [-.63, -.50]). Heterogeneity for this analysis was significant (Q=49.83, p <.0001, I2=73.42, Tau2=.01). The current study found a significant, moderate, negative association between meaning in life and post-traumatic stress. These results are in line with several theories (Lazarus & Folkman, 1987; Park, 2010) which suggest that meaning in life plays a crucial role in an individual's response to traumatic events. The results of this study support the use of therapies designed to increase a person's levels of meaning as a treatment for people who have experienced a traumatic event or have been diagnosed with PTSD.

Evaluating a Brain Health Education Training Program among Professional Health Educators

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Alzheimer's disease and related dementias (ADRD) are expected to increase by 26.7% in Georgia by 2025. Although no cure exists, improving a subset of health behaviors, (e.g., diet, smoking cessation, exercise) may prevent up to 40% of ADRD, particularly in rural communities with higher risk. As 70% of Georgia's counties are rural, educational interventions tailored to rural Georgians are needed. Here, we create and evaluate a rurally tailored ADRD-risk education program, to be presented by rurally-located Cooperative Extension educators. Following a needs assessment, an evidence-based, rurally tailored ADRD prevention program was created. Family and Consumer Sciences Extension agents (N=35; 0.5-30 years of experience) from across Georgia were trained to deliver the presentation in their communities and surveyed following training via the Qualtrics online survey platform. Agents viewed the training as engaging (M=4.79/5±0.40), expressed high likelihood (M=4.71/5±0.74) to use the presentation and felt confident (M=4.94/5±0.24) in delivering content. Agents rated the program reading level (handouts, 94.12%; presentation, 85.29%; pre- and post-tests, 87.5%) "just right" and ranked cultural appropriateness "extremely appropriate" (M=4.43/5±0.96). Agents indicated community members would be highly likely to attend (M=4.53/5±0.78) and would view the content as important (M=4.71/5±0.62). Accessible and culturally appropriate education is needed to reduce ADRD risk among rural Georgians. Agents expressed high satisfaction with programming and felt prepared to deliver programming in their communities. Moving forward, community member satisfaction will be evaluated.

Assessment of Changes in Cognition and Motor Function in Response to a Proprietary Neuroprotective Agent in a Piglet Model of Traumatic Brain Injury

Charlie Sachi Nakatsu
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Traumatic brain injury (TBI) is a leading cause of death and disability in children in the United States. Children who sustain a TBI harbor a greater risk of developing long-lasting cognitive and motor function deficits. Currently, there are no FDA-approved treatments for TBI leading to an increased interest in developing neuroprotectant therapies that can reduce inflammation, edema, and tissue damage and restore function in TBI patients. Therefore, the objective of this study was to determine if treatment with a proprietary neuroprotective agent mitigates acute inflammatory responses and improves functional recovery in a piglet TBI model. In this study, pigs underwent controlled cortical impact surgery to induce TBI and received subcutaneous injections of a low dose (LD) neuroprotectant (n=4), high dose (HD) neuroprotectant (n=4), or placebo (n=4) every 8 hours for 5 days. Changes in cognition were assessed using the three-chamber social recognition test (SRT) and the object recognition test (ORT) and changes in motor function were assessed using a semi-automated GaitFour mat between 1 and 42 days post-TBI. Compared to placebo pigs, it is expected that LD and HD pigs will spend more time with the novel pig in the SRT and the novel object in the ORT as well as exhibit improvements in gait velocity, cadence, and cycle time via gait analysis due to decreased brain damage and enhanced functional recovery after treatment with the neuroprotectant. This study lays the framework for future efficacy and safety studies as it moves towards human TBI clinical trials.

Assessing International Health Practioners' Autism Knowledge in Various Subscales

Prisha Nanda Kumar, CURO Research Assistant
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Autism spectrum disorder (ASD) knowledge has been well-documented among the general public and teachers, but less so among medical professionals who play an important role in screening and diagnosis. Early evidence shows that medical practitioners have insufficient knowledge of ASD, with concerningly low levels compared to the lay public. It's important to identify the main areas of knowledge deficits to properly intervene, especially in symptoms given the role they play in recognition and referrals. To examine profiles of ASD knowledge strengths and weaknesses among healthcare providers, the autism stigma and knowledge questionnaire (ASK-Q) will be used to assess knowledge and stigma among mental health professionals across different countries and demographics. The study aims to compare the means of the different ASK-Q subscales (symptoms/diagnosis, treatment, etiology, stigma), using ANOVA to determine if there are particular knowledge domains that are concerning for health professionals. At least one domain is expected to be of lower knowledge. The goal is to inform intervention development needs for health professionals.

Minimum Wage and Human Voter Rights: What's the relationship?

Milan Nayak
Dr. K. Chad Clay, International Affairs, School of Public & International Affairs

Human rights and the minimum wage: what's the relationship? Economists have been debating on the topic of the minimum wage's effects on unemployment, consumer choices, and industry prices for decades, with still no conclusive answer. This paper takes a different, not-so-common view on the minimum wage and examines insight on this matter through a qualitative lens via a human rights perspective: specifically comparing the human right to government participation to wage rates across the country. How are the rights that one has merely to being human and the minimum wage rate a worker gets paid even related? How causal are they? I argue that because low wage workers earn less money, they won't have as much time for other non-economic activities because they will need to spend more time working in order to afford basic necessities such as rent, food, healthcare, etc. An increase in wage will give people more time to meet their essential needs of food, water, and shelter, thus giving them the opportunity to vote and exercise their rights as denoted in American domestic law and international law. Essentially, increasing the current wage of workers will increase the chances of the opportunity cost, that being voting which is the next best alternative to working, being fulfilled. People with lower incomes are less likely to vote because of other pressing economic concerns.

Enzyme Activity of Key Krebs Cycle Enzymes in a Model of Volumetric Muscle Loss Injury

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Volumetric muscle loss (VML) is the frank loss of skeletal muscle tissue by trauma or surgery. Previous studies have shown that metabolic function is impaired following VML injury. The primary objective of this study was to determine if key Krebs cycle dehydrogenase enzymes are affected by the VML injury. Male C57BL/6 mice underwent unilateral VML surgery to one limb's hindlimb plantar flexors (gastrocnemius, plantaris, soleus), while the other limb was uninjured at age 12 weeks. At 8 weeks post-injury, the gastrocnemius muscle is homogenized in phosphate buffer (1:40) using a glass homogenizer. Krebs cycle enzymes glutamate dehydrogenase (GDH), malate dehydrogenase (MDH), and α-ketoglutarate dehydrogenase (aKGDH) were tested using a HORIBA spectrofluorometer using homogenate from uninjured and VML-injured muscles. The reagent buffer (50 mM phosphate buffer with 10 mM $CaCl_2$, 200 mM $MgCl_2$, 2 mM Rotenone, 8 mM NAD^+, 100 mM coenzyme A, 300 mM thiamine pyrophosphate) was mixed with the muscle homogenate, and glutamate, malate, or α-ketoglutarate were added, respectively, to initiate the enzymatic reaction. Based on the existing literature on metabolic dysfunction in VML-injured muscle fibers, I hypothesize the enzyme activities of GDH, MDH, and aKGDH in the VML-injured muscles will decrease. The results of this study will provide further understanding of metabolic function following VML injury and can potentially be implemented into future VML injury rehabilitation strategies.

Effects of Attentional Impulsivity on Cognitive Control

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Cognitive control can be tested through various eye tracking paradigms that measure saccades, or rapid eye movements. Prosaccade tasks require subjects to make a saccade to a peripheral stimulus while antisaccade tasks require a saccade to be generated to the exact opposite location of the peripheral stimuli in equal distance. Antisaccades require more recruitment of cognitive processes such as attention, inhibition, and working memory, as indicated by longer reaction times and higher error rates. Previous research has established a strong correlation between faster prosaccade latencies and increased antisaccade errors in individuals with high working memory. We hypothesize that faster prosaccade latencies and higher antisaccade error rates will strongly correlate to high attentional impulsivity compared to those with low attentional impulsivity. Data were collected from 182 healthy undergraduates aged 18–22 years. Attentional impulsivity scores

were measured on a scale of 0-32 using the Barratt Impulsiveness Scale (BIS-11) survey. Participants with low impulsivity scored between 0-16 (n=81) and those with high impulsivity scored between 17-32 (n=102). Simple linear regression was used to test if prosaccade reaction times and attentional impulsivity predicted the antisaccade error rates. The overall regression was statistically significant ($R2 = 19.4$, $F(2,180) = 5.114$, $p < .05$) suggesting that attentional impulsivity does play a role in mediating the relationship between prosaccade latency and antisaccade errors. These results may help elucidate the variance in antisaccade error rates in healthy undergraduates, which may help clarify the effect attentional impulsivity has on these individuals.

The Kinetic Trapping of the Evasive Phosphatetrahedrane
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Dr. Henry F. Schaefer, Chemistry, Franklin College Arts & Sciences
Though phosphatetrahedrane is predicted to have high relative kinetic stability, synthetic chemists have nonetheless failed to successfully isolate it. This paper proposes the most significant reaction pathways for the decomposition of phosphatetrahedrane to offer insight to synthetic chemists wishing to synthesize this elusive compound, which has potential applications in energy research, and extends that analysis to singly, doubly, and triply substituted forms of phosphatetrahedrane. Ab initio computational methods are used to analyze the energetics of the transition states and minima of each respective pathway, allowing for the precise calculation of reaction barrier heights, the lowest of which was found to be 31.0 kcal/mol. Hammond's Postulate is used to deduce the relative import of certain structural motifs on the overall endothermicity or exothermicity of each pathway. This paper motivates future work in synthesizing the elusive phosphatetrahedrane compound with a bolstered understanding of the system's energetics and dynamics.

The Home Front: Changes in Domestic Space during the Intensification of Conflict in Northern Iroquoia, ca. 1475-1615 CE
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Dr. Jennifer Birch, Anthropology, Franklin College of Arts & Sciences
During the later 15th century through the early 17th century CE, Northeastern North America witnessed an eruption in violent conflict. Archaeological evidence for endemic warfare during this period includes a proliferation of human remains bearing signs of perimortem trauma and the formation of large, densely populated and highly defensible settlements. While a great deal of attention has focused on identifying evidence for conflict, less attention focused on how warfare and aggregation into larger settlements resulted in changes in domestic life for the people living through and responding to these events. In this study, data on the spatial arrangements of Iroquoian longhouses and villages sites in Ontario and New York was quantified, with particular attention given to living space, storage area, house length, external activity areas and site area. By comparing these dimensions, we can understand how compromises might have been made as space became limited. We hypothesize that as communities coalesced, living space within houses was sacrificed for needed extra storage area on account of people being less free to forage or otherwise operate in a landscape convulsed by war. This study permits new insight into how change in individual domestic groups occur when the cultural landscape shifts as a result of sacrifice necessitated by violence.

Population Ecology of the Common Musk Turtle (Sternotherus odoratus) in a Georgia Piedmont Ecosystem.
Seamus O'Brien, CURO Summer Fellow
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Common musk turtles, Sternotherus odoratus, are among the most abundant freshwater turtles across eastern North America. Despite their commonness over a wide geographic area, little is known about their ecology compared to other turtles with similar ranges. S. odoratus typically occur in lentic water systems such as wetlands, ponds, and river oxbows. Behaviorally the species is wary of basking and seldom leaves the water due to their small size and reduced plastron. We compared the morphology and abundance of S. odoratus across 16 ponds within the Whitehall Experimental Forest as well as sections of the North Oconee and Middle Oconee Rivers that border the property in Clarke County, GA. Ponds included human made impoundments and natural bottomland wetlands. We captured and marked 200 individual S. odoratus in 2022 and have a 15% recapture rate. Of the adult individuals caught, 41% were male and 49% were female. Maximum body size (straight line carapace) varied among ponds and was positively correlated with proximity to the river. Aquatic turtles make important contributions to the trophic structure and nutrient dynamics of wetland systems. Understanding patterns in the abundance of common species, such as S. odoratus, across a landscape improves our understanding of the structure and function of these critical systems. Comparing anthropogenic constructed wetlands to naturally formed wetlands also tells how human development impacts the life history and morphology of aquatic vertebrates.

Attentional Deficits Related to Compromised Target Detection in Visual Paradigms
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Attentional deficits in schizophrenia are potentially a mechanism for perceptual problems and can be studied through neuroimaging paradigms. Target identification tasks identify selective visual attentional processing deficits but are unable to determine whether these deficits are caused by issues in detecting target events in a paradigm or in attending to target locations. To address this issue, we hypothesized that psychosis individuals would demonstrate proper attentional resource allocation but would show deficits in neural measurements of target detection. To determine whether schizophrenia attentional deficits relate to attentional deficits or target detection deficits, we used complex visual tasks to separate the neural response related to attention engagement and that related to target detection. 47 schizophrenic and 78 healthy subjects completed this visual target detection task while 256 dense array EEG was recorded. During the task, 5 horizontal bars flickered at a steady rate of 8.33 Hz, while 6 vertical bars – a central, 2 middle peripheral, and 2 outside bars – flickered at 7.69 Hz, 7.14 Hz, and 6.67 Hz respectively. During the task all vertical bars would randomly vary in width, and subjects were asked to press a button in response to the central or middle peripheral bar width changes. We collected behavioral responses (d-prime), Event Related Potential responses (p300), and attentional target detections (SSVEPs). We used SPSS to assess statistical significance between healthy and schizophrenic responses and found that attentional deficits in schizophrenia were related to target detection of visual events and not attentional selectivity deficits.

Dissecting the Interactions Between the Bacterial Predator Acinetobacter Baylyi and its Prey Escherichia Coli
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Bacteria exhibit predator-prey relationships similar to macroscopic wildlife found in large-scale ecosystems. The soil bacterium Acinetobacter baylyi uses a well-characterized type six secretion system (T6SS) to kill other bacteria and consume their cellular

components. In killing and consuming other species, A. baylyi can also take up their DNA and acquire new genetic material including antibiotic resistance genes in a process called horizontal gene transfer. While much is known about the T6SS-mediated killing of prey cells, it remains unclear how A. baylyi initiates interactions with its prey. Preliminary data from the Ellison laboratory indicate that A. baylyi uses adhesive appendages called type 1 pili (T1P) to bind and attach to other bacteria such as Escherichia coli for subsequent killing. However, the mechanism of this T1P-prey binding remains unclear. In this work, we will seek to identify the factors that are important for predator-prey binding through a combination of microbiology, genetics, microscopy, and biochemical assays. I will also perform genetic screens that will seek to isolate prey mutants that are resistant to A. baylyi attachment, and I will likewise carry out genetic screens to isolate A. baylyi mutants that are unable to attach to their prey. These predator prey interactions often involve horizontal gene transfer leading to the spread of antibiotic resistance. Understanding the nature of these interactions, can increase understanding of how antibiotic resistance is acquired.

Visualizing the Plasmodium Food Vacuole for PRC1590 Co-localization Experiments

Temiloluwa Ogunsanya
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Malaria is a deadly disease caused by the Plasmodium parasite. In 2020, an estimated 240 million people were infected with a total of 627,000 deaths. Though treatable, strains of the malaria parasite have developed resistance to the most effective antimalarials. Hence, researchers must develop new antimalarials to be used against drug-resistant parasites. PRC1590 is a compound discovered by the Cassera Lab as a potential antimalarial. The next step in the drug discovery process is determining the compound's molecular target in the parasite. PRC1590 is potent in the parasite's trophozoite stage, the lifecycle stage where the parasite begins to consume its host red blood cell and form the food vacuole (FV). Due to this stage-specific potency, we hypothesize that PRC1590 has a mechanism of action related to the parasite's FV. To test this hypothesis, we are using fluorescence microscopy to visualize where PRC1590 localizes in the parasite. PRC1590 is auto-fluorescent and requires no further staining. For this project, we are optimizing the visualization of the FV with multiple stains. We have attempted to stain the FV with LysoTracker, a stain with an affinity for acidic organelles. Additionally, we have used a fluorescent sugar that labels the red blood cell and localizes to the FV. Preliminary results show that PRC1590 co-localizes with these FV stains. Future experiments will be to compare the localization of PRC1590 in different drug-resistant strains of malaria. This project contributes to the ongoing effort to identify novel compounds potent against malaria.

Exploring the Validity of an Instantaneous Fatigue & Recovery Test Using Electrical Stimulation and Accelerometer

Justin Minwoo Oh & Amishi Patel
Dr. Kevin McCully, Kinesiology, Mary Early Frances College of Education Education

Skeletal muscle fatigue is commonly associated with many clinical conditions. Previous electrical stimulation tests showed noticeable potentiation between the few sets of plantar flexion exercises followed by a decrease in muscle twitch velocity and fatigue over time. The objective of this study is to measure and explore the validity of the instantaneous muscle fatigue and recovery protocol as it measures fatigue in the gastrocnemius muscle during plantar flexion exercise. A wireless triaxial accelerometer record movement of the medial gastrocnemius muscle, while electrical stimulation will deliver twitches to the muscle and determine the strength of the muscle over time. Following two sets of baseline twitch contractions, healthy individuals will perform six rounds of plantar flexion exercise, each lasting for seven seconds. This exercise will serve as the fatiguing protocol. Between each round of calf raises, two twitch contractions will be delivered to the muscle and used to determine whether muscle fatigue occurred. Participants will then undergo a recovery phase which consists of two twitches every 30 seconds for 5 minutes. Muscle twitch velocity and exercise intensity will be analyzed over time and compared to the movement of the calf. Based on preliminary tests, the overall movement of the calf was higher than at the beginning of the exercise which contradicts the initial hypothesis that decreased twitch fatigue should also be correlated with low movement production. In the future, the goal would be for clinicians to utilize this diagnostic tool of measuring muscle fatigue while patients perform physical activities.

Rapping Resistance: The Evolution of Hip-Hop Music in the Black Communities of Brazil and the United States

Sarah Ayomide Olatidoye
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The transatlantic slave trade (1604-1807), or travessia, marked the beginning of the African diaspora, uprooting African communities and cultures to North and South America among other continents. Blacks experienced similar yet uniquely distinct forms of oppression, abuse and isolation in North and South America. As involuntary transplants to a foreign land, black communities strived to not only maintain their traditions, but also create a new sense of identity as generations continued. Therefore, cultural practices and new traditions became powerful tools of resistance against white domination. In the United States and Brazil, music played a transformative role in empowering African American and Afro-brazilian communities. Not only do we see prominent elements of African culture within slave spirituals, but also forms of resistance that persisted through abolition and beyond. Today, hip-hop serves as a form of resistance and expression for black Americans; likewise, the unique sound of funk carioca echoes the same message for Afro-brazilians. This research paper seeks to examine the evolution of hip hop music in Brazil and the United States--from a marginalized genre to the proud voice of the people. Through the analysis of music history, song lyrics and prominent themes throughout African American and Afro-brazilian culture, I will compare and contrast genre styles and sound with the goal of explaining how each respective community utilized hip hop to not only resist but expand opportunities for its members. Ultimately, this research would better inform our understanding of genre creation within the African diaspora and its effects on black communities as a medium of expression and empowerment.

Optimizing Extraction Methods of Northopassaolora personata for Whole Genome Sequencing

Christian Tyler Ona, CURO Research Assistant
Dr. Marin Talbot Brewer, Plant Pathology, College of Agricultural & Environmental Sciences

Northopassalora personata is a major fungal pathogen found worldwide in peanuts that causes late leaf spot (LLS). When left untreated, together with early leaf spot (ELS) caused by Passalora arachidicola, they can cause up to an 80% loss in biomass production and severe financial losses for farmers. Despite this, very little has been done to determine the population structure and diversity of these pathogens which is vital data for plant breeders to develop and select resistant peanut cultivars for farmers to use. My research focuses on determining the genetic diversity of both pathogens using isolates collected internationally from countries such as Brazil, Haiti, Senegal, and Uganda, as well as domestically

from states such as Georgia, Oklahoma, and Virginia. We have previously studied the diversity of LLS using the internal transcribed spacer (ITS) region in fungi, but we need to sequence the entire genome for conclusive results. Currently, our research has reached a bottleneck due to both the slow growth time of isolates, which can take up to four weeks, and due to current DNA extraction methods producing low-quality samples that cannot be used in Illumina sequencing. Our goal this semester has been to troubleshoot our current DNA extraction methods and create a method that can be done at scale that consistently produces high-quality samples suitable for sequencing.

Plastic Ingestion by an Omnivorous Mammal, the Ringtail (Bassariscus astutus), in a National Park

Logan Lane Owens, CURO Research Assistant
Dr. Sonia Altizer, Ecology, Odum School of Ecology

Plastics are pervasive human-derived contaminants that pollute natural wildlife habitats. Ringtails (Bassariscus astutus), an opportunistic omnivore species living in Grand Canyon National Park, have been documented consuming human foods and their plastic packaging in human-dominated environments. To better understand the frequency of plastic ingestion by ringtails in this protected park, we collected 120 scat samples in 2021 from sites of high vs. low human use in Grand Canyon National Park. The areas of lower tourism included wilderness areas along trails and areas of higher tourism were sites with vehicle access such as the historic El Tovar Hotel. We visually examined scat samples to identify the anthropogenic components and quantified the proportion of plastic by weight. We performed a hot needle test to validate the presence of plastics and burn and odor tests to determine, if possible, the type of plastic. We commonly found polyethylene plastics which are used for film and packaging on many food products like granola bars and sandwich bags. We examined whether the frequency of scat containing plastic materials depended on tourism habitat type. Researchers over the past two decades have studied the frequency and health consequences of plastic ingestion by sea turtles and other aquatic wildlife but this issue is not restricted to waterways. This study provides insight into the scavenging habits of terrestrial omnivores in human-manipulated environments. In the future, this study can be used to better understand the effects of humans and their indirect interactions with wildlife in protected areas.

Developing a Comprehensive Power Simulation Model for the MEMESat-1 CubeSat using Orbital Dynamics

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UGA's Small Satellite Research Lab's Mission for Education and Multimedia Engagement Satellite (MEMESat-1) requires the use of variables such as power generation, power draw, orbital path, packet size, and data processing times. As power generation and battery charge vary, MEMESat-1 will automatically transition through three different operational modes to prevent battery depletion and halt system processes in case of anomalies. The different modes of MEMESat-1 are Cruise Mode, Anomalous Safe Mode, and Critical Power Safe Mode. After deployment, MEMESat-1 will only enter any safe modes if the battery single-cell charge goes below a certain threshold or if an anomaly is encountered. Taking these variables and operational modes into account, the MEMESat-1 Mission Operations (MOPS) team will use FreeFlyer software to analyze power generation and draw during MEMESat-1's orbital cycle. In order to document the power consumption of the MEMESat-1 satellite, MOPS will implement an output table into the FreeFlyer simulation to display system power variables throughout the orbit. This allows MOPS to create a power budget to determine subsystem requirements. The power limitations of MEMESat-1 are budgeted based on battery and solar cell specifications implying the necessity of power simulations by MOPS. The validity of the power simulation data can be verified by comparing it against other missions' telemetry data via the SatNogs network. In conclusion, the power simulations of MEMESat-1 take into account a plethora of variables in order to provide accurate results imperative to mission success.

Dynamic Changes of Uterine Immune Function Facilitate Early Pregnancy Events

Maddie Packard
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The reproductive and immune systems hold one of the most unique relationships within the body. Unlike anywhere else, the reproductive system must accept foreign materials (i.e. semen, sperm and embryo) while protecting the host from diseases. Uterine immune functions are dynamically regulated by ovarian hormones. Preovulatory estrogen (E2) mounts the inflammatory response within the uterine luminal epithelium (LE) necessary to build a resistance to allogenic sperm, while postovulatory progesterone (P4) promotes anti-inflammatory signaling to protect the semi-allogenic embryo during implantation. While the major regulators are known, there has been no systematic investigation into specific factors that sculpt the uterine immune environment. To fill this knowledge gap, our lab has isolated and sequenced mRNA from 0.5 days post-coitum (D0.5) and D3.5 LE cells where embryo implantation in the mouse initiates on D4.0. Analysis of our data found the most downregulated gene pathway was inflammatory response, and 14 of the top 20 were immune associated. From this list, I have isolated Cd40 (immune cell activation; downregulated 32-fold), Cxcl1 (immune cell recruitment; downregulated 35-fold), and S100a8 (neutrophil recruitment; downregulated 582-fold) as important immune genes dynamically regulated by ovarian hormones. I have generated primers for each gene and will confirm the differential expression via realtime-PCR and investigate protein localization by immunohistochemical staining. I plan to expand upon my list including more genes involved in uterine immune function. Overall, this study will contribute meaningful data to the field and provide important context in describing immune-reproductive pathologies like endometriosis, adenomyosis, and infectious agents.

Evaluating the Effects of Environmental Variation on American Alligator Telomere Length

Victoria Pagano, CURO Research Assistant
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Telomere length (TL) may be used as a biomarker of oxidative stress and biological age, with potential repercussions for individual survival and population health. As a result, it has become increasingly important to understand the factors influencing telomere dynamics, especially in the context of both environmental contamination and a rapidly changing global climate. To examine the role of contaminant exposure and temperature on telomere dynamics, we analyzed TL in a population of American alligators, a species with temperature-dependent sex determination. We collected alligator eggs from a mercury contaminated site and incubated them at female- and male-promoting temperature groups (29.5 ℃ and 33 ℃, respectively) until hatch. Blood was drawn 7-10 days post-hatch, and DNA was extracted from erythrocytes to quantify TL using qPCR; total mercury was also quantified from blood samples. We ran linear mixed effects models with AICc model ranking to determine the model that best explained variation in TL. Our top model only incorporated the effects of incubation treatment (log-likelihood = -178.1, AICc = 366.6, Akaike weight = 0.522), wherein there was a positive correlation with individuals incubated

at the male-promoting temperature ($\beta = 0.423 \pm 0.123$, $p < 0.001$). Forthcoming data will likewise analyze the relationships between TL and hatchling morphology and early growth.

Creating a Novel Technique to Model Populations of Pond-Breeding Amphibians

Victoria Pagano, CURO Research Assistant
Dr. John Maerz, Wildlife, Warnell School of Forestry & Natural Resources

Capture-mark-recapture surveys of pond breeding amphibians often have low recapture rates, making it difficult to accurately assess population dynamics. I aim to address this issue by creating a novel technique which will use amphibian egg masses to conduct capture-mark-recapture surveys. This should provide a more accurate representation of the breeding adults within a population, as eggs are static, making them easier to sample than capturing adults who are only present for a few weeks out of the year. Egg jelly contains only female DNA, and egg yolk contains both female and male DNA. By using microsatellites, I will be able to determine maternal DNA from the egg jelly and use that to decipher paternal DNA from the yolk. From this, I will be able to identify which individuals are contributing genetic material to the population, and how their offspring disperse and breed in following seasons. This methodology has broad applications for amphibian surveys, and I aim to apply this technique to understand the breeding and dispersal patterns of spotted salamanders (Ambystoma maculatum) in Whitehall Forest. A. maculatum breeds in ephemeral wetlands, and the dispersal of breeding adults among wetlands both within and between breeding seasons is largely unknown. By identifying breeding adults from egg masses, I will assess sex-specific site fidelity and movement of A. maculatum in relation to conspecific and congeneric density, hydroperiod, and water level stochasticity.

Factor Analysis of Pre-Quit Minnesota Nicotine Withdrawal Scale Scores Among Smokers Seeking Treatment

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Traditionally, smoking withdrawal has been regarded as a set of co-occurring symptoms that load onto a single factor. Two widely accepted core symptoms of withdrawal, negative affect and craving, have been shown to independently predict relapse and follow different time courses, suggesting that a multi-factor model may be a better fit. These symptoms have been previously linked to personality traits, which are also known markers of cessation outcomes. A community sample of 53 adult smokers planning to quit smoking was recruited for a 9-week cessation therapy intervention. Personality was assessed using the NEO Five-Factor Inventory-3 (NEO-FFI-3) at intake, and pre-quit withdrawal levels were measured using the Minnesota Nicotine Withdrawal Scale (MNWS) following 30-minute abstinence. It was predicted that personality traits would be associated with withdrawal, particularly the negative affect aspect, and that withdrawal levels would predict treatment outcome. Exploratory factor analysis of withdrawal scores revealed a three-factor model. As hypothesized, a personality trait regression model significantly predicted Factor 2: Negative Affect ($r2 = .418$, $p = .007$). Factor 1: Somatic Symptoms and Factor 3: Agitation were moderately strong predictors of cessation treatment outcome, while Factor 2 was not. Results suggest that a three-factor model may be appropriate for withdrawal symptoms after 30-minute abstinence. Additionally, the evidence suggests that negative affect per se may not drive relapse, although an increase in negative affect post-quit might. It is notable that pre-quit withdrawal symptoms at relatively low levels could be driven more by individual differences in personality than smoking severity or prognostic utility.

Evaluating Strategies to Increase Client Participation in Campus Compost Program

Sahana Parker, Foundation Fellow, CURO Research Assistant
Tyra Byers, Ecology, Odum School of Ecology

The UGA Campus Compost program uses an electric tricycle to collect compost from bins distributed across UGA's campus. The program is divided into six routes with bins primarily located in somewhat private areas like faculty breakrooms and staff offices that allow them to maximize proximity to food waste but minimize potential for misuse. This structure allows for a unique space for experimentation because the bins are in fixed locations, collection amounts are generally consistent, and access to the bins is usually available to the same group of people week to week. For a ten-week period, thirty bins were randomly selected across all routes and were designated either a control or targeted with a specific, standardized in-building "eco-feedback" strategy. After allowing 2-3 weeks of collection to serve as a "base," bin weights were taken each week in pounds by interns and logged in a spreadsheet to determine the effectiveness of each technique and scaled against the control locations. I plan to present the results of this semester-long research at the symposium, including a report of any statistically significant changes in user behavior in alignment with the "ecofeedback" concepts and recommendations for the most optimal strategy for implementation in future campus compost/sustainability activities. This research is important because it could indicate economic, campus-friendly ways to increase student and faculty participation in sustainability activities without increasing a burden on individual interns or waste management personnel.

Growth Inhibation of Streptococcus Mutans Using Nanoceria

Herchel Patel, CURO Summer Fellow; Dhruvi Patel; Jenisa Gandhi; Vaidehi Patel
Dr. Vladimir Reukov, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

Tooth decay results from bacterial biofilms and acid production. Streptococcus mutans is a key contributor by metabolizing sugars into lactic acid. Cerium oxide nanoparticles (nanoceria) show promise as an antimicrobial and biofilm disruptor. Nanoceria may inhibit S. mutans growth and acid production, reducing tooth decay by interrupting lactic acid dehydrogenase function. Optical density and colony-forming units were used to measure bacterial growth, and pH tests studied nanoceria's effect on acid production at varying sucrose levels. Xylitol and sorbitol were used as sugar substitutes. They are polyols and surprisingly, xylitol was not digested because of the inability to convert Xylitol 5-Phosphate into lactic acid, while sorbitol exhibited lactic acid production. All in all, Nanoceria inhibited lactic acid production and decreased bacterial growth. Further research could support nanoceria as an antibacterial agent in dental applications.

Assessing the Effect of Ciprofloxacin on the Heart Rate of Chick Embryos at Development Stages 6-7

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Antibiotics are commonly prescribed medicine, even during pregnancy. Ciprofloxacin is an antibiotic used to treat bacterial infection as it works to stop the growth by blocking bacterial cell wall production, thus leading to the breakdown of cells, and eventually bacterial death. While ciprofloxacin is assumed to be safe when taken during pregnancy, it does have the potential to transfer from the bloodstream of the mother and into the placenta. Therefore, it is important to understand and identify the potential risks associated with the use of ciprofloxacin during pregnancy. The chicken embryo model serves as a suitable alternative

animal model for toxicity studies. It is fairly accessible due to its high reproducibility in a short amount of time and low cost. The teratogenic effects of varying concentrations of ciprofloxacin on cardiac development were studied in chick embryos of days 6 and 7 of incubation, because this is the stage at which the embryo is more developed. The main objective of this study is to establish the dosages at which ciprofloxacin serves to be detrimental on chicken embryos, clarify the pathological changes in the ciprofloxacin-exposed embryos and the cardiovascular system, and lay a foundation for further studies on the mechanism of ciprofloxacin in embryonic toxicity.

Development of a F-127 and Sodium Alginate BioInk for 3D Bioprinting Applications

Jessica Patel, CURO Research Assistant

Dr. Vladimir Reukov, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

Recently, there have been many technological advancements in additive manufacturing, such as extrusion-based three-dimensional (3D) bioprinting. Extrusion-based (3D) bioprinting allows for the creation of tissue with contrasting cell types using a combination of different materials including a biopolymer ink. Utilizing solutions with optimal consistency is essential to printing stable structures to sustain cell growth as the effectiveness of a biopolymer ink is defined by its adhesion capacity to tissues, sufficient residence time of cells, and the effect of bacterial growth. In order to standardize this process, a method of measurement called the parameter optimization index (POI) will be used to define the optimal printing speed and pressure needed to achieve the highest accuracy and precision. This experiment aims to find the POI of pluronic F-127 and sodium alginate concentrations. The bioink solutions were prepared in solutions of deionized water kept at 4⅓This procedure was repeated using concentrations of 13%, 16%, and 20% pluronic F-127 by weight and 6%, 3%, and 3% sodium alginate respectively. 13% pluronic F-127 and 6% sodium alginate was recognized to have the best consistency and viscosity for printing, using a capillary viscometer. To promote cell growth, the optimal bioink will be autoclaved and seeded with fibroblasts with fluorescent properties. Cell growth and viability will .be observed and evaluated using a compound epifluorescent microscope. Cell viability will be further evaluated using MTT assays.

Modification of Xylan for Bioplastics Application

Mir Patel

Dr. Sergiy Minko, Chemistry, Franklin College of Arts & Sciences

Hemicellulose, a polysaccharide found in plant cell walls, is a byproduct of the paper industry that is commonly burned for energy due to its lack of commercial value. However, there is growing interested in utilizing green and sustainable methods to convert hemicellulose waste into useful building blocks. One such approach involves transforming xylan, a type of hemicellulose, into sustainable biomass products for applications such as bioprocessing and bioenergy feedstock. These green chemistry routes have the potential to transform hemicellulose waste into valuable resources for a variety of industries while reducing environmental impact and promoting sustainability. In this study, we investigate the modification of xylan with succinic anhydride (SA) and the effect it has on various reaction parameters on the yield and degree of substitution of the product. The reaction was catalyzed by potassium hydroxide (KOH) and carried out in dimethyl sulfoxide (DMSO). Our results showed a direct correlation between succinic anhydride and an increase in yield, which increased the reaction time and temperature and led to an increase in yield. Four reactions were conducted with various factors such as differing temperatures, SA amount, catalyst amount (KOH), and the effect of reaction time on yield. The reaction showed that increasing the SA amount and reaction temperature led to higher yields. In addition, ionic liquids were investigated as a potential solvent substitute, with varying results observed. There were some challenging steps, which involved the complex lignin and xylan bonds. Lignin is a complex organic polymer that provides structural support to plant cell walls and is often found together with hemicellulose and cellulose, Lignin can be difficult to remove from biomass due to its strong, covalent bonds with other cell wall components, making it a significant challenge int he production of biofuels and other value-added products from plant biomass. The production of modified xylan was further complicated by the presence of lignin, as this compound can interfere with chemical reactions and reduce ht yield of desired products. Thus, effective methods for removing or minimizing lignin content in plant biomass are critical for achieving high yields of sustainable biomass products.

Nostoc muscorum as a Sustainable Source of Polyhydroxybutyrate for Biocompatible Hernia Mesh

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Dr. Suraj Sharma, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

Polyhydroxybutyrate (PHB) is a biocompatible polymer that can be used to produce hernia mesh. Several algae, including Nostoc muscorum, have been utilized in boosting the biosynthesis of PHB homoplymer and copolymers. The goal of this work is to use to produce a large amount of PHB by using Nostoc muscorum. We used a cell culture of Nostoc muscorum to control and enhance the environment for PHB by adding Nitrate ($NaNO_3$) and phosphate (K_2HPO_4) to the BG-11 medium. Algae growth was analyzed to extract dry-weight polymer from algae efficiently. The feedstock approach that uses lactate and acetate will ensure a high output of PHB. According to previous research, Nostoc muscorum can produce polymers with yields of 10% to 20%. However, we intend to modify the parameters to boost the polymer yield by varying the light conditions, i.e., the duration of light and darkness. We will also stabilize the CO_2 levels, feedstock, and pH. We also aim to isolate the polymer in its purest form and boost the yield by at least 10% to 15%. Finally, we plan to create nanofibers from pure PHB to coat hernia mesh for biomedical applications. Our findings can potentially contribute to the development of a biocompatible and sustainable PHB-based hernia mesh.

Exploring the Efficiency of Maze Exploration using Multiple Communication-Aware Robots

Neil Patel

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Throughout the years, there has been growing interest in the use of multiple robots for cooperation in various environments. However, effective communication between robots to improve exploration efficiency is a major hurdle to achieving this cooperation. This research explores how the use of multiple communication-aware robots can increase the efficiency of maze exploration. Currently, an existing robot software has been modified to enable line-following along with a controller for the robots. We focus on the safety and efficiency of cooperative algorithms. To ensure that the robots can traverse the maze safely, a collision detection algorithm has been implemented to prevent robots from colliding with one another and diverting their path. To enhance efficiency, we study different algorithms where cooperation can be integrated into the maze solvers. Finally, both of these modules will be integrated to produce an improved cooperative maze exploration algorithm. These findings will serve to be essential in the field of robotics, namely

in the areas of mapping and exploration. The expectation of this research is that it will contribute to the development of efficient robot communication in unknown environments, with the potential for search-and-rescue, industrial automation, and potentially environment monitoring applications.

Utilizing Block Copolymerization to Enhance Target Specific Treatments

Rani Patel, CURO Research Assistant
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Cancer is the second leading cause of death in the United States. Although there are a few cancer therapies, many of them pose life threatening side effects and have a low cure rate. This is because current drug delivery systems lack drug specificity. Thus, increasing the target potential of a drug to a corresponding tumor tissue is crucial in creating successful cancer therapies. Block copolymers, linear arrangements of blocks that are made up of two or more polymer molecules, can be used with the application of nanotechnology to create safer and more effective forms of cancer therapy. Using radical polymerization, we have synthesized the block copolymers, Guanidine-Containing Methacrylamide (GPMA) and Hydroxypropyl Methacrylate (HPMA). We are going to use these two blocks and study their cell penetration activity. Cell penetration activity measures how much of the polymer can go inside the cell. We are going to measure the cell penetration of activity of both GPMA and HPMA separately and together. Our first goal is to synthesize a block copolymer with these polymers. Then we will load an anticancer and/or antiviral drug onto it. Most anticancer drugs are not target specific, so we can make this copolymer target specific by attaching some target specific. These findings will help develop cancer therapies that are more effective and have less adverse side effects in the future.

The Use of Multiple Muscle Stimulation to Enhance Muscle Metabolism

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Dr. Kevin McCully, Kinesiology, Mary Frances Early College of Education

Exercise provides many health benefits from increased strength and daily function to reduced chronic disease risk. Unfortunately, not everyone can participate in traditional exercise, especially individuals facing mobility problems. The purpose of our study was to evaluate multiple muscle electrical stimulation (MMES) as a potential substitute for traditional exercise. Four lower body muscle groups were stimulated on both legs in college-aged, healthy subjects. MMES lasted for 10 minutes at a frequency of 6 Hertz. Changes in muscle metabolism, calculated as oxygen consumption slopes, were measured with near infrared spectroscopy following a short period of blood pressure cuff ischemia. Our pilot studies found a 19% increase from pre-stimulation to during- and post-stimulation metabolic rates. Whole-body oxygen consumption and resting metabolism were measured via indirect calorimetry (TrueOne 2400, Parvomedics, Sandy, UT, USA). Blood flow velocity and vessel diameter changes of the femoral artery were measured via ultrasound (L15 HD3, Clarius, Vancouver, Canada). The stimulation protocol caused minimal participant discomfort and used inexpensive electrical stimulators (TheraTouch EX4 Electrotherapy Device, Clayton, MO 63105, USA). For people experiencing mobility issues, MMES may provide similar physiological benefits to those seen with traditional exercise. It could become a regular, at-home exercise solution for numerous clinical populations.

Exploring Neuronal Cell Death in Nodose Ganglion to the Vagus Nerve

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There are a multitude of compounds that vary in toxicity that the human body is exposed to. The relation of their neurotoxicity to the effect on our brain varies in expanse. Examining the effect of toxic compounds on neuronal cell bodies and the connection between vagal neurons and regions of the brain helps test factors that influence brain processing from nerve signaling. For that reason, it is essential the severity of the severing of connection between the central nervous system and the heart, respiratory tract, gastrointestinal tract, and colon is understood. Capsaicin and Vagotomy were used to distinguish between the difference in result of cell death when comparing chemical and mechanical stressors. Capsaicin, an active ingredient (chemical stressor) in chili pepper is found to be lethal to cells that carry a TRPV1 receptor, inducing cell death. Vagotomies are used as a physical stressor that induces cell death through surgical manipulation of the vagal trunk, altering the central nervous system and organ innervated through the vagus nerve. Rats were used in the study to determine effects of Capsaicin and Vagotomy treatments on neuronal cell death. Data was collected from vagal sensory afferent neurons in nodose ganglia that sends information to regions of the brain via the nucleus tractus solitarii (NTS). TUNEL assay and Caspase-3 antibody were used to analyze cell death. TUNEL assay revealed that neurons in Vagotomy and Capsaicin treated rats underwent apoptosis significantly more than both control groups (sham surgery and vehicle injected rats). There was however, no significant change in apoptosis between groups when analyzing Caspase-3 staining, which we attribute to the increase in Caspase activity upon harvesting of the nodose ganglion. Our study provides evidence on the neurotoxic effects of chemical and physical stressors on vagal neurons.

A Meta-Analysis of the Relationship Between Proactive and Retroactive Aggression with Later ADHD-Type Symptoms

Soumil Patel
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Children's complex social interactions are perpetuated by two major types of aggression: proactive and reactive. Reactive aggression is characterized by acts undertaken in response to negative effects or provocation, while proactive aggression is driven by the desire to accomplish a particular goal. Individuals with ADHD often have difficulty regulating their emotions and behavior, which can lead to impulsive and reactive aggression. Their tendency to be easily distracted and have difficulty sustaining attention may result in a misunderstanding of their own perceptions of the events, further contributing to their aggressive behavior. Comorbid illnesses like conduct disorder and oppositional defiant disorder frequently co-occur with ADHD, further contributing to the development of violent behavior. The goal of the meta-analysis is to better understand long-term implications of childhood violence and to guide treatments to lower the likelihood of negative adult outcomes. A systematic search of the literature was conducted using the Boolean phrases "proactive and reactive aggression" and "ADHD," which yielded a total of 5 studies. Studies were examined through initial screening, inclusion criteria such as proactive and reactive aggression, children (below 18 years old), and measures related to ADHD-type symptoms. We plan to code for sample size, country, mean age, study type, and association between reactive or proactive aggression and ADHD symptoms. Effect sizes will be calculated as correlations (Pearson's r) between types of aggression and ADHD-type symptoms. Analyses will be conducted using the Metafor package in R.

Exploring the Use of Nanocellulose in Root Canal Therapy: Development of an Antibacterial Sealing Material

Vaidehi Patel, CURO Research Assistant, & Vijay Mohakar
Dr. Suraj Sharma, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

Root canal therapy is a dental procedure where an infected or damaged tissue within the tooth is removed, followed by filling the root canal with a sealing material to prevent further infection. While this procedure has a high success rate, various issues like bacterial infection and incomplete filling can lead to complications. Therefore, the goal of this study is to investigate the potential issues that can arise during this procedure and to develop a nanocellulose-based sealer with antibacterial properties to improve clinical outcomes. This research uses existing data on root canal procedure issues and focuses on incorporating nanocellulose into the sealer to create an antibacterial material that can prevent bacterial infections. The methodology consists of two parts: the first is a literature review on the use of nanocellulose or other material in dentistry and root canal therapy, including their mechanical properties, biocompatibility, and antibacterial properties. The second part involves developing the nanocellulose-based sealer and testing its antibacterial properties and adhesion to the root canal. The expected results of this study may provide essential insights into the use of nanocellulose in root canal therapy. These findings could have significant implications for dental practitioners, as they can improve the success rates of root canal therapy and enhance patient satisfaction. Additionally, the use of nanocellulose in dentistry can provide a sustainable and biocompatible alternative to traditional materials, potentially revolutionizing the field. Overall, this study has the potential to contribute to the advancement of root canal therapy, leading to improved dental care for patients.

Controller Design of a Variable Frequency Vibration Table for Stress-Testing of Small Satellite Components

Pandora Navarro Paterson
Dr. Deepak R Mishra, Geography, Franklin College of Arts & Sciences

When testing the vibration tolerance of a part, it is important to ensure that the part not only survives, but works as intended in all conditions. While commercial vibration tables are available to use when accounting for a majority of movement conditions, many are either limited in the scope of their frequency range or are expensive. Upon reviewing available options, the UGA Small Satellite Research Lab determined that a custom-made vibration table was the best way to meet its needs according to budget. After exploring different concepts for the custom table, a control scheme was designed that fully utilizes and accounts for the vibrations. Among these specifications is a set of accelerometers and other equipment to act as both a source of feedback control as well as diagnosing any issues and determining system efficiency. It is feasible to use an Arduino microcontroller as the basis of this control scheme, but while the process of coding a sine sweep is relatively simple, random vibrations can pose a challenge considering their mathematical complexity. This project will lead to the development of a method to operate a vibration test using a microcontroller, a computer, a pair of accelerometers, and a vibration driver. MOCI (Multi-View Onboard Computational Imager) is the SSRL's current primary project, slated for launch in 2023. Using the control scheme that this project produces, paired with the table designed and built by Mechanical Team Lead Aidan Delliponti, we will be able to perform full vibration tests of necessary components for MOCI.

A Precision Approach to Rejuvenation: Determining the Impact of Genetic Variation on Cognitive Responses to GDF11 Treatment

Sanjana Pawar, CURO Research Assistant; Elizabeth Patel; Allison Callaway
Dr. Robert Pazdro, Nutritional Sciences, College of Family & Consumer Sciences

Over 6 million Americans are living with Alzheimer's disease and other dementias that have no cure or proven therapeutics to reverse disease pathology and improve symptoms. Recent innovative studies have revealed cellular targets and circulating proteins with significant potential to improve cognitive function in older individuals. Growth differentiation factor 11 (GDF11) was shown to increase neurogenesis, and most excitingly, restore cognitive function in aged inbred C57BL/6J (B6) mice. To begin translating results to human populations, we must test whether GDF11 is similarly effective in a genetically diverse population. For that purpose, we selected the Diversity Outbred (DO) mouse stock, a model of human genetic diversity, and performed baseline scores of hippocampal memory and learning, which we assessed via the Novel Object Recognition (NOR) test and Object Location Recognition (OLR) test and contrasted results against those of B6 mice. In the NOR and OLR tests, there were no significant differences between DO and B6 mice at baseline. In the next step, we predict DO mice will exhibit a broader range in cognitive responses to recombinant GDF11 (rGDF11) compared to the B6 mice. Results will allow us to determine the impact of genetic variation on cognitive responses to rGDF11 treatment and pave the way for further translational studies to move rGDF11 from the lab bench to the clinic.

Prevalence and Diversity of Rickettsia Species in Ixodid Ticks from Baird's Tapirs (Tapirus bairdii) from Costa Rica

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Rickettsial tick-borne pathogens are the causative agents of severe and potentially fatal spotted fever group (SFG) and typhus group diseases in dogs and humans. Despite the public-health importance of SFG Rickettsia, there are relatively few data on the prevalence and diversity of rickettsial pathogens in ticks from in Costa Rica. The aim of this study was to characterize the SFG Rickettsia prevalence and diversity in ixodid ticks collected from Baird's tapirs (Tapirus bairdii) from Costa Rica. Ticks were collected from tapirs captured for research purposes or were found road-killed from July 2021-May 2022. Ticks were morphologically identified, and species confirmed through PCR and sequencing of the 16S rRNA gene. Ticks were individually tested for SFG Rickettsia spp. using a nPCR targeting the 17-kDa gene. Species identification was determined using bidirectional sequencing of the 17kDa and/or ompA gene targets. To date, 174 ticks have been collected from 7 tapirs; species included Amblyomma colebes, A. ovale, A. tapirellum, Dermacentor latus, Ixodes tapirus, and Rhipicephalus microplus. Four of 22 A. ovale have been positive for Rickettsia; Two were positive for Rickettsia parkeri, a human pathogen, and two were positive for R. belli, a presumably non-pathogenic Rickettsia. The remaining A. ovale and other tick species are currently being analyzed. These data indicate that tapirs are infested with a high diversity of ticks and that A. ovale is infected with R. parkeri, a zoonotic pathogen which may be a concern given the recent incursion of tapirs into small farms.

What Motivates Generation Z to Interact with Instagram Story Fashion Ads?

Bella Peck, CURO Honors Scholar
Dr. Jewon Lyu, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

Generation Z, sometimes referred to as the iGeneration, is infamous

for experiencing the world on their phone. In the nature of the ever-changing marketing industry, advertising for most companies have moved to social media. I am constructing a study under Dr. Jewon Lyu to understand why Generation Z clicks on the targeted ads that they receive on Instagram stories, specifically ads related to fashion companies. I am investigating what motivates Generation Z to click on their Instagram story targeted advertisements. I am testing different methods of favorability as to why Gen Z might respond to these advertisements, namely presence of a model and presence of brand name. I predict that the combination of both the brand name and the presence of the model will be the most favorable among the participants. This research project is delving into the motivation behind the newest generation of consumers and allows them to experience a social media fashion merchandising experience by having a simulation for them to "be on Instagram" experiencing these ads. This project is worthy of exploration due to the fact that it can help both the industry and the individuals; it will allow merchandisers to maximize their advertisement engagement by pertaining what is best for the new generation of consumers and allow the new generation of consumers to be more aware and cognizant of their consumer behavior, specifically on Instagram.

The Intersection of Leishmaniasis and Chagas Disease Incidence in Canine Health and Environment

Paula Sofía Pelet Cruz

Dr. Susan Tanner, Anthropology, Franklin College of Arts & Sciences

With some zoonotic diseases such as Chagas Disease, research suggests that domestic dogs can be viewed as sentinels of an infection. In other words, the seroprevalence of disease in dogs correlates to its incidence in the area. Accounting for the distinctions in wealth between households gives researchers insight on susceptibility to disease. However, human-dog interactions are more complex. This paper will explore the epidemiological implications of animal wellness. Literature and research conducted in Panama on land use and zoonotic disease examines how household characteristics like food insecurity manifest themselves in dog health. Preliminary analysis suggests there is not a clear association between household food security and dog health. The relationship between canines and people in rural communities may illustrate an interdependence. A dog will subsequently act as a member of the household partaking in agricultural and domestic chores while receiving care and food in return. Typically, a household will have multiple dogs to facilitate physical labor within the owner's work environment. The association between household wealth and dog health warrants further research attention.

Investigating Colonization and Enzyme Activity of Ectomycorrhizal Fungi through White Oak Inoculation

Isabella E. Pellicano

Dr. Nina Wurzburger, Odum School of Ecology

Ectomycorrhizal fungi are important for plant growth and ecosystem processes such as carbon storage. Ectomycorrhizal fungi also impact soil organic matter, though this relationship isn't thoroughly understood. Current studies hypothesize direct enzymatic breakdown, oxidation via Fenton chemistry, and saprotrophic microbe stimulation as likely mechanisms. We hope to understand how ectomycorrhizal fungi species Lactifluus volemus, Cenococcum geophilum, and Cortinarius iodes associate with white oak seedlings and how those possible associations vary morphologically and functionally. We seek to understand the amount of fungal colonization through observing root tips while the seedlings grow in rhizoboxes in a peat-sand mixture. We will introduce fungi using fungal agar plugs placed near the root tips and insert leaf litter in the rhizobox corners to supply nutrients and encourage localized production of oxidative enzymes. At harvest, we will examine root tips for the presence of a mantle and a Hartig net, structures indicative of ectomycorrhizal fungi. Further, we will perform enzyme assays of colonized peat-sand and root tips to quantify activity of several peroxidases, key enzymes involved in decomposition. We will compare the enzyme activity and colonization of the three fungi and determine whether there are significant differences using an ANOVA. We expect that the peroxidase activity of both Cortinarius iodes and Lactifluus volemus will be higher than Cenoccocum geophilum, with Cortinarius activity higher in leaf litter and Lactifluus higher on root tips. This study will aid in understanding possible decay capabilities of various fungi species and allow for selection of fungi with significantly different decomposition characteristics in further soil organic matter investigations.

What is a "Healthy Brain?": An Exploratory Qualitative Study of How Younger and Older Adults Define a Healthy Brain

Megan Elizabeth Peterson

Dr. Katy H. O'Brien, Communication Sciences & Special Education, Mary Frances Early College of Education

Protective lifestyles that promote brain health include maintaining cognitive, physical, and emotional functioning. Engaging in healthy brain lifestyles can reduce incidence of 40% of dementias. However, "health" is an individualized construct, and age or gender may play an important role in conceptualization of brain health. The goal of this study was to interrogate what it means to have a healthy brain as described by different populations, how participants describe caring for their brain at their current stage of life, and what experiences have shaped how they perceive healthy brains. Data was collected from semi-structured interviews. We used inductive phenomenological coding of the interviews to generate major themes for both healthy brain definitions and protective lifestyle factors. Participants include 28 younger adults and 12 older adults. Our findings were that age impacted definitions of healthy brains with younger adults describing more objective characteristics (i.e., medical testing, neuroimaging). Older adults relied more on subjective characteristics such as being able to perform the tasks necessary to their daily life and being able to effectively solve problems. Additionally, age appeared to affect how participants described caring for their brain. Younger adults had a greater variety of cognitive, physical, and emotional strategies to engage in protective lifestyles. In contrast, older adults provided fewer examples overall and emotional strategies were not present. Understanding individualized beliefs can guide provider engagement in meaningful conversation about personal values to create meaningful brain health goals, specifically as they differ across age groups.

Reducing Adolescent Risky Sexual Behaviors through Relationship Education

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Most teenagers experience their first romantic relationship during adolescence, with 70% of 17-year-olds reporting one within the past 18 months. However, teens often have unrealistic expectations for relationships, and many lack the skills necessary to build healthy and safe relationships. In fact, unhealthy behaviors and experiences in romantic relationships can influence adolescents' mental health, substance use, sexual health, and risk of STIs and unintended pregnancy. In 2018, there were over 10,000 teen pregnancies in the state of Georgia and more than half of STI cases in Georgia were reported among young adults aged 15-24. Youth-focused Relationship Education (YRE) has been found to promote healthier teen relationships and prevent these negative outcomes by teaching youth about healthy versus unhealthy relationship patterns and

equipping them with skills to promote positive communication and healthier ways to manage conflict. Between 2021-2022, UGA Extension delivered the YRE program, Relationship Smarts, to 1,278 youth across Georgia. Using data collected from the youth, the current study examines changes across various attitudes/beliefs (e.g., alcohol and drug use, social-emotional choices, educational aspirations) and relationship skills that have been linked to reducing sexual risky intentions and behaviors. As well, variations in these changes and associations based on participants (e.g., gender, race, age) and program characteristics were explored. These findings will help advance our understanding of how, and for whom, YRE can increase sexual delay intentions in order to support schools and communities in reducing the risk of STI and unintended pregnancy among adolescents.

Integrating Well-Aligned Pre-Lecture Videos in Student-Centered Large Enrollment Undergraduate Physics Courses

Morgan Pickett & David Seiden
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Many STEM degree programs require their students to take introductory-level physics courses, cementing foundations in practical experience with applied mathematics. Studies show that preparing and becoming familiar with the information before class greatly improves comprehension and curiosity toward the course content. Our goal is to create well-aligned pre-lecture videos that sufficiently prepare students and expedite the teaching process of studio physics courses. Many classrooms employ general textbooks or guides with outsourced resources for these purposes, but these combinations are often presented incongruously concerning the need for individual course structures. This project demonstrates our approach to creating well-aligned pre-lecture videos for the Studio Physics I course at UGA, which uses the OpenStax textbook. Our work aims to eliminate the "middleman" and provide a class with pre-lecture content that is tailored uniquely to the specific course outline and that is interactive visually and audibly to increase engagement. Through a combination of coded video demonstrations and visually stimulating slides, upperclassmen narrators familiar with the material break down explanations and present introductory mathematical and conceptual information. This presents course content in an informal, encouraging environment and provides the essential groundwork for more detailed learning in the classroom. In this poster, we present student feedback on these pre-lecture videos, evidence of improved student engagement, and how much money we save for students by adopting OpenStax textbooks and course materials to make education accessible and affordable.

The Relationship of Activity Intensity Levels and Caffeine Consumption

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Caffeine is the most consumed psychoactive stimulant which can be found in various substances such as coffee, soda, energy drinks, and chocolate. More specifically, its use has become frequent among young adults as one study concluded that 92% of college students consumed caffeine in the past year. Caffeine is consumed for the following reasons: to increase energy, alertness, mood, physical activity, and to reduce fatigue. Within physical exercise, caffeine is the most popular performance-enhancing substance and has been shown to improve endurance and strength. For this reason, substances such as pre-workout have become popular among individuals who engage in exercise. This study aims to determine if exercise intensity is associated with caffeine intake. A sample of 456 full-time students were recruited from the University of Georgia in the Spring of 2023. Participants self-reported their caffeine consumption, exercise behavior, and motivations for consuming caffeine. Preliminary results from a sample of 350 students showed that nearly three-quarters (72.6%) of individuals consumed caffeine daily, with most students consuming it once daily. Determining if the intensity level of activity one participates in affects caffeine consumption is important to public health as too much caffeine consumption can have negative effects such as dehydration, anxiety, and insomnia. Figuring out what motivates individuals to utilize these products can allow public health officials to determine the best way to advise the consumption of these stimulants while working out properly.

The EU Responses to the Syrian and Ukrainian Humanitarian Crises

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The war in Ukraine has created a humanitarian crisis of millions of refugees seeking asylum. With the expedition of policies from countries within the European Union, trying to aid the masses, many are questioning the willingness of these European countries to welcome the refugees into their countries versus their reluctance to do the same for victims of the Syrian humanitarian crisis in 2015. I will be comparing the mobilization of governments regarding refugee policy during the current crisis to their refugee policies for the one in 2015. First, I will study reviews of the original policies to establish the basic obligations of the European Union to help each other in these situations. Then I will examine which countries participated and which policies were followed or were created in each context. My goal is to determine whether there is a disparity in the treatment of the refugees.

Identification of Potential Biomarkers in Pediatric Glioblastoma

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Glioblastoma multiforme is a rare type of aggressive glioma tumor with a very low survival rate. Moreover, pediatric glioblastoma presents differently from adult forms and is particularly understudied. Due to the heterogeneous nature of glioblastoma, there are multiple subtypes and the search for a biomarker for each subtype can prove to be beneficial for more individualized treatment. We performed a computational analysis of glyco-enzymes to find potential biomarkers. The genes of interest were picked using a gene expression profile dataset obtained from patient samples. Based on statistical analysis, we identified GXYLT2, ST3GAL4, and EXTL3 as potential subtype-specific biomarkers. To understand the function of these genes in tumorgenicity, a gene silencing experiment was conducted for ST3GAL4 and EXTL3. The results suggested that there is a general decrease in cell proliferation in knockout cells, although some comparisons are not statistically significant. It was concluded that ST3GAL4 and EXTL3 are promising biomarkers for pediatric glioblastoma although they may not be functionally important for the proliferation. The future direction of this study is testing the role of the genes of interest in other oncogenic characteristics such as migration and treatment resistance. We will also investigate other genes of interest and observe their role in pediatric glioblastoma.

Developing a Usable R Package for Transition Diagnostic Classification Models

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Transition Diagnostic Classification Models (TDCMs) can be used to

model level transitions (e.g., pass/fail, a/b/c/d, etc.) in assessment data as a function of the random effects of related covariates. Existing work describes the development of TDCMs and how they can be used to inform evidence-based changes involving educational interventions. This project aims to develop an open-source R package that will enable users to utilize TDCMs in their own work. Our primary research questions are: 1) what factors impact the usability of our statistical package; and 2) how can these factors help us improve the user experience of our package over time? After reviewing existing work, we identified several features that are known to impact the usability of similar packages, and we plan to incorporate these features into one or more user studies that we will use to inform the development of our R package. In this work, we will describe our preliminary work regarding this effort, the methods and protocol for our initial user study, and our plan to determine the efficacy of our study.

Exploring the Perceptions that the American Public has of Using Robotics and AI in the Healthcare Industry.

Hawkins Pontes
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Although healthcare is widely a medical industry, there are many sociological aspects that are present and can be analyzed to determine how Americans feel about the setting of a hospital. Since the beginning of the 21st century, the healthcare field has moved toward using robotics and AI to increase efficiency.

American journals, books, and research articles from 2010 to present were analyzed regarding how their participants perceived robotics and AI in healthcare, both personally and generally. This systematic review of healthcare research had the results of each study coded in categories that were representative of the American perception of robotics and AI. It was determined that in America, people prioritize personal health outcomes over community cost, risk, and their beliefs. However, many citizens simply would prefer human interactions when dealing with their health. Determining how Americans feel about the introduction of robots and AI in healthcare can be used to create a more trusted healthcare system. The perceptions of Americans could also be used comparatively to see how other countries feel about the same use of robots and AI. To promote a movement towards a culture of preventative healthcare rather than strictly medical treatment, the healthcare industry needs to adapt to be viewed as a place without judgment rather than an intimidating experience than many have towards robotics and AI.

Does Interview Type Affect Children's Dietary Recall Accuracy: Differences by Meal Components

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18% of children in the state of Georgia are obese. Assessing children's diets could share information on childhood obesity prevention and treatment. However, obtaining a 24-hour dietary analysis from a child is complex because children lack proper developmental and cognitive maturity. While information could be gathered by proxy, limited data for foods eaten outside the home can be collected (i.e. in school). This study aims to understand if a child's meal recall accuracy, overall and by meal component, differs between those interviewed via quantified vs. non-quantified methodology. The study participants are from a camp serving the state of Georgia (60 students) and a local Athens Elementary School (44 students). Participants had their weights and heights collected to analyze BMI. Chosen participants had their BMI classified as Normal (25th-70th percentiles) or High (≥85th percentile). The methodology consists of participants being observed at meal time and, after 24 hours, participating in a quantified (numerical and descriptive) or non-quantified (descriptive) interview method to recall foods eaten. Reported foods fell into a Match, omission, and intrusion category. Results show the subjects from the camp had higher omissions and intrusions for each interview type. The camp study did not have any statistically significant results. For the Elementary school study, bread is statistically significant for omissions and intrusions, as Quantified interviews have a significantly higher omission and intrusion rate. In the future, there is hope to conduct the study with a larger participant pool and to analyze the role BMI, sex, and race play in a child's recall ability.

How Does Sustainability Policy Affect Local Industries? A Study in the Archipelago of the Açores

Davis Wesley Potts, CURO Research Assistant
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Contemporary sustainability policies are altering industries and traditional values. This research focuses on the impact of newly enacted sustainability policy by studying how citizens perceive sustainability policy in the Azores, an archipelago off the coast of Portugal, and the sustainability actions of people and companies that they interact with. This is due to their recent enactment of the 2019 Azorean Sustainability Action Plan. Interviewees were identified utilizing a snowball sampling method. All interviews were transcribed, and qualitative data were analyzed utilizing content analysis which was performed with the assistance of the Dedoose program. The content analysis provided information regarding the knowledge of sustainability policy that locals hold, their views on the effectiveness of sustainability policy, and their critiques of other industries' sustainability actions. This research has the potential to better understand areas of sustainability policy that citizens identify as necessary to improve, as well as what people view as successful, such as the protection of areas off the coast from fishing and other intrusive activities. Also, this research provides insight into what sustainability actions islanders perceive as important and how it is imperative to alter the policy to be more effective. One of the largest findings was the perceptions of enforcement in regard to the economic scale of a company. Multiple interviewees felt strongly that corporations and companies with large economic power were treated to lesser sanctions and punishments if they violated sustainability policy compared to artisanal fishermen and other small industries.

Priorities of the U.S. Presidency: Insights from Bureaucratic Appointments

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How does the president use his powers within the executive branch to implement his policy goals? If a president prioritizes a specific policy area, he will appoint members of a bureaucratic agency related to this work as quickly as possible so as to put the necessary people in place to implement these policies.

In this paper, I use an event history model to show the relative percentage of vacancies among bureaucratic agencies. For each appointment confirmed by the senate, I have compiled the date on which that appointment was submitted to the Senate, the specific title of that appointment, the associated department, and the number of days that have passed since the day before the associated president's inauguration. Each line on the graph of the event history model will represent an agency. The graph will show how certain agencies will have fewer and fewer vacancies as the president's term progresses. If the number of vacancies decreases sooner, it could signal that the president has placed a priority in putting the necessary people in place to accomplish the work of this agency.

This dataset will at least include all presidential appointments approved by the Senate during President Barack Obama's first term in office, of which I have 1,000 collected thus far.

Julian of Norwich's Guide to Suffering: Christ's Divine Fall
Gillian Lee Pytte, CURO Honors Scholar
Dr. Cynthia Turner Camp, English, Franklin College of Arts & Sciences
In Revelations of Divine Love, medieval mystic Julian of Norwich presents her resolution to the problem of evil. The "problem of evil" poses the question: "how could an omnibenevolent God permit the existence of evil?" Julian's Revelations mitigates this problem in what initially appears to be an avowal of Augustinian psychology and theodicy. However, Julian distinguishes her theology from Augustine's by uniquely incorporating a moralization of suffering, suggesting that there are good and bad ways to suffer. Julian's Augustinian psychology reflects her neoplatonic ontology. Neoplatonism moralizes Plato's form-particular split, such that the forms are good, and the particulars evil. Accordingly, Julian's Augustinian psychology imagines the individual mixed with a good "inner man" (the Holy Spirit dwelling within the soul) and an evil "outer man" (the corporeal aspect of the psyche that perceives physical noumena). Julian resolves the problem of suffering by privileging the inner man, suggesting that when one suffers in the inner rather than the outer man, one suffers divinely. By suffering in the inner man, one suffers "in the lord's will for love," as Christ suffered. Julian points to Christ's Passion as an exemplum of beautiful suffering and Adam's Fall as an exemplum of odious suffering. Revelations thus provides a prescription for proper suffering. This project shows Saint Augustine and neoplatonism's influence on Julian's thought, and it shows how this woman diverged from contemporary theological models to purport a radical interpretation of suffering—as potentially beautiful.

Insights on Ferrochelatase as a Novel Therapeutic Target
Shreya Raj
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Ferrochelatase catalyzes the final step of the heme biosynthesis pathway, specifically, the incorporation of ferrous iron into protoporphyrin IX to produce heme. An interesting characteristic of the protoporphyrin IX substrate is its photoreactivity, rendering cells with high protoporphyrin IX buildup susceptible to photodynamic therapy for cancer treatment. To date, 5-aminolevulinic acid is administered to generate protoporphyrin IX accumulation in patients with prostate cancer, glioblastoma, and cutaneous leishmaniasis as a target during photodynamic therapy. Further, ferrochelatase inhibition depletes the heme cofactor; depletion has recently been linked to the treatment of ocular angiogenesis. Due to the growing importance of ferrochelatase in disease treatment, there have been efforts to identify potent small-molecule inhibitors of the enzyme. Thus, we sought to identify and evaluate small-molecule inhibitors of ferrochelatase via a three-phase approach. Phase I involves in vitro kinetic assays to monitor ferrochelatase enzyme activity in the presence of different potential inhibitors. Phase II involves co-crystallization of ferrochelatase with the potential inhibitors to elucidate the structure of the ferrochelatase enzyme-inhibitor-substrate complex. Phase III involves in vivo analysis to understand how the compound affects heme synthesis in human erythroleukemia cells. Our findings revealed novel small-molecule inhibitors of ferrochelatase, and that a previously identified inhibitor (vemurafenib) does not inhibit the enzyme in vitro. These results suggest that there are new small molecule inhibitors of ferrochelatase. This will ultimately reduce the gap in knowledge and treat diseases associated with both protoporphyrin IX buildup and heme depletion.

Simulating Interactions with Lunar Rocks
Rinisha Ramprakash, CURO Research Assistant
Dr. Phillip C. Stancil, Physics & Astronomy, Franklin College of Arts & Sciences
The moon, like all air-less bodies, is exposed to the harshness of the environment of space. The surface is bombarded by solar wind ions, cosmic rays, Ultraviolet, and X-ray radiation, which interact with the soil in a process referred to as space weathering. Further studies have found that micrometeorite impacts affect the moon's soil, and by studying micrometeorite interactions, we can learn about the early conditions and processes in the solar system's history. Knowing about the dynamics of the moon's regolith leads to a better understanding of the complex mineralogy on the moon. The purpose of this research is to simulate the lunar regolith and explore the dynamics of interacting particles. One of the main constituents of lunar rocks is the mineral forsterite (Mg_2SiO_4). We apply the public-domain software package Large-scale Atomic/Molecular Massively Parallel Simulator (LAMMPS) to simulate a lunar rock and its interactions at its surface. A crystal slab of forsterite is created with the packages Vesta and Moltemplate. Classical trajectory calculations are performed with LAMMPS to relax the slab into an amorphous state. LAMMPS is then used to simulate particle collisions with the forsterite slab. Ultimately, we plan to study both solar wind proton and micrometeorite collisions, which are proposed as mechanisms for the production of water in the lunar regolith. The tool VMD is used to visualize the time-dependent interactions.

MSC Single Cell Analysis Methods for (evaluating) Functional Heterogeneity
Nic Rasool, CURO Research Assistant
Dr. Ross Alexander Marklein, School of Chemical, Materials, & Biomedical Engineering, College of Engineering
Mesenchymal stromal cells (MSCs) have potential as a cellular therapy because of their immunomodulatory function. MSCs are capable of producing anti-inflammatory signaling molecules and extracellular vesicles (MSC-EVs) that can modulate T cell subsets and potentially treat immune diseases such as multiple sclerosis and Parkinson's. However, clinical translation has been slow due to MSC and MSC-EV functional heterogeneity, impacted by source and manufacturing processes. Priming, or exposing MSCs to relevant inflammatory signals, has been shown to enhance immunomodulatory function and decrease heterogeneity. However, predicting MSC response to priming and subsequent function is necessary to identify optimal manufacturing conditions. MSC morphology has been shown to be a potential critical quality attribute (CQA, predictor of function). Previously, aggregate cell morphology data was utilized to screen MSC response to priming. In this work, we implemented single cell analysis through the program Cytobank to reveal higher resolution information than initial summative analyses towards determining frequency and phenotype of efficacious subpopulations, applicable in evaluating manufacturing conditions, enriching for functional subpopulations, and eventually understanding MSC mechanisms of action. We applied the single cell analysis workflow to a validation screen of MSC mitochondrial inhibitors aimed at exploring the influence of mitochondrial bioenergetics on MSC response to priming. The work helps establish a standard analytical method (subpopulation analysis) applicable to a variety of MSC research and manufacturing contexts. Ultimately, such approaches contribute to understanding and controlling functional heterogeneity of MSCs and accelerated clinical translation of consistent, efficacious MSC-based therapies.

Detection of Cyanobacteria Harmful Algal Blooms in the Southeastern United States through Data Mining of Social Media
Keshav Raviprakash, CURO Research Assistant
Dr. Deepak R. Mishra, Geography, Franklin College of Arts & Sciences
Cyanobacterial Harmful Algal Blooms (CyanoHABs) are a major issue due to their degradation of environments across the world and the potential health risks that they pose to animals and humans. Detection of CyanoHAB events needs to be timely and accurate in order to convey the potential effects that each event can have on a water body. While previous projects have aimed at using remote sensing and water sample testing alone to determine whether algal blooms are present or not, they are unable to meet the requirements stated above. Thus, the Cyanotracker project aims to solve this problem by using data mining of social media platforms. This work will improve upon previous iterations of data mining used in the project by providing live updates to potential CyanoHAB events from social media platforms with large social engagement. It will then utilize articles from Google News to verify the detection of a potential CyanoHAB event using geolocation. Finally, the data from both of these processes will be used by the Cyanotracker project to provide data for the public through sensor systems deployed at various locations and satellite remote sensing. By conducting this work, the Cyanotracker project aims to provide more accurate and timely data for the general public of the Southeastern region of the United States and eventually the rest of the world.

Automated Data Extraction from Autodesk Inventor 2022
Emilia Reber, CURO Research Assistant
John Loosemore
Dr. Deepak R. Mishra, Geography, Franklin College of Arts & Sciences
Two critical considerations during the fabrication of a small satellite are the materials used in construction and the mass of the satellite. In designing and machining the components for the Multiview On-board Computational Imager (MOCI) satellite mission, the Small Satellite Research Lab utilizes Autodesk Inventor for designing spacecraft components. Additionally, several manually created and maintained documents, including a materials list and mass budget, are used. The Python pywin32 library allows access to many Windows Application Programming Interfaces (APIs) directly from Python, which would simplify automating the creation and maintenance of these documents, saving hours of manual labor reviewing and editing documentation. We propose a program that implements the pywin32 library to automatically access the MOCI assembly drawing and parse the properties of each component, updating the respective files. Every Windows program is required to have an API that is accessible by Windows to facilitate user interaction with the software. Inventor's Windows API will allow us to automatically open Inventor drawings and assemblies, access their properties such as part number, material, and mass, and compile the results into a Comma Separated Value (CSV) file. The resulting CSV file can then be opened by spreadsheet software such as Microsoft Excel. To demonstrate this proposal, we developed a Python program capable of generating a mass budget and materials list spreadsheet for the MOCI satellite mission. The program completes the computation in seconds, as opposed to the multiple hours taken by team members to manually generate and update the aforementioned spreadsheets. This poster illustrates the methodology behind the design and testing of the program.

Modeling Strontium Isoscapes for Archaeological Research in Turkey
Hailey Reed
Dr. Suzanne Pilaar Birch, Anthropology, Franklin College of Arts & Sciences
Strontium isotopes are used in archaeological analysis for geographic origination and mobility for both humans and animals, because of their value as geoindicators of provenience. Unfortunately, its merit is undermined by difficulties with large-scale compilation and analysis of local "baseline" values. Current work with strontium utilizes extrapolation of expected values from bedrock, the identification of outliers from archaeological data, or individual and localized datasets generated from floral and faunal material but have been unable to create a cohesive conception of the variation in bioavailable strontium versus bedrock values in Turkey. Using a meta-analytical approach, strontium-isotope data points were compiled, and Random Forest Regression was utilized through R software to predict strontium values for given coordinates across the broader landscape of Turkey. The data was then subsetted and organized to produce four different maps in QGIS in order to compare projected values and determine the greatest level of predictive accuracy in comparison to previous models. These isoscapes of bioavailable Strontium can facilitate the analysis of trends and discrepancies in terms of the locality and mobility of humans, plants, and animals, as well as the reconstruction of movement in Turkey. Further research is focused on these analyses through individual and site-specific investigation in addition to the advancement of large-scale synthetic archaeological research in the area.

Triboelectric Edge Computing Sensors and their Application in the IS Supply Chain
Jake Andrew Reinhart
Dr. Rick Thomas Watson, Management Information Systems, Terry College of Business
In this paper, we explore a new generation of sensor technology, the triboelectric sensor, and offer improvements to its structure to increase its applications. In addition, we propose a revised edge computing architecture implementing these sensors for wide and narrow wireless sensor networks. We explore each architecture's implications through various use cases, which rely heavily on factors such as latency, security, and scalability. Such an architecture provides solutions to many problems present in contemporary edge computing frameworks; however, it also acts as a starting point for discussing the expansion of wireless sensor networks and the value that larger volumes of data from vast sensor networks can provide.

Brexit Reopens the Irish Border Conflict
Sloane Rice
Dr. Andy Owsiak, International Affairs, School of Public & International Affairs
What was the effect of Brexit on conflict narratives in Northern Ireland? We argue that conflict narratives are exceptionally stubborn, which leaves them latent in the wake of a settlement. Certain issues can then reactivate the narratives. In Northern Ireland, both sides' conflict narratives touch upon the question of the Irish border. Brexit reopened the border's status, thereby bringing the narratives back to the fore. Conflict narratives remain latent as a result of their longevity and stickiness resulting from the discord sewn by opinion leaders, the recontextualization of victimhood in participating groups through empowering narratives, and collective memory. When previously linked to a territorial disagreement—which are notoriously violence-prone—the reintroduction of that disagreement reopens the related conflict narratives. We predict that, while the Irish border conflict cooled down prior to Brexit emerging on the public's radar (via the Belfast/Good Friday Agreement of 1998), Brexit reintroduced that conflict to the public. This caused strong, negative emotions associated with the conflict narrative to remerge, and then intensify as Brexit moved from an idea to a referendum to an actual separation of the United Kingdom from the European Union. Violence will have accompanied this reintroduction and intensification of emotions. We will test this argument with a new

emotional analysis, social science software tool that can analyze Twitter data and, through these data, gage emotional reactions over time to proceedings (this portion is developed by Professor Boucher at the University of Calgary). We expect to find the emotional reaction of concerned parties on Twitter will reflect the escalation of Brexit in each stage.

Designing a Multi-Aspect Automatic Scheduling Script for Small Satellites

Liam Riley, Ramsey Scholar, CURO Research Assistant
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The scheduling of Small Satellites with ambitious operational concepts requires accounting for a large number of variables in power budgeting, orbital dynamics, software architecture, and data handling. This can prove difficult for many Small Satellites that do not contain complex autonomous decision-making software, such as the Multi-View Onboard Computational Imager (MOCI) at the Small Satellite Research Lab (SSRL). MOCI requires manual uploading of operational schedules, which necessitates either manual scheduling or an automated solution. Manual scheduling is prone to human error and prohibitively time-consuming during scheduling timespans; an automated solution is desirable. To achieve this demand, I have been developing the MOCI Automatic Satellite Scheduler (MASS) within the Commercial off-the-Shelf (COTS) software FreeFlyer. During my tenure at SSRL, I will continually improve on the scheduling criteria in order to improve MASS's simulational fidelity. The MASS program combines three primary components that check and balance each other via specific criteria informed by MOCI's operational concept. These three components include: the scheduling component, utilizing a complex conditional logic tree to decide between all possible sub-modes when given instantaneous timestep conditions; the data handling component, implementing MOCI's data budget to simulate MOCI's onboard computational capabilities; and the power budgeting component, utilizing MOCI's power generation as per its solar orientation alongside its power consumption as per sub-mode wattages, to calculate satellite power positivity. Functioning together, the three components of MASS will be shown to properly account for MOCI's various functions and requirements: automatically generating schedules of arbitrary lengths from hours to potentially months.

Production of Varroa Destructor dsRNA in Vitro

Lucy Robbie, CURO Research Assistant
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Varroa destructor, a type of mite, are silent killers of honeybees due to their ability to transmit viruses and cause physical damage to the bees. Eradication is difficult. Currently, the most effective treatments for Varroa destructor are either formic acid or oxalic acid, which are harsh chemicals that cause many bee casualties. The goal of this project is to produce double-stranded RNA (dsRNA) of the Daughterless gene from Varroa destructor to treat honeybees via RNA interference mechanisms. Varroa mites were collected from an active honeybee hive, and their mRNA extracted. After reverse transcription to make cDNA, the Daughterless gene was produced by PCR amplification of the cDNA library. The PCR products were inserted into a dsRNA-expression vector, and restriction enzyme digests and sequencing were completed to confirm the accuracy of the plasmid. dsRNA was then produced in Escherichia coli transformed with the plasmid and grown in auto-induction culture media. An additional plasmid with GFP fragments (pLRGFP-1) was created with the same methods to produce control dsRNA. In the process of making dsRNA, it was noticed that the cells were lysing during the induction step for dsRNA production, which would limit the yield of dsRNA. There has been research into E. coli growth habits that shows cells may induce cannibalization in sick colonies, which may be due to excessive amounts of dsRNA. Due to the problems with cell lysis of the E. coli during induction, various methods will be explored to lower the number of lysing cells and increase the dsRNA yield.

Impact of Variable Temperature Fluctuation on Zika Virus Replication

Rachel Robertson, CURO Research Assistant
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Zika virus is a positive, single-stranded flavivirus that is transmitted to mammalian hosts by mosquito vectors. While humans maintain a relatively constant body temperature, mosquitoes are ectotherms, and their temperature varies with the environment. To develop Zika virus risk maps, researchers have examined Zika virus transmission dynamics in the mosquito vector across a range of temperatures. The majority of these studies were completed at a constant temperature, however, in nature, the mosquitoes experience temperature fluctuations due to the day-night cycle. Here, we examined Zika virus replication at varying magnitudes of temperature fluctuation. First, mosquito C6/36 cells were infected with Zika MEX 1-44 and maintained in different temperature conditions: 22±5°C, 22±2.5°C, and 22°C. Supernatants were collected from each culture to monitor viral production over time. We detected higher viral titers It was found that in the cultures that experienced temperature fluctuation produced higher titers earlier in infection than in the constant conditions. The virus was also produced earlier in the culture when placed in fluctuating conditions. Subsequently, experiments including fluctuations at a lower mean temperature, 20°C, will be performed to detect Zika virus replication closer to the minimal permissive temperature of Zika replication. Zika virus is expected to reproduce to higher titers in both fluctuating environments compared to constant conditions. These results imply that Zika virus replication in mosquito cells is more efficient in an environment that undergoes regular temperature variation within permissive ranges. Because temperature fluctuation improved Zika replication, the previously generated maps produced using the data from constant conditions may underestimate Zika virus transmission risk.

Effect of Time Dedicated to Teaching on Student Learning

Bryn Robinson & Cloe Reynolds
Dr. Tessa C. Andrews, Genetics, Franklin College of Arts & Sciences

Active learning can be a useful strategy in promoting student learning but is reliant on teacher ability and willingness to incorporate such practices into their classrooms. Despite the benefits of enhancing students' conceptual knowledge, there is often an absence of effective implementation of active learning strategies in STEM undergraduate education. In this study, we are seeking to identify if the time dedicated to teaching impacts the use of active learning in undergraduate biology courses. In a nationwide survey, 11 teachers from various universities reported their teaching appointment percentage and teaching development, including if they had participated in more than 40 hours of teaching professional development, participated in formal teaching mentorship as a mentee, and had formal training in teaching as a graduate student or postdoc. Additionally, we analyzed lessons from participants to determine the amount of interaction with students facilitated by the teachers. By comparing the time invested in teaching and teaching practices through a simple linear regression and ANOVA test, we are seeking to determine if there is an association between time invested in teaching and low, medium, and high levels of active learning in the classroom. We anticipate that the findings will reveal that there is a significant association between the time dedicated to teaching and the active learning practices used in classrooms. These findings can help provide

information to shape the types of jobs and training needed to create an effective learning environment for undergraduate students.

Developing a Chatbot to Improve Prenatal Testing Education Amongst Pregnant Women

Alexa Nicole Robles, CURO Honors Scholar
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Prenatal care involves a variety of prenatal testing ranging from routine testing to genetic testing. Given the number and range of testing and the fact that different tests are appropriate for different points in the pregnancy and under certain conditions, many expecting women have questions about what types of testing they may need at different points of their pregnancy. Chatbot applications in healthcare education, provide an easy and convenient access to accurate and relevant information that answers the user's specific questions. As a result, I have developed a chatbot named Eve. The primary goal is to answer questions concerning the various types of prenatal exams. The knowledge base for Eve consists of information on prenatal testing from the National Institute of Health. Eve's knowledge base consists of question and-answer pairs that allow users to receive information based on (a) their stage in the pregnancy; and (b) by different categories of testing (e.g., routine, genetic). Following implementation, healthcare professionals interact with Eve to validate the accuracy of Eve's information. Following their feedback and revision, Eve will be tested on a convenience sample of pregnant women which is the target audience for the chatbot. We will assess whether Eve increases pregnant women's awareness and knowledge of available prenatal testing options and decreases their anxiety surrounding this information. We will also assess whether Eve is easy to interact with. In order to evaluate Eve's success, we will conduct a short voluntary questionnaire following each user's interactions. Overall, we expect Eve to improve prenatal care education, and lessen anxiety.

The Search for a Universal Influenza Vaccine: Broadening Influenza A Immunization Using Next-Generation COBRAs and Nanoparticle Technology

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Influenza vaccines have moderate efficacy and are redesigned annually due to the high mutability of the primary antigen, hemagglutinin (HA). The question investigated was whether antibody protection elicited by HA antigens of influenza A subtypes H1N1 and H3N2 could be broadened using new vaccine technologies: Computationally Optimized Broadly Reactive Antigens (COBRAs) and nanoparticles. The hypothesis was that vaccines combining both technologies would elicit antibodies inhibiting diverse influenza strains. In our first study, COBRAs Y2 (H1) and TJ5 (H3) were anchored to the surface of nanoparticle I53_dn5 in formulations of Y2-I53_dn5, TJ5-I53_dn5, and Y2-TJ5-I53_dn5. BALB/c mice were immunized with the assembled vaccines. Serum samples were collected 56-days post-prime. Antibody protection was evaluated against H1N1 and H3N2 strains with hemagglutination inhibition (HAI) assays. Y2-I53_dn5 and TJ5-I53_dn5 elicited significant cross-group seroprotection, supporting the hypothesis. In our second study, we confirmed this activity in a mouse influenza challenge model. Vaccines containing Y2 and TJ5 in recombinant HA and nanoparticle formulations were used to immunize DBA/2J mice in a prime-boost-boost regimen. Serum samples were collected 4 weeks after each immunization. Antibody activity was analyzed in enzyme linked immunosorbent assays (ELISAs) against Y2 and TJ5. While data collection is ongoing, currently, Y2 has shown reduced H1N1 immunogenicity in DBA/2J compared to BALB/c mice. However, TJ5 rHA and nanoparticle vaccines have elicited strong titers of activity against H3N2 antigens. The antibody breadth an efficacy observed has positive implications for developing a more effective, accessible vaccine.

The Effects of Early-life Food Insecurity on Neuronal Development and Obesity

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Food insecurity is characterized as inconsistent or uncertain access to food and is linked to eating disorders and obesity. Although there is a lot of research on the impact of nutrition on adolescent development and eating behaviors in adulthood, there is a lack of research on the impact of food insecurity on brain development and eating behaviors. This study seeks to determine how food insecurity impacts the brain development of adolescents and their eating behaviors as adults. This study uses a female rodent model with three experimental groups to simulate and study food insecurity. One group of animals were fed a regular, high fiber diet on a set schedule, another group was fed a high fat/sugar diet on a set schedule, and another group of animals were fed a high-fat/sugar diet on an unpredictable schedule. All three groups received the same caloric intake and were subjected to multiple behavioral tasks. The study found that female rodents with food insecurity had an increase in fat mass when given access to an obesogenic diet in adulthood. There was no increase in motivation for sucrose or high-fat food and only a small difference between increased caloric intake and body weight on the obesogenic diet. The results indicate that early life food insecurity increases likelihood for diet-induced fat gain in female rodents. The study is currently being replicated in male rodents to potentially generalize the results to both genders.

The Association Between Age of Onset of Alcohol Consumption and White Matter Structure in Psychotic Disorders

Cayleigh Cassidy Romano
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White matter is responsible for communication between different parts of the brain and abnormalities in the structure have been identified in patients with psychotic disorders as well as in those with high levels of alcohol consumption. Previous studies have found in both psychotic disorders: bipolar disorder with psychosis (BP), schizophrenia (SZ), and schizoaffective disorder (SA), and high levels of alcohol consumption, there is an increase in white matter abnormalities. Water diffusion around the axons that make up white matter in the brain can be measured using Diffusion Tensor Imaging (DTI), a type of MRI, which can then be quantified into Fractional Anisotropy (FA) values, with lower FA values indicating white matter abnormalities. The goal of this project is to utilize mean FA values of 18 white matter tracts to better understand the relationship between age of onset of alcohol consumption and FA, the difference in FA values between the psychosis group (PG) and healthy control (HC) and determine if there is an interaction between age of onset of alcohol consumption and diagnosis group on FA. We hypothesize a positive relationship between age of onset of alcohol consumption and FA, significant differences between the PG and the HC, and an interaction between age of onset of alcohol consumption and diagnosis group on FA. Better understanding of the association between diagnosis group and age of onset of alcohol consumption on white matter abnormalities may shed light on possible consequences of young drinking with and without psychotic disorders.

A Meta-Analysis of Workaholism and Negative Health Outcomes
Cora Romick
Lexie Goldman, Angela Vo, Rithvick Kumar, Faaris Rashid, Danyal Ahmad
Dr. Malissa Clark, Psychology, Franklin College of Arts & Sciences
Over the past 30 years, there has been a multitude of studies conducted to research the effects of workaholism on various lifestyle outcomes. However, there has not been a systematic review that investigates the relationship between workaholism and health outcomes in more recent years. The goal of this review is to show how workaholism can cause a severe negative impact on health outcomes, specifically insomnia, cardiovascular risk, and blood pressure issues. Using the PsychInfo database, we have collected 20 articles using keywords related to work addiction and numerous physical health outcomes. We plan to meta-analyze the correlations between these health outcomes and workaholism to evaluate and add evidence to the relationship between workaholism and harmful health risks. This relationship is key to expanding the general knowledge about the dangerous effects of workaholism, and we suggest doing future studies about how these negative health outcomes can be mitigated.

Foraging Rate Across Resources and Temperature gradient in Daphnia dentifera
Christopher Oluwafemi Romiluyi
Dr. Alexander Strauss, Odum School of Ecology
Many factors play a role in how we comprehend disease ecology and its effect on biological organisms in various ecosystems. In the case of Daphnia dentifera and aquatic ecosystems, factors such as foraging rate, temperature, and resource availability are key components in understanding these systems because Daphnia are filter feeders and encounter parasites while eating phytoplankton. We will investigate the foraging rate of D. dentifera across three different temperatures (15, 20, and 25°C) and three resource concentrations (0.1, 0.5, and 1 mg carbon/L). Specific roles in this project were rearing populations of D. dentifera, preparing cohorts of D. dentifera and different concentrations of phytoplankton for the foraging rate assay, performing the assay using 96-well plates and a spectrophotometer to measure changes in chlorophyll (phytoplankton) over time, and analyzing the difference between foraging rates in different temperature and resource conditions. Our goal is to analyze differences seen with Daphnia due to temperature and resource availability, and the interaction between the two factors. For the collected foraging rate, we are expected to see a saturating effect whereas resource concentrations increase, the foraging rate will increase to a point, which may differ between temperatures. These data will then be incorporated into a general mechanistic model of disease transmission in D. dentifera to pair with other experiments in the lab.

Engineering Citrate Synthase to Decrease Flux Through the Acetyl-CoA Node in Escherichia coli: Molecular Cloning, Protein Purification, and Biotransformation
Abigail Elizabeth Rose
Dr. Mark A. Eiteman, School of Chemical, Material, and Biomedical Engineering, College of Engineering
Many biochemicals are derived from the central metabolic intermediate acetyl-CoA, and entry into the tricarboxylic acid cycle via the enzyme citrate synthase is the most significant drain of acetyl-CoA in most microbes, including Escherichia coli (Zhao et al., 2004). Pathways involved in the production of biochemicals derived from acetyl-CoA must compete with citrate synthase. The underlying assumption is that a reduction in citrate synthase activity will increase biochemicals derived from acetyl-CoA. Our previous research demonstrated that E. coli containing any of three randomly generated citrate synthase variants behaved differently than the strain expressing the wild-type citrate synthase. The variants generated a greater yield of acetate than the wild-type strain. Our goals were to verify the sequence of plasmids made for recombinant protein production, to purify the wild-type and three variant citrate synthase proteins using immobilized metal affinity chromatography, to construct plasmids for a bioconversion that utilizes each variant citrate synthase, and to determine the effect of variant citrate synthase on mevalonate generation. We confirmed the sequence of the expression plasmids and the presence of our target protein using SDS-PAGE. We also constructed plasmids, each with a mutated gltA gene, to introduce three variant citrate synthases onto the chromosome of E. coli. The genes for the mevalonate biosynthetic pathway were introduced into these E. coli variants and analyzed via shake flask experiments.

Evaluation of a Molecular Tool to Measure the RNA Sequence-Dependent Translation Efficiency
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H. Travis Ichikawa and Branson Ritchie, New Materials Institute
Understanding bacterial translation initiation efficiency becomes critical when expressing heterologous genes or altering endogenous gene expression in bacteria. The untranslated region (UTR) of mRNA is the primary element in bacterial translation initiation. An UTR sequence connecting two different reporter genes encoded in a polycistronic transcript in a plasmid can be used to investigate the role of the UTR sequence-dependent translation efficiency. In such a setting, translation of the upstream reporter gene (mNeptune2) is expected to be independent of translation of the downstream reporter gene (eGFP), which is translated using the UTR sequence of the interest. In this configuration, the upstream mNeptune serves as an intracellular internal control. Two UTR sequences of different origines, TIR-1 and TIR-2, were tested in this system to compare their translation efficiencies. The obtained eGFP fluorescence levels were normalized to internal control mNeptune2 fluorescence levels for TIR-1 and -2. Surprisingly, the ratio of normalized eGFP fluorescence levels translated from two TIR sequences, TIR-1 / TIR-2, were quite different from what was calculated in an online program. The online program uses thermodynamics of deduced RNA sequences for calculation. Whereas our experimentally driven numbers may have been influenced by bacterial physiological conditions such as available energy and free ribosomes that can participate in translation. In order to validate our plasmid tool, we are generating seven more constructs that contain TIR sequence with different mutations in and around the Shine-Dalgarno sequence.

Scapegoats of Crisis in Ecuador? Narratives of migrants during times of social unrest
Christopher Rosselot, Foundation Fellow
Dr. Jorge C. Derpic, Sociology, Franklin College of Arts & Sciences
The Paro Nacional (national boycott) of June 2023 shut Ecuador down for 18 days. Activists, led by indigenous confederation CONAIE, blockaded key highways and occupied urban areas, protesting rises in gasoline prices and other economic policies of right-wing President Guillermo Lasso. While the methods and reasons for protest were similar to previous Paros in 2012 and 2019, Ecuador's social context has changed dramatically: more than 500,000 Venezuelan migrants now live in Ecuador. Ecuadorian policy and public perception has historically welcomed regional migrants (particularly those from Colombia), but new narratives of migrant-related insecurity and economic threat are emerging. While little evidence suggests that migrants participated in social protest, do times of social unease accentuate discriminatory narratives against foreign outsiders? This research analyzes this question on both the subnational and national levels through a narrative analysis of news

stories and statements of elected officials. Perceptions of migrants as posing either economic or social threats drastically influence the public narratives of migrant participation. This research holds implications for contexts in which migrant human security may be particularly precarious.

Superiority of Silk Wound Dressing Over the Dermabond® Prineo® Skin Closure System: A Prospective, Randomized, Single-Blinded Clinical Trial

Daniel Sina Rouhani, CURO Honors Scholar

Dr. Janet Westpheling, Genetics, Franklin College of Arts & Sciences

Over 1.5 million patients annually in the USA have had an adverse reaction to medical adhesive dressings including allergic contact dermatitis (ACD), skin blistering, skin tears, or surgical site infections. These complications, known as medical adhesive related skin injuries (MARSI), are one of the most overlooked complications in surgery. We hypothesize that a natural hypoallergenic silk wound dressing will decrease the incidence of MARSI in comparison to a synthetic alternative. This prospective, randomized, single-blinded trial studied 25 patients who were dressed with Dermabond® Prineo® on one side of their body and on the contralateral side with the silk wound dressing after undergoing abdominoplasty or reduction mammoplasty procedures. Data was collected over 5 postoperative visits using photographs and an investigator administered questionnaire to track rash, itch, discomfort, erythema, edema, SSIs, need for pharmaceutical intervention, mechanical injury, removal time and bathing routines. 64% (16/25) of patients characterized the severity of discomfort as a score of 4 out of 10 or greater on the Dermabond® Prineo® control side and only 4% (1/25) for the silk dressing side ($p<0.001$). 52% (13/25) had a visible rash of 4 or higher on the Dermabond® Prineo® side of their incision and 0% (0/25) had a rash on the silk side ($p<0.001$). 52% (13/25) required pharmaceutical intervention (steroids or antibiotics) to treat MARSI to Dermabond® Prineo® and 0% (0/25) required pharmaceutical intervention on the silk side ($p<0.001$). The study shows an early demonstration of the efficacy and safety of a hypoallergenic silk wound dressing compared to Dermabond® Prineo®.

Recasting Surrogacy as Labor: Assessing International Law and Developing a Regulatory Framework

Julianna Russ, Foundation Fellow

Dr. Maryann Gallagher, International Affairs, School of Public & International Affairs

This research project focuses on the transnational surrogacy industry and how it might be regulated if it were considered a type of labor, with surrogates being reproductive employees. How would current international labor laws apply to transnational surrogacy under these conditions? Recasting surrogacy as labor would obligate states to develop more comprehensive regulatory standards in line with current international labor laws. An in-depth law review will be conducted to assess what types of regulations are already in place and how they might apply to reproductive labor. Findings might suggest that certain international laws would be highly applicable to surrogacy, or they may prove that regulation of transnational surrogacy is too difficult on such a massive scale. No matter the findings, this research fills a significant gap in scholarship regarding the protection of surrogates. Research about protecting the children of surrogates is abundant, but study of the surrogate's personal protection is scarce.

Development of the MEMESAT-1 PMAC ADCS Simulations

Jillian Y. Russell

Dr. Deepak R. Mishra, Geography, Franklin College of Arts & Sciences

MEMESat-1, a satellite mission out of the University of Georgia Small Satellite Research Laboratory utilizes a passive magnetic attitude control (PMAC) system for its attitude determination control system (ADCS). The PMAC system utilizes, an internal bar magnet, hysteresis rods, and residual magnetic torques to stabilize the system as a combatant to the environmental torques of the low Earth orbit (LEO) environment. During its orbit, the system will reorient itself to a point where it can maintain a strong connection with UGA SSRL's ground station during the mission. Each of the destabilizing and stabilizing torques has a different ratio of the impact that it can have on the satellite. We will use the characteristics of the LEO space environment and of MEMESat-1 to determine the torque values. The goal is to rank or place in order from least to greatest, the disposition each torque will have on the attitude of MEMESat-1. This is important to the PMAC ADCS of MEMESAT-1 because it will show us what to give most of our attention to as we continue with the simulations as well as after the launch. If we rank the stabilizing and destabilizing torques against one other, then the stabilizing torques should have a more significant overall impact on the satellite's ADCS abilities, with the greatest single impact via torque being from the bar magnet. We will test this via simulations on MATLAB which will emulate the environment that the satellite will face during its mission.

The Beauty of Plurality: The Designing of Genderless Clothing

Emma Kay Ryals & Alyssa Dickson

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This design research utilized the User-Centered Design Theory (Rosenblad-Wallin, 1985) to design gender neutral clothing for children and adults. This design method puts the consumer at the focus of the design process, which allows for the design process to be driven by consumers' clothing needs and wants. Traditionally the fashion industry designs based on trends and assumed consumer desires, however, this process excludes many people from participating in fashion. The research objectives are (a) identify what is missing from mass market fashion marketed towards non-binary individuals, (b) engineer digital prints for final garment, as well as create prototypes, and (c) create a visually appealing design that is not only genderless, but ageless as well.

To begin the process, research was conducted on what is already on the market for genderless clothing to gather inspiration and more of an understanding of what is missing. Second, the design process began with an inspirational mood board, sketches and general print ideas. This led to drafting the prototype and print designs on Lectra's Kaledo print software. Lastly, the designed prints were printed onto fabric using the sublimation printer and then constructed into the final garment. The anticipated findings will help bring attention to where mass market fashion may be falling short in inclusivity.

A Case Study of the Degrees of Racial Equity in Jenkins City Schools Gifted Education, AP Programs, and High School Math and Science Classes

Joshua Rysiew

Dr. Tarek C. Grantham, Educational Psychology & Instructional Technology, Mary Frances Early College of Education

Although Georgia's gifted education guidelines allow multiple methods and approaches to identify students for advanced education programs, underrepresentation among Black, Hispanic, and Native American students persists in many schools. Georgia educators and policymakers in gifted education are concerned about the excellence gaps and implicit bias that can perpetuate underrepresentation. Yet, few know the degree of racial equity in Georgia gifted programs. How significant are these racial gaps in Georgia's gifted and advanced educational services, and to what degree might there be schools with equitable representation that

can serve as models of equitable policies and practices? To address these questions, we conducted a descriptive study of enrollment patterns by race based on Georgia's five largest school districts; later, we replicated the five-district equity study and focused on one district as a case study to disaggregate the data. First, we examined the overall student enrollment by race compared to their gifted education enrollment using the Equity Index. We then used the 20% allowance formula to determine the degree of equity in the gifted/AP program. Finally, we utilized the recently-developed Degrees of Equity Grading Scale (DEGS) to grade the district on an A-F, +/- grading scale to provide more levels for measuring the district's progress. For this pilot study, we found underrepresentation across multiple subjects in the district. The findings establish a baseline and can support educators in establishing gifted and advanced education school improvement goals and enhancing local policies and practices to reach and sustain greater degrees of equity.

Starvation as a Tool of War: A Phenomenon, or Is It?
Aicha Sabara
Dr. Leah Carmichael, International Affairs, School of Public & International Affairs
Starvation, within war, is a phenomenon that has been perfected throughout history. Methods we've observed within war have shifted as society continues to evolve and become more industrialized. As we are highly unlikely to see a disappearance of war it is imperative that we understand the nature of why war occurs, why certain methods are chosen, and what repercussions these methods have on war. The specific mechanism of war this research focuses on is starvation and the various techniques used to produce it. This concept has been widely acknowledged in history, as evidence of its use dates back even earlier than periods of colonization. Yet, during the 19th century a peculiar pattern of lack of starvation seemed to arise before returning to wide use in the 20th century. This raises the question, "What caused this anomaly to occur?" This research will serve to explain observed patterns, develop a hypothesis regarding the existence of this anomaly, and explain the importance application of this research can bring to the international community. Understanding this phenomenon can potentially help society identify means of reducing the use of starvation as a mechanism of war.

The Impact of COVID-19 on Substance Use Disorder Treatment
Taylor Sabato
Dr. Lydia Aletraris, School of Social Work
The impact of COVID-19 on various fields in the healthcare industry is extensive and has affected the delivery of many healthcare services, including that of substance use disorder (SUD) treatment. The COVID-19 pandemic made it especially difficult to deliver SUD treatment services to individuals in already highly vulnerable populations at risk of overdose and relapse in addition to infection. This research examined the effects of the COVID-19 pandemic on the operational and staffing practices of SUD treatment facilities across the nation. Prior studies analyzing the effects of COVID-19 on SUD treatment focused primarily on qualitative data collected from relatively small sample sizes or limited geographical regions. In this study, data were collected between September 2021 and February 2023 from 325 treatment facilities in 48 states. Phone interviews were conducted with clinical directors who were asked a series of open and close-ended questions. Quantitative and qualitative data were analyzed for changes in operations, staffing, and treatment administration. Data collected from this study reveal potential causes for decreased access to SUD treatment for patients during the COVID-19 pandemic, including a partial or complete shutdown of operations, discontinuation of services such as group therapy, family visitations, drug screenings, wraparound services, and aftercare, and a reduction in staff hours and salaries. On the other hand, treatment access via telehealth greatly increased, with the majority of treatment programs offering this as a newly-added service. These findings will be useful in assessing the long-term effects of the COVID-19 pandemic on the administration of SUD treatment services.

Mycobacterium tuberculosis Interactions with Various Epithelial Cell Types
Audrey Safir, CURO Research Assistant
Dr. Frederick D. Quinn, Infectious Diseases, College of Veterinary Medicine
Mycobacterium tuberculosis is the primary causative agent of human tuberculosis, acquired by inhalation of bacteria-containing aerosols. M. tuberculosis can also cause infection through ingestion and dissemination from the intestinal tract. Our lab has shown that M. tuberculosis can internalize and replicate within alveolar epithelial cells during infection of the lower airway. The activity of the bacilli in the upper airway has not been well-characterized, and we hypothesize that like other respiratory bacterial pathogens, M. tuberculosis is not able to effectively internalize and replicate within bronchial epithelial cells found in this area. Like these other bacterial species, we suspect that M. tuberculosis may colonize cells of the upper airway without damage, which would reveal an undetected step in the disease cycle and have implications in vaccine development and transmission control. It is completely unknown how M. tuberculosis interacts with epithelial cells in the intestinal tract during infection. Using a fluorescent strain of M. tuberculosis mc26206, an attenuated double auxotroph, I infected A549 (an alveolar epithelial cell line), BEAS-2B (a bronchial epithelial cell line), and Caco-2 cells (an intestinal epithelial cell line) and used confocal microscopy to observe bacterial attachment, internalization, and replication. Internalization was observed 24 hours post-infection in both A549 and Caco-2 cells. Conversely, there was limited association between M. tuberculosis bacilli and BEAS-2B cells. These data provide initial evidence in support of our hypothesis and warrant further investigation using virulent, non-attenuated, M. tuberculosis strains and animal models.

Harvesting Microalgae Using Thermoresponsive Surfaces
Yash Sajjan, CURO Research Assistant
Dr. Sergiy Minko, Chemistry, Franklin College of Arts & Sciences
Microalgae is a promising candidate for biomass fuel production to reduce greenhouse gasses and have a renewable and reliable energy source as the developing world becomes more energy hungry. Currently, algae are harvested either from flocculation, if in a liquid media, or scraping, if grown on a biofilm. Both methods have proven to be expensive and less effective since the strong adhesion of algae to the biofilm reduces yield from scraping, and flocculants are too expensive to use commercially. Furthermore, thermoresponsive polymers are known to exert mechanical force due to conformational change. Thus, we propose to implement a dual polymeric domain surface capable of binding and then physically removing the strongly adherent algae. In order to do this, silica wafers were spin-coated with SU-8, cured under a photomask, and grafted with N-Isopropylacrylamide (PNIPAAm) which acted as a thermoresponsive surface with a lower critical temperature of 25⅓Our results show that algae will attach to the SU-8 domain under biologically viable conditions with and without a photomask. We expect the algae will detach from the SU-8 domain when the PNIPAAm expands at its lower critical temperature. This study proves that biofuels can be produced more efficiently and paves the way for more research to enable this technique to be mass-produced and used in the industry to make energy more sustainable, affordable, and widespread.

Examining Global Perspectives in Middle Grades Teacher Education
Paula Salazar, CURO Honors Scholar, CURO Research Assistant
Dr. Gayle Andrews, Educational Theory & Practice, Mary Frances Early College of Education
The world is more interconnected than ever, and globalization causes two main trends in teacher education programs in the U.S. today: a growing interest in internationalizing teacher education and increasing concerns about neoliberal influences narrowing the focus of teacher preparation programs. Therefore, incorporating global perspectives in teacher education seems imperative. Teachers will develop global competence to teach their students to live successfully in the closely interconnected world and to meet students' diverse needs in multicultural classrooms. Also, teachers will be able to perform as change agents through examining different cultural approaches to education and the relationship between society and education systems. In spite of this significance, little is known about how global perspectives are discussed in the field of middle grades teacher education. Through a critical reading and synthesis of the relevant literature, this study aims to investigate practices and approaches of incorporating global perspectives in teacher education programs in the U.S. and consider implications for culturally responsive middle grades teacher education. This research adopts critical consciousness as a guiding theoretical framework and proposes a global education as a way to support developing preservice teachers' critical consciousness. Critical consciousness is the social process of questioning one's assumptions about reality and active participation in the critique of knowledge production. This analysis of extant literature will enable teacher educators to understand how U.S. teacher preparation addresses the demands of globalization and what to improve to prepare teachers to work with young adolescents living in our globalizing society.

The Global Importance of Women in Energy
Brooke Sanders, CURO Research Assistant
Dr. Maryann Gallagher, International Affairs, School of Public & International Affairs
The paper is an analysis of how women are currently being added to the energy sector globally and what other ways can women be incorporated into the sector. This work examines the way energy security directly correlates with human security. It ties in a way that women in energy can correlate with Women, Peace, and Security. This work reviews the ways that different countries are currently adding women into their energy sectors. In doing this, it will show the differences in how developed and developing states look at energy. The work looks at different National Action Plans and the current data that there is on women in energy. Currently, developing countries seem to be acknowledging the ways that energy affects women and pushing for the inclusion of women in the field. In more developed nations with fewer issues related to energy security, women have seemingly been excluded from the conversation. The paper will also review the work that current scholars have been doing to focus on the importance of women and energy. Additionally, the paper examines the act of women in nuclear energy as the future of energy seemingly moves in that direction This research makes the argument as to why we as scholars and policymakers need to focus on this more and bring attention to the ways that women are needed through the means noted above. I hope this will allow for more research and work to be put into this topic.

Supplementing Neural Networks with Visual Transformers for Semantic Material Segmentation in Mobile Robot Systems
Diego Alejandro Santamaria-Sarcos
Dr. Ramviyas N. Parasuraman, Computer Science, Franklin College of Arts & Sciences
Semantic material segmentation is the computer vision process by which images are segmented by the material composition of the objects within them. Compared with its counterpart, object segmentation, material segmentation benefits more from increasing the modality of its input suite, such as including infrared vision and simply using RGB; however, contemporary computer vision algorithms rely on convolutional neural networks (CNNs), and they are increasingly resource intensive. As a result, to run on mobile robotics systems, which have limited computational resources, image processing, especially in extending modalities, must be offloaded to run in real time. Researchers have focused on supplementing CNNs with visual transformers for their relatively constant runtime to address this. The Dense Prediction Transformer (DPT) is a state-of-the-art system notable for achieving comparable results to contemporary algorithms for segmenting objects. Since material segmentation systems are built with identical backbones as those for object segmentation, I predict that DPT would perform similarly well in the material setting. To test this, I will compare its performance to contemporary models trained and tested on subsets of the Dense Material Segmentation dataset. The performance evaluation will be multi-objective comparisons in processing time per image and the standard measures for accuracy in machine learning. I expect that DPT will appear in the resulting Pareto front, demonstrating its efficacy in compromising accuracy and processing speed. This shows that visual transformers are a suitable alternative for running online and in real-time in mobile robot systems.

Analysis of Varying Drug Treatment Regimens on the Activity of Trypanosoma Cruzi Amastigotes In-Vitro
Saanvikha Saravanan
Dr. Rick Tarleton, Cellular Biology, Franklin College of Arts & Sciences
Dr. Angel Padilla, Center for Tropical & Emerging Global Diseases & Department of Cellular Biology, Franklin College of Arts & Sciences
Trypanosoma cruzi is the causative agent of Chagas disease, the highest impact parasitic disease in Latin America. Intracellular amastigotes of T. cruzi are the replicative stage in mammals, but spontaneous dormancy in a fraction of these amastigotes allow them to survive drug treatment. Using currently available drugs, the rate of killing of T. cruzi amastigotes is slow and there are gaps in understanding drug kinetics. This research focuses on understanding how two drugs, benznidazole, in use for T. cruzi infection treatment for more than 50 years, and AN15368, a new compound that has yet to be tested in humans, control both actively replicating and dormant T. cruzi in-vitro. We used time lapse videos to track in-vitro intracellular amastigote activity (proliferation, stasis, and death), in the presence and absence of drug for up to 11 days. CellTrace violet pre-staining of infective trypomastigotes allows for the identification of dormant (non-replicating) amastigotes. In a four-day treatment period at 10X IC50, the dose required for ½ the maximal killing, of AN15368 and benznidazole, followed by washing out the drugs, AN15368 shows earlier, and more rapid killing. Killing of T.cruzi amastigotes continues after removal of the drugs, mainly in AN15368-treated cultures. Likewise, parasite rebound after drug removal is more extensive and happens sooner in benznidazole treatment. Fewer parasites rebound post AN15368 treatment. Our results provide a better understanding on the killing kinetics of these two drugs, which will be useful for modifying treatment regimens to effectively kill the parasites as they come out of dormancy.

Cyber Risk and Insurance in the Financial Sector
Ria Sardana, CURO Honors Scholar
Prof. Lindsay Sain Jones, Insurance/Legal Studies/Real Estate, Terry College of Business
Financial technology, or fintech, includes all technologies that have altered the delivery of financial services. Firms utilize these financial technologies to organize information, save time, and increase profits. Cybersecurity is an important consideration in the use of financial technology due to the quantity of valuable data captured by the technologies. The COVID-19 pandemic has presented new cybersecurity challenges for fintech firms and other financial service providers, as hackers have been able to exploit increased vulnerabilities created by employees working from home. The question is what steps should be taken to moderate this problem, whether that be effective risk management techniques, specialized insurance coverage, or legislative action. This study will discover methods to mitigate this risk. The first step will be to identify the causes of breaches, and their impact. Next, the study will examine the specific steps a hacker takes to access data. Using the results, the study will identify how financial authorities and/or affected firms can effectively mitigate this risk. Lastly, the study will identify various loss reduction or loss prevention techniques to reduce the impact of cyber loss. The results of the study are expected to be that employees working from home have significantly increased the risk of cyber-attacks. In addition, a finding that mobile banking applications have contributed to the rise in cyber-attacks is expected. Effective changes to insurance underwriting for cyber-attacks could mitigate losses. Ideally, the study will then determine whether training employees in simulations of cyber-attacks, would strengthen their knowledge and awareness. Potentially, a foundation of the solution could be improving international cooperation thereby improving cybersecurity resilience globally. Cybersecurity risk, although unavoidable, can be reduced through numerous practices and laws. This study aims to identify how cyber-attacks have impacted the financial sector and discover specific solutions to possibly diminish the level of cybersecurity risk in this sector.

Evaluating Fitness Contributions of RidA in S. enterica
Bryce Sawyer
Dr. Diana M. Downs, Microbiology, Franklin College of Arts & Sciences
RidA is a reactive intermediate deaminase found in all domains of life. In Salmonella enterica, this protein eliminates the toxic metabolite 2-aminoacrylate (2AA) that is generated via IlvA-mediated serine/threonine dehydratase activity. When grown under conditions that increase the levels of 2AA, i.e., supplemented with serine, ridA mutants are unable to grow due to damage caused by 2AA. This growth defect is rescued by isoleucine, which allosterically inhibits IlvA and prevents the formation of 2AA. RidA also deaminates 2-aminocrotonate, which is generated when IlvA acts on threonine in the biosynthesis of isoleucine. Therefore, isoleucine is a downstream product of RidA activity, suggesting isoleucine biosynthesis might be compromised in ridA mutants. Analyses found no growth defect for ridA mutants compared to wildtype in unsupplemented minimal glucose medium. A reduced efficiency of isoleucine biosynthesis could nonetheless be driving more subtle changes in overall fitness that were not detected via growth data. Therefore, we performed competition assays in which wildtype and ridA mutant S. enterica strains were competed in minimal glucose media with or without various supplements, including isoleucine. Because the competitive fitness of a bacterial strain relative to another is highly responsive to minor changes in metabolism, competition assays provide a more sensitive means of detecting minute growth defects. Through these assays, we were able to elucidate a deficit in the competitive fitness of ridA mutants grown in minimal glucose medium that is rescued upon isoleucine supplementation, further supporting the idea that RidA may play an important role in isoleucine biosynthesis.

Investigating Enhancer Function of 157 base pair Region within FADS2 in Humans
Kennedi Lashaun Scales, Foundation Fellow
Dr. Kaixiong Ye, Genetics, Franklin College of Arts & Sciences
An 85-kb long genomic region covering the entire FADS1 and most of FADS2 has been found to play important roles during human genetic adaptation to local diets. The same genomic region has been associated with more than 40 traits and diseases. While previous expression quantitative trait (eQTL) analysis has suggested the presence of likely more than one regulatory variant, the exact causal variants are still unknown. This project aims to perform cellular and molecular biology experiments to narrow the 85-kb region down to one or more causal variants and to elucidate their mechanisms in disrupting gene regulation. Two haplotypes in the population correlate to differential biosynthetic efficiencies, but molecular mechanisms remain partially unknown. This study strives to determine whether an identified fragment in the putative regulatory region can act as an enhancer using a luciferase reporter assay. Two different versions of the same genomic regions have been PCR amplified from two homozygous donors and inserted into a plasmid with a minimal promoter. We have verified that our plasmid contains our fragment of interest by sequencing, and our next experiment will be to transform our plasmid into cells to determine expression patterns. The fragment's relative effect on gene expression will be tested in a human liver cell line with luciferase reporter assays, which visualize differences in luciferase expression between haplotypes. Our 157 base pair fragment contains a single nucleotide polymorphism (SP) that has been previously demonstrated as a causal SNP in human colorectal cancer. To contextualize our study within the current literature, we plan to investigate its role in the HepG2 human liver cancer cell line.

Comfort in Chaos: The Electoral Benefits of Dysfunctional Governance
Brock Schultz, CURO Summer Fellow, CURO Research Assistant
Dr. Jamie L. Carson, Political Science, School of Public & International Affairs
The importance of strategic politicians, responsive electorates, and the electoral connection comprises the formula for a competitive, healthy election system. In recent years, however, new layers have been added to this electoral bedrock. Since the 1980s, the nation began to transition into a nationally-oriented political environment, in which conflicts occurring on the national stage are reflected in subnational contexts, funneling political engagement towards such conflicts to the exclusion of local involvement. Additional studies have identified how through emerging national media networks, Congressional voting behavior has shifted to focus on the obstruction of opposition rather than the furtherance of policy. However, little research has been done to see if this trend towards negative partisanship translates into legislative actions and dysfunction. Tying in David Mayhew's theory of the self-interested Congressperson with trends in negative partisanship driving electoral gains, I seek to investigate the electoral incentives members receive for Congressional dysfunction. To test such associations, I track the relationship between Congressional general election vote shares and legislative productivity. I control for member's ideology, partisanship, and funding as well as the presence of a qualified challenger, competitiveness of districts, and a district's previous Presidential vote shares. These findings provide context and significance to the rise of partisan politics and the decline in moderated Congressional compromise.

Analyzing Student Perceptions and Memories of Non-Content Instructor Language

Jaidyn Marie Schultz
Dr. Dax Ovid, Physiology & Pharmacology, College of Veterinary Medicine

Instructor Talk refers to the non-content related language instructors use in classrooms. This language has been analyzed in previous studies, but the extent to which students remember it is currently unknown. This research aims to address several questions. Do students remember specific instances of Instructor Talk, when prompted? If there are discrepancies between student and researcher analyses, why? To determine the effects of Instructor Talk on student memory, survey data and class recording transcripts will be used. The surveys we will share with physiology classes ask students to recall instances of Instructor Talk in their own classes, and to categorize recorded examples as having positive or negative effects in the classroom. Class recording transcripts have not yet been used but will be screened for instances of Instructor Talk. Our research team will then categorize these instances based on a systematic qualitative analysis. Based on previous findings and what our team has reviewed so far, we predict more students will remember certain categories of Instructor Talk; the frequency of student memories may not correspond to the frequency of recorded instances of Instructor Talk. The results will be significant in future research because there is much to be learned about Instructor Talk; it is a relatively new concept, and the results of studies pertaining to it can be used to improve instruction in classrooms. As researchers learn more about Instructor Talk, instructors' ability to understand the impact of their words will improve classroom environments.

Gender and Its Implications as a Fluctuating Construct Throughout the History of Ballet

Avery Scott
Dr. Lisa Fusillo, Dance, Franklin College of Arts & Sciences

In my study, I examined gender roles in classical ballet from a dance history lens. Proposing the concept that gender roles have fluctuated wildly since the origins of classical ballet, I argue that ballet should not be treated as an unbreakable tradition in today's classrooms or on today's stages. The study reviewed four eras of ballet history: the 17th century, the romantic era, the 20th century, and modern day, highlighting the 'accepted' gender roles in ballet at that time and how these roles corresponded to the societal beliefs in each era. In reviewing these eras, it was revealed that there is no consistency in the expectations put upon men and women, but rather that these roles shifted continuously in conjunction with shifting societal viewpoints. This has vast implications for the future of policies regarding gender both in employment and creative choice in professional ballet companies today. Applying this history to the current gender issues in ballet, I hope to use the past to inform the present and explain the potential that ballet, and dance as a whole, possesses to work as an equalizer in addressing current gender disparities, showing how history has demonstrated to us already how to move toward solutions, should we simply try.

Assessing Potential Risk Periods of Disordered Eating in Collegiate Dancers

Rose Sebaugh
Prof. Rebecca Gose, Dance, Franklin College of Arts & Sciences

Through an IRB-approved survey study, I am investigating whether disordered eating habits may demonstrate an association with the transition from high school to collegiate dance. Using the Eating Attitudes Test questions in a participant-friendly Google Forms format, students completed the survey 2 times: one submission reflecting their eating attitudes in high school and one submission reflecting their eating attitudes currently, as a collegiate dancer. My hope is that this study will help researchers and healthcare professionals identify life stages in which dancers are more susceptible to falling victim to dangerous eating habits and building an unhealthy relationship with food. Though this is an ongoing study, the responses received thus far point to a greater rate of disordered eating in high school as compared to college, and this developing information can help target specific times to provide nutrition education and focus eating disorder prevention methods. Based on these findings, it is my recommendation that eating disorder prevention curriculums and general nutrition seminars should begin to be provided to dancers no later than high school. This age demographic seems to be more at risk, and it is my hope that addressing the issue and educating dancers at a younger age will prevent disordered eating habits from developing in high school and continuing into their college years. If schools and studios could incorporate nutrition into their coursework, dancers can learn factual information that will help them navigate their food choices and help them understand the best ways to fuel their bodies.

The Relationship between Physical Activity and Sleep

Bansari R. Shah
Dr. Jennifer L Gay, Health Promotion & Behavior, College of Public Health

Past research indicates that college students only obtain about 6 hours of sleep each night, which is less than the recommended amount. Factors including schoolwork, extracurriculars, and jobs often create a negative impact on sleeping habits. Many students also take time out of their day for physical activity. This study examines the correlation between time spent being physically active and how many hours a student sleeps per night on average. The hypothesis is that an increase in time spent being physically active decreases the hours a student sleeps on average. A survey was conducted recruiting students (n= ~500) from the University of Georgia in the spring semester of 2023. Students answered questions regarding the amount and quality of sleep and the amount of physical activity participation. Preliminary results indicate that the sample size (n = ~ 350) is 82.4% female and 16.4% male, 78.0% white, and 91.4% are undergraduate students. Students get 6.95 hours of sleep on average, and it takes them an average of 30.208 minutes to fall asleep each night. About 58% of participants listed that they would benefit from more sleep. Students mostly visited the gym 2-3 times a week (36.6%) or 4-5 times a week (18.6%) and for an hour at a time (66.5%). This research is important because it will help students adjust their time being physically active to benefit their sleeping schedule. Students will be able to balance their physical activity along with their other responsibilities while getting the proper amount of sleep.

Using a Plate-Based Approach to Test Toxicity of 1-HP on C. elegans

Man Shah, CURO Research Assistant
Dr. Art Edison, Genetics, Franklin College of Arts & Sciences

Caenorhabditis elegans are widely studied to understand metabolic pathways common across many eukaryotes, and one set of genes that affect many detoxification pathways is the ugt family. We used a plate-based assay to study the effects of 1-hydroxyphenazine (1-HP), a toxin produced by Pseudomonas aeruginosa, on C. elegans knockout mutants in the ugt family of genes. Following the plate-based assay, we were also able to create large volumes of detoxification byproducts using a recently developed assay with LSCP (large scale culture plates). These plate-based assays complement the wider literature from studies that focus on liquid cultures and implicate some ugt genes for detoxification of 1-HP. We show that knockout mutants of ugt-23 and ugt-49 have elevated mortality compared to reference strain N2. Our toxicity results show the role of ugt genes for detoxification using a plate-based assay.

Analyzing the Effect of Atmospheric Cold Plasma Treatment on Apple Juice Quality

Nikita Shah
Dr. Rakesh Singh, Food Science & Technology, College of Agricultural & Environmental Sciences

With increasing trends in juice consumption and demands for high-quality foods, developments in innovative technology to match the market is critical. Thermal processing techniques have long been used to pasteurize fruit juices to ensure microbiological safety, but it's also led to overprocessing, which influences nutritional and functional properties of juices. We want to study non-thermal, cold plasma technology, a novel method with great potential for application in pasteurization of food products, as supported by increased research in the field. The purpose of this research project is to analyze the impact of cold plasma technology on the quality of apple juice samples. Utilizing this technology, under both simulated air (SA) and combined gas (CG) conditions at varying degrees of treatment time (30, 60, 90, 120, and 150 seconds), we compared treated juices to untreated control (T0) and thermal pasteurization conditions. We then completed two replications and analyzed properties of pH, °Brix, titratable acid, color, viscosity, phenolic content, and turbidity to compare the effectiveness of atmospheric cold plasma to its alternatives. In analysis of our results, we found no large changes in the data to distinguish the effectiveness of cold plasma treatment from its alternative of thermal pasteurization. In future studies, we believe this data may support usage of cold plasma under the same quality standards as thermal pasteurization, though its efficacy should continue to be studied. We hold that research in such topics will influence consumer markets and future innovations in pasteurization and sterilization technologies.

Familial Dysautonomia (FD) Associated Gene Elp1 is Expressed in Various Innervated Tissue Compartments in the Tongue and Innervating Cranial Ganglia

Ruchi Shah
Dr. Hong-Xiang Liu, Animal & Diary Science, College of Agricultural & Environmental Sciences

Familial Dysautonomia (FD) is a neurodegenerative disorder resulting in a variety of symptoms caused by impaired development and survival of neurons in the autonomic and sensory nervous systems. FD is caused by a point mutation in the gene encoding elongator complex protein 1 (Elp1) resulting in reduced wild-type Elp1 protein production, which is required for neurogenesis and neuronal survival. Partial or complete loss of taste buds is a characteristic symptom of FD. It has been reported that taste bud development and maintenance requires mesenchymal-epithelial interactions and taste bud innervation. Thus, understanding Elp1 expression in different tissue compartments at various stages allows us to further study the roles of Elp1 using tissue- and stage- specific Elp1 deletion models.

In this study, we utilized an Elp1-LacZ transgenic mouse line to visualize Elp1 expression using X-gal staining of the tongue and cranial ganglia innervating the lingual epithelium and taste buds (trigeminal and geniculate). In embryonic tongue tissues, we observed a dynamic expression pattern of Elp1 through development, i.e., from the mesenchyme at E12.5 to the basal epithelium at E14.5. Though mesenchymal expression continues through all stages, we observed that at E14.5 and P1, X-Gal signals were distributed in the tongue basal epithelium in a clustered pattern. In adult tongue tissues, X-Gal signals were largely restricted to basal epithelial cells, especially those of the taste papillary wall. In cranial ganglia tissues, we observed X-gal signals in individual neurons. Together, our data revealed a dynamic Elp1 expression pattern in lingual tissue compartments and innervating ganglia.

Developing Rho1 into a Reporter to Determine Yeast GGTase-I Specificity

Sumil Shah, CURO Research Assistant; Khushi Patel
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Protein prenylation is a post-translational modification (PTM) of "CaaX proteins" which regulates their localization and function. Prenylation occurs to proteins having a C-terminal sequence that consists of a Cysteine (C), two aliphatic amino acids (a), and one of several amino acids (X). CaaX proteins typically undergo a coupled 3-step PTM pathway involving initial lipidation with a C15 or C20 isoprenyl group on the Cysteine, followed by endoproteolytic removal of the 'aaX' sequence, and finally methylation of the isoprenyl-cysteine carboxyl group. The 3-step PTM is documented for many CaaX proteins although emerging evidence indicates that some CaaX proteins are only subject to the first isoprenylation step. Ydj1 is an example of a CaaX protein that only undergoes isoprenylation, and it has been adapted as a genetic reporter to assess the prenylation potential of all 8000 possible CXXX sequences. Published results indicate that Ydj1 prenylation mediated by farnesyl transferase (FTase), which adds a C15 farnesyl lipid, can occur with sequences that extend beyond the traditional CaaX motif. Likewise, preliminary evidence indicates that Ydj1 prenylation mediated by geranylgeranyl transferase-I (GGTase-I), which adds a C20 geranylgeranyl lipid, extends beyond the traditional CaaL/F motif. These results suggest that the prenyltransferases, FTase and GGTase-I, have broader specificity than previously considered. Reliance on the naturally farnesylated Ydj1 reporter limits interpretation of these results for GGTase-I. This study reports on a method for assessing GGTase-I specificity through the naturally geranylgeranylated Rho1 GTPase that is a more appropriate reporter for GGTase-I activity. The method uses the essential nature of Rho1 and genetic recombination to create and assess the function of a plasmid library of Rho1-Cxxx sequences for insight into GGTase-I specificity. This study will refine the breadth of potential targets of the CaaX PTM pathway and provide insight into the implications of using GGTase-I inhibitors as human therapeutics in a variety of disease states.

The Geography, Growth, and Property Price Effects of Private Student Housing Developments in American College Towns

Micah Duane Shannon, CURO Research Assistant
Dr. Joseph T. Ornstein, Political Science, School of Public & International Affairs

The number of large, private student housing developments has been rapidly growing in international college towns over the past decades. This growth has often created tension between the students and the local population over concerns about displacement or other undesirable effects caused by the effects of "studentification," whether that be increasing property values due to increased demand or the tailoring of services and culture in certain neighborhoods as student-dominated regions. This tripartite analysis examines the growth of private student housing developments in various American college towns over the past decades. Specifically, we observe and map the location and time of development, perform a proximity analysis of student housing developments to college campuses, and analyze any resulting effect on property sale values during the past two decades, using the staggered difference-in-differences method developed by Brantly Callaway and Pedro H.C. Sant'Anna. We find strong evidence of spatial clustering, that most extant private student housing was built within the past four decades, and mixed and inconsistent evidence as to whether private student housing meaningfully influences property prices.

An Examination of Antimicrobial Coatings for Textiles
Joanna Shephard
Dr. Vladimir Reukov, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences
The current study's objective was to examine the clinical effectiveness and utility of fabrics with cross-linked antimicrobial coating. It was found that coated fabric had a statistically significant effect on the prevention of S. aureus and E. coli colonization, in comparison to non-coated fabrics. For their durability and other practical qualities, natural, synthetic, and blended fibers like cotton, nylon, polyester, and polyblend have undergone structural and functional analysis. Antimicrobial tests are being used in these studies to quantify and qualitatively assess these effects, and this approach has been expanded to include agents that are both antibacterial and antifungal. For the coated textile, additional characteristics including flammability, air permeability, leaching, and washing durability are also assessed.

Evaluation of Coated Fabric Antimicrobial Properties
Joanna Shephard
Dr. Vladimir Reukov, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences
The current study's objective was to examine the clinical effectiveness and utility of fabrics with cross-linked antimicrobial coating. It was found that coated fabric had a statistically significant effect on the prevention of S. aureus and E. coli colonization, in comparison to non-coated fabrics. For their durability and other practical qualities, natural, synthetic, and blended fibers like cotton, nylon, polyester, and polyblend have undergone structural and functional analysis. Antimicrobial tests are being used in these studies to quantify and qualitatively assess these effects, and this approach has been expanded to include agents that are both antibacterial and antifungal. For the coated textile, additional characteristics including flammability, air permeability, leaching, and washing durability are also assessed.

Evaluating Social Support Services Provided by the CARE Center for Persons with Dementia and Their Care Partners
Claire Sheppard
Dr. Jenay M. Beer, Gerontology, College of Public Health
Alzheimer's Disease and Related Dementias (ADRD) affects 5.8 million people in the US, with cases estimated to rise to 14 million by 2060. Despite the increasing incidence of ADRD, there is a lack of support for persons with dementia and their care partners after diagnosis. Due to the continued burden of care for both care partners and for those living with ADRD, increased social support services are needed. The University of Georgia's Cognitive Aging Research and Education (CARE) Center provides support services for ADRD patients and care partners, including music therapy, monthly social support check-ins, and a care partner support group that meets twice per month. These support services are designed to improve patients' and care partners' experience during diagnosis, ease care partner burden, and improve the quality of life for ADRD patients and care partners. To examine the efficacy of CARE Center social support services, a questionnaire was adapted from validated ADRD and care partner scales and administered pre- and post-diagnostic support services. It is hypothesized that CARE's social support services model will result in improved ADRD standard of care, care partner burden, and quality of life for patients and care partners. We anticipate that the findings from this study will confirm that implementing ongoing social support services into the ADRD standard of care can improve patient and caregiver quality of life.

Subjective Appetite Responses to a Pecan-Enriched Meal
Naomi Shin, CURO Research Assistant
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Authors: Naomi M. Shin, Alyssa J. Guadagni, M. Catherine Prater, Chad M. Paton, and Jamie A. Cooper, PhD
The addition of pecans to the daily diet has previously been shown to improve subjective markers of postprandial appetite; however, there is a lack of evidence of the acute effects of pecans in a single meal on appetite responses. To examine subjective appetite responses to either a pecan-enriched meal or an isocaloric control meal in healthy adults. Twenty-Seven adults (n= 12 men, n=15 women) were recruited for a double-blind, randomized crossover trial with two testing visits for two treatment conditions: an isocaloric pecan-enriched shake (68g pecans) or a high saturated fat shake as control. Participants completed a 100 mm visual analog scale (VAS) to subjectively measure hunger, fullness, prospective consumption, desire to eat, thirst, and nausea at fasting and 30-, 60-, 120-, 180-, and 240-minutes postprandially. Additionally, an overall appetite score was calculated at each time point using the following equation: [desire to eat + hunger + (100 – fullness) + prospective consumption]/4. No significant differences between groups were observed for the VAS measurements of hunger ($p=0.7587$), thirst ($p=0.8754$), fullness ($p=0.403$), nausea ($p=0.0771$), prospective consumption ($p=0.8530$), desire to eat ($p=0.6138$), or overall appetite score ($p=0.8935$). Preliminarily, there were no improvements in postprandial ratings of appetite following pecan consumption compared to control. This information will be valuable in adding to the knowledge of how pecan consumption influences subjective appetite responses, which are important factors to consider for achieving appetite control and maintaining energy balance. Unblinding of treatment conditions will occur in early March.

Contextualizing Personality in Team Environments
Swathi Shivaram & Brisa Castro-Coronado
Dr. Neal Outland, Psychology, Franklin College of Arts & Sciences
This study looks at the difference between personality distributions prior to and after working in a team setting within individual trait distributions as well as the average trait distribution of a team. Whole Trait Theory (Fleeson & Jayawickrem, 2015) posits that personality can be represented by momentary states that make up traits on a distribution. Specifically, we aim to answer how contextualization to team environments impacts personality trait distributions at the individual and team levels. It is also important to understand how team dynamics can shift over time based on the impact of context on personality. Our methodology consists of administering a series of personality surveys to students in an undergraduate psychology class at a southeastern university. The surveys are split into two categories: contextualized and non-contextualized. The non-contextualized survey will be a general personality assessment based on the Big 5 personalities while the contextualized survey will be a manipulated version using contextualization to fit team-related terms. Using the Big 5 personality dimensions as predictors, based on the initial data gathered from the non-contextualized survey responses, we expect to see a significant difference in levels of openness, agreeableness, and extraversion within individual distributions after interacting in a team environment, and an overall difference in levels of conscientiousness and agreeableness in a group's overall personality distribution.

Development of an In Vitro Model of Psoriasis

Anya Shroff & Yanin Reinholz
Dr. Vladimir Reukov, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

This research project aims to develop an in vitro model of psoriasis – a debilitating skin disease associated with forming inflammatory skin plaques. Currently, topical treatments for psoriasis face many challenges, including but not limited to patient satisfaction and patient adherence. The two most significant characteristics of psoriasis are the hyperproliferation of keratinocytes and an abundance of activated T-cells – a combination of immune-stimulated inflammation. Keratinocytes and fibroblasts are the two major cell types that respond to inflammatory changes; therefore, we will use a specialized version of fluorescent fibroblasts (3T3GFP) to mimic psoriatic cell response. During psoriasis, activated T cells further activate macrophages, creating a pro-inflammatory response. In our project, we plan to use a co-culture of the 3T3GFP fibroblasts with RAW264.7 macrophages. The culture will be exposed to the TLR ligand lipopolysaccharide (LPS) which is expected to induce reactive oxygen species (ROS). With this experiment, we hope to create an in vitro model that will effectively encompass psoriasis and can be easily utilized for a variety of experiments that can improve the process of treatment development for this disease.

Formulating the Parameters of Plastination

Evan Jacob Sinclair, Carlee Harris & Julia Florentino
Dr. Krzysztof Czaja, Veterinary Biosciences & Diagnostic Imaging, College of Veterinary Medicine

Plastination is the process of creating nonperishable and easily handled biological specimens for educational purposes. The models are dry, durable, and contain less odor when compared to the specimens preserved using formalin fixation. Plastination maintains the anatomical structure of tissues, ensuring all models are accurate. The procedure consists of dissection, dehydration, forced impregnation, and curing. Dissection is a detailed process in which tissue is prepared by removing visceral fat and parts of lesser importance. The specimens are dehydrated in acetone in which the acetone replaces all water in the tissue. Once it is fully dehydrated, the sample is placed in a vacuum chamber where acetone is replaced with liquid rubber polymer. The tissue is then cured within an enclosed container until the polymer hardens. The curing of the specimens will prevent them from decaying and make them durable for handling. However, there is no detailed information on the parameters of dehydration and forced impregnation. Therefore, the experiment we are conducting seeks to determine the dynamics of the dehydration process by developing a formula for water replacement with acetone related to the volume and weight of tissue used. With this information, we aim to make the acetone dehydration step more efficient. We will be using three separate batches separated by the type of tissue. We will strictly use canine hearts, kidneys, and spleens for this experiment. Currently, we are measuring the acetone concentrations daily in order to find the most efficient way to dehydrate tissue. For this experiment, we used a HarvestRight freeze dryer to measure how much water accounts for the mass and volume of our tissues. Prior to acetone dehydration, we freeze-dried each tissue type to find an expected average mass and volume difference due to water loss in the specimen. To understand the effectiveness of acetone dehydration, we will be comparing the change in mass and weight due to acetone dehydration with the expected values from freeze drying. The importance of this concerns all who perform plastination in any capacity. With an effective formula, we can better plan the plastination process and save time in order to increase productivity. The success of this experiment will not only increase the efficiency of plastination but will also make it more affordable and, therefore, more accessible to other labs.

Relationship Between Margin of Stability and Joint Kinematics During Gait in Children with Cerebral Palsy

Bhavini Singh, CURO Summer Fellow, CURO Research Assistant
Dr. Christopher Modlesky, Kinesiology, Mary Frances Early College of Education

Cerebral palsy (CP) is a neuromotor disorder characterized by abnormal tone, posture, and movement, causing limitations in physical activities such as walking, or gait. For children with CP, previous research studies have suggested an altered ability to control their stability. Margin of stability (MoS) is a unique, dynamic measure calculated from the center of mass trajectory and is utilized to assess the margin an individual has to maintain stability if a perturbation was introduced. Compared to typically developing children, children with CP exhibit a greater MoS in the lateral direction during gait, which may be a compensatory method to keep them from falling. This compensatory method may be associated with the body's orientation which is reflected by joint kinematics. It is plausible that greater MoS in the lateral direction during gait is related to discrepancies in ankle and knee kinematics. The purpose of this study is to determine if there is a relationship between MoS and ankle and knee kinematics during gait. Kinematic data will be collected through three-dimensional motion analysis during a 5 m gait study using retroreflective markers placed on bony landmarks and motion capture software. It is hypothesized that the greater MoS in the lateral direction during gait in children with CP than typically developing controls is related to ankle and knee joint kinematics, such as joint angles in the frontal and sagittal planes.

Testing the Effects of Bisphenol Exposure on Meiotic Spindle Organization in Control and Pericentrin-depleted Oocytes

Vanshika Singisetti, CURO Research Assistant
Dr. Maria M. Viveiros, Physiology & Pharmacology, College of Veterinary Medicine

Chromosome segregation errors during meiotic division can lead to 'aneuploidy', whereby gametes contain an incorrect chromosome number that is passed to the embryo during fertilization. In oocytes, high rates of aneuploidy occur with increasing maternal age and in studies following exposure to environmental toxicants. Bisphenol A (BPA) is an endocrine disruptor that has detrimental effects on animal and human health, including the reproductive system. This has led to restrictions on BPA, but an increase in the use of replacement analogs such as bisphenol F (BPF) with similar structures. In female mice, exposure to BPA disrupts early ovarian follicle development and promotes oocyte meiotic errors and aneuploidy. Studies in our lab also revealed that bisphenols disrupt meiotic spindle organization and stability in oocytes. Accurate chromosome segregation dependents on spindle formation and stability, which is regulated unique by acentriolar microtubule organizing centers (aMTOCs), in which Pericentrin (PCNT) functions as the key scaffolding protein. Thus, we tested whether bisphenols disrupt the meiotic spindle via effects on the aMTOCs, using a transgenic (Tg) mouse model developed in our lab, in which PCNT is knocked down exclusively in oocytes. Ovulated oocytes from control (WT) and Tg females were exposed to BPA or BPF during culture, then fixed for fluorescence analysis of the meiotic spindle and chromosome configurations. Interestingly, our results demonstrate that bisphenol-mediated alterations of the meiotic spindle were diminished in Tg (PCNT-depleted) compared to WT oocytes, indicating that BPA and BPA likely act on both the meiotic spindle and aMTOCs, essential for spindle stability.

Investigating the Use of Technology-Led Piano Lessons in Improving Older Adult's Cognitive Function

Sophie Elizabeth Slyman, CURO Research Assistant
Grace Mccorkle, Frances Ricks, & Caitlin Grdinich
Dr. Lisa Renzi Hammond, Gerontology, College of Public Health

Research has shown that cognitive training, including music learning, can slow cognitive decline in persons with mild cognitive impairment; yet, not everyone has access to a teacher. Using technology to teach piano to older adults may overcome these barriers and facilitate cognitive improvements. N (22) participants (M=73.136±3.992 years; 59.09% female; 40.91%, male; 81.82% White; 13.64% Black, 4.55% more than one race) expressing memory complaints and worry about cognitive function were recruited for a 6-month technology-based music learning study. Participants' cognitive function was evaluated at baseline, midpoint, and end of study via the CNS-VS Computerized Neurocognitive Test Battery. Participants engaged in weekly piano lessons delivered via technology, and practiced at home. A preliminary analysis of n=22 participants was conducted to determine changes in cognitive function between baseline and 6-months after receiving training. 50% of participants experienced improvement in all domains (verbal memory, visual memory, psychomotor speed, cognitive flexibility, processing speed, executive functioning, working memory, sustained attention, simple attention, and motor speed) with all participants experiencing improvement in at least two domains. Music learning is a complex cognitive skill, and past research has shown improved neurocognitive function in older music learners. We found when technology was used instead of a human teacher, music learning improved function in multiple domains. Technology has been cited as a solution for overcoming access barriers. In our study, we found learning via technology yielded similar cognitive benefits to learning with a human teacher.

Effects of Word Presentation During Treadmill Walking on Free-recall and Recognition Episodic Memory

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Dr. Phillip Tomporowski, Kinesiology, Mary Frances Early College of Education

Results of dual-task methods on episodic memory are varied. Several entrainment research supports the idea that the synchronization of cognitive processes and motor movements may influence dual-task costs and enhance episodic memory. To examine how the difference in time intervals between words during word presentation, or the predictability of word presentation, while walking on a treadmill influences episodic memory. We hypothesized that encoding while walking would benefit free-recall and recognition long-term memory compared to encoding while standing. Additionally, the presentation of words at a predicted rate while walking was hypothesized to facilitate episodic memory compared to the random unpredicted word presentation where words were presented across unequal intervals and the standing control. A within-subjects counterbalanced design, 21 young adults (22.56 y/o; 64% F) completed three sessions (separated by 24 hrs) where they walked on a treadmill at a preferred pace (< 3.0 mph) while listening to a 40-item word list presented via headphones during two learning trials. In one session (predicted), a word was presented every fourth step; in another session (unpredicted), a word was presented randomly between 2 and 6 steps; in another session (control), words were presented while standing on the treadmill. Free-recall memory was assessed immediately after the first trial, the second trial, after a 10 min delay, and 24 hrs. later. Recognition memory was assessed after the 10 min delay and 24 hrs. later. Walking during predictable word presentation led to a significant decreased decay of free-recall memory ($p = .054$), especially when comparing immediate (after second trial) and 24 hr. time points ($p < .05$, $\eta p2 = .125$). No connection was made between walking during word presentation and recognition memory. Dual-task conditions influenced free-recall but not recognition memory performance. Words presented predictably during walking facilitated long-term memory, while unpredictable word presentation decreased memory performance. These findings support entrainment theory, predicting that auditory-motor coupling will aid long-term memory.

Investigating the Functional Role of Thyroid Hormones on Insulin-Like Growth Factor Binding Protein Expression during Avian Muscle Development

Addie Laurel Smith
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The somatotropic and thyrotropic axes are two endocrine systems both known to influence growth and engage in crosstalk to regulate skeletal muscle growth and metabolism. The thyrotropic axis includes biologically active triiodothyronine (T3) that binds thyroid hormone receptors (THRs) to regulate gene expression through thyroid response elements (TREs) on the DNA. The somatotropic axis consists of the insulin-like growth factor (IGF) signaling system. Insulin growth factor binding proteins (IGFBPs) regulate IGF-IGF receptor type 1 (IGFR1) interactions to influence cellular proliferation, differentiation, and apoptosis. Identification of putative TREs in select IGFBPs suggests that IGFBP expression may be regulated by THs. Previous results showed that T3-induced regulation of IGFBP2 and IGFBP3 increases gene expression at concentrations slightly higher than would be found in circulation. The purpose of this study was to determine if T3 at more biologically relevant concentrations can alter IGFBP expression. Quail muscle clone 7 cells were treated with T3 at 0, 0.2, 0.4, and 1 ng/µl for 0.5, 6, and 24 hours. Total RNA was extracted and will be converted to cDNA. Gene expression of IGF receptors and IGFPBs will be measured by performing quantitative polymerase chain reactions. Results will indicate whether T3 can alter IGFBP gene expression. This may have implications for the effect of plasma T3 on IGFBP expression in avian muscle cells and consequently, overall skeletal muscle growth and metabolism.

Abomasal Parasites in White-Tailed Deer (Odocoileus virginianus) in West Virginia

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Abomasal nematode abundance in white-tailed deer (Odocoileus virginianus) has historically been used by wildlife managers as an indicator of host density relative to carrying capacity and in setting localized herd management goals. White-tailed deer in agricultural areas can be infected by parasites of importance to domestic ruminants and subsequently serve as reservoirs. Haemonchus contortus, for example, is commonly found to infect deer and is also an important pathogen of sheep, goats, and exotic ruminants. Additionally, little is known about anthelmintic-resistant abomasal nematode infections in deer that may spillover from domestic ruminants and subsequently cycle in the wildlife-agriculture interface. In the Southeast, white-tailed deer may be infected by various species of Haemonchus, Ostertagia, Mazamastrongylus, and Trichostrongylus. However, there are few contemporary studies on abomasal nematode abundance, distribution, and genetic characterization in West Virginia. During white-tailed deer herd health exams at four sites in West Virginia, abomasa were collected and screened for nematodes. Parasites were morphologically identified, and a random subset of those worms were genetically classified. Although data collection is ongoing, we have found a high

prevalence of abomasal parasites (40% with Haemonchus, 100% with medium-sized worms [Ostertagia or Mazamastrongylus], and 90% with Trichostrongylus). Among medium-sized nematodes, four species were detected including O. dikmansi, O. mossi, M. pursglovei, and M. odocoilei with the last species being most common. Deer exhibited a wide range of infection intensities (100-3660 worms). These new data will provide West Virginia deer biologists a more complete picture of white-tailed deer herd health.

Assessing Carbon Benefits and Economics of Wood Pellet-Based Sustainable Aviation Fuel Production in the Southern United States
Jordan Nicole Smith
Dr. Puneet Dwivedi, Sustainability Sciences, Warnell School of Forestry & Natural Resources
The Southern United States produces about nine million tons of wood pellets annually, which are exported to various countries worldwide to generate electricity. A potential new market for these wood pellets is emerging in the United States. In 2022, the White House announced that the United States will produce 35 billion gallons of Sustainable Aviation Fuel (SAF) by 2050 to displace a hundred percent of crude oil-based Conventional Aviation Fuel. Wood pellets could be an important feedstock for producing SAF in the United States for various reasons. First, wood is a cellulosic feedstock and, therefore, does not directly contribute to the food vs. fuel debate. Second, the United States is the largest producer of roundwood worldwide, so sufficient wood throughout the year is available for potential SAF production. Third, additional demand for roundwood would help private forest landowners get better prices, especially when roundwood prices have been historically low since the last decade. In this context, my study will evaluate the carbon benefits of producing one gallon of wood pellet-based SAF in the Southern United States. My study will also assess the economics of wood pellet-based SAF production to ascertain the economic-environmental trade-offs in light of various policy instruments. The study results will directly feed into national policy goals of climate mitigation, rural development, and, most importantly, integrated sustainable development to balance the needs of people, prosperity, and the planet.

Using Epoxides for the Combustion Study of Hydroperoxy Radicals
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Hydroperoxyl-substituted carbon-centered radicals are present in our atmosphere. Radicals, though, can be difficult to analyze in experiments due to their instability. An alternative way to pursue the study of these hydroperoxyl radicals is to use a product that is formed during the combustion reaction. The species we want to focus on that is created within the radical reaction is the epoxide. With this product, we can profile its specific reactivity than can contribute to a comprehensive picture of hydrocarbon combustion. The combustion of epoxides is not well understood currently, and the results that are presently available do not consider possible isomers of each epoxide. Stereochemistry is important to consider with the different modes of radicals that could form from syn- and anti-epoxides. We are exploring the preparation of epoxides from cis- and trans-2-pentene. The synthesis of these compounds can be quite difficult due to their volatility, precluding straightforward isolation techniques. To combat this issue, we plan on investigating various synthesis strategies and purification methods to generate our product in pure form. The different spatial configuration of the two isomers will enable our understanding of how stereochemistry can influence the combustion reaction of each epoxide.

Mosquito Cell Adaptation Confers Replication Advantages to Zika Virus at an Expanded Range of Temperatures
Amelia Snyder, CURO Honors Scholar, CURO Research Assistant
Dr. Melinda Brindley, Infectious Diseases, College of Veterinary Medicine
Zika virus (ZIKV) is a positive sense, single-stranded RNA virus that can cause birth defects or, more rarely, severe neurological effects. ZIKV is spread primarily by Aedes mosquitoes, limiting its transmission to tropical and subtropical locations. Mosquitoes are ectothermic while mammals maintain a warm temperature of 37°C, requiring Zika to replicate across a wide thermal range between mosquito and mammalian hosts. Previous work has demonstrated that Zika replicates efficiently in mosquitoes between 22-34°C. To determine if this range was due to host or viral factors, we serially passaged ZIKV in mosquito cells in cold (20°C) or warm (28°C) conditions. We hypothesized that the high mutation rate of Zika would select for virus capable of replicating in cold conditions if a viral factor was reducing replication. We compared the replication efficiency of the newly adapted viruses to the parental strain adapted to mammalian Vero cells. The warm-adapted stocks showed replication advantages in both cold and warm conditions in mosquito cells compared to parental or cold-adapted. When added to mammalian cells, the mosquito-adapted stocks could not replicate as well, indicating adaptation to mosquito cells. We have sequenced the adapted stocks, cloned mutations of interest, and are rescuing ZIKV stocks that each contain one mutation. We will evaluate each mutation through replication curves to determine phenotypic effects. We hypothesize that adapting ZIKV to warm conditions in mosquito cells retained a high level of genomic diversity, resulting in stocks with replication advantages in warm and cold conditions despite being passaged in only warm temperatures.

Theoretical Methyl Substitution of the Evasive Phosphatetrahedrane: Bridging the Gap between Experiment and Theory
Sam Snyder & John Norris
Dr. Henry F. Schaefer, Chemistry, Franklin College of Arts & Sciences
Though phosphatetrahedrane is predicted to have high relative kinetic stability, synthetic chemists have nonetheless failed to successfully isolate it. This paper proposes the most significant reaction pathways for the decomposition of phosphatetrahedrane to offer insight to synthetic chemists wishing to synthesize this elusive compound, which has potential applications in energy research, and extends that analysis to several substituted forms of phosphatetrahedrane. Ab initio electronic structure computations yield reaction profiles for the singly, doubly, and triply substituted pathways. The lowest barrier heights for the singly, doubly, and triply substituted pathways are 38.0, 37.0, and 35.0 kcal/mol, respectively. Hammond's Postulate is used to elucidate the relative impact of each substitution upon phosphatetrahedrane's structural motifs and energetics. This paper motivates future work in synthesizing the methyl substituted variants of the elusive phosphatetrahedrane compound with a bolstered understanding of the systems' energetics and dynamics.

A Rodent Model of Adolescent Food Insecurity: Impact on Eating Behaviors and Susceptibility to Diet Induced Obesity
Caroline Akemi Soares Iizuka & Vivien Christopher
Dr. Emily Noble, Nutritional Sciences, College Family & Consumer Sciences
Food insecurity (FI) is characterized by an uncertain supply of food, with or without nutritional insufficiency, and is linked to adult obesity and eating disorders. The influence of an uncertain supply of food on brain development and eating habits during adulthood

is still unknown. Therefore, a new rodent model was created to research whether early-life inconsistent food access increases susceptibility to obesity during adulthood.
Thirty-two female Wistar rats were individually housed and assigned one of three experimental diet types: food-secure with standard chow (Chow; n=11), food-secure with a Western diet (WD; n=10), and food-insecure with a WD (FI; n=11). Food-secure animals were fed at fixed times (9:00, 13:00, and 16:00). FI animals were given the same number of calories as the WD rats but at unpredictable time intervals. We studied the effects of adolescent FI on weight gain and hyperphagia when presented with a choice diet during adulthood. Rodents who experienced early-life FI presented greater amounts of body fat while consuming an obesogenic diet in adulthood, despite not displaying greater motivation for sucrose or high-fat food, and only demonstrated a modest inclination towards consuming more calories and gaining weight on an obesogenic diet.
Based on our findings, we conclude that rodents that experience unpredictable food access in adolescence are predisposed to diet-induced fat gain later in adulthood. This may indicate that adolescent FI could influence energy expenditure and energy storage, a topic of an ongoing investigation.

Questions of National and Cultural Differentiation in Central Asian States

Jessica Morgan Sobieski
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There are five Central Asian countries that were once members of the Soviet Union: Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan, and the Kyrgyz Republic. Due to the unique geopolitical positioning of these countries, Russia and the Middle East have affected the formation of autonomous national identities. This study will attempt to discover to what degree these countries have successfully implemented nationalist ideology using the observation of specific national symbols such as the national flag, emblem, and anthem, and the presence and nature of a religious and language policy. Understanding of the long-standing relationship between Russia and these countries is at the core of understanding the ways in which the national identity is expressed in this area. Evaluation of Russia's influence is also imperative for understanding the security of the region. National symbols hold power and meaning to the people of the nation that they represent. This study will enlist and examine cultural concepts, political reforms, and historical events that scheduled choices for the expression of national pride in Central Asian countries. The results of this project will help better understand the dynamics of legal and illegal trade, established and developing alliances, and other political processes in the Central Asian region.

Inhibition of Neutrophil Elastase by the Bacterial Serine Protease Inhibitor Ecotin

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The most common fatal genetic condition in North America, cystic fibrosis (CF), manifests in impaired transport of chloride ions across mucosal surfaces and significantly affects the respiratory system. Battling constant inflammation in the lungs due to sticky, dehydrated mucus, CF patients have higher levels of an immune cell type known as neutrophils. While neutrophils are essential to fight infections, they can also harm the body's own tissues when left unchecked. Neutrophil elastase (NE) is a powerful serine protease needed for host defense. However, NE can cause detrimental and irreversible tissue damage when released by neutrophils in large amounts. NE is present in large quantities in CF airways and is the best predictor of lung disease. Although previous studies have explored targeting NE in CF, optimal inhibitors that can be delivered safely and effectively to the lungs have not yet made it to the clinic. Our study tested ecotin, a known bacterial periplasmic serine protease inhibitor, for its potential to inhibit NE activity in CF airway samples and NE release from human neutrophils. Our results show that ecotin can significantly reduce NE activity in sputum samples obtained from several CF patients. We also found that ecotin inhibited NE release from human neutrophils in presence of stimuli that can be found in CF lungs such as Pseudomonas aeruginosa bacteria. These results identify ecotin as a new NE inhibitor in CF with clinical potential to be explored in the future for CF patients.

Exploring Young Children's Recovery Rates in Academic, Social, and Behavioral Skills Following COVID-19-initiated Disruptions to In-person Learning

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Amidst online instruction prompted by the COVID-19 pandemic, children experienced uneven access to school supports, prompting long-term questions about educational attainment and widening opportunity gaps. The pandemic disrupted schooling for more than 90% of children and largely removed children from consistent, in-person contact with adults and peers. This study examined racial/ethnic differences of COVID-19 school closures on the academic and social-emotional skills of Pre-K children transitioning to kindergarten and investigated how teachers' responses supported children during closure and initial recovery periods. Teachers completed online surveys assessing student-teacher relationship quality and children's academic and social skills. Comparisons examined the causal impact of COVID-19 disruptions on children's school readiness. Correlations among child outcomes and school/home learning supports were examined. Analyses were conducted for the full sample and separately by race. Immediately following disruptions to in-person instruction, non-White students had significantly lower language, literacy, and mathematics skills.
As they transitioned to kindergarten, all students experienced gains in language, social skills, and teacher-child closeness, along with declines in behavior problems and teacher-child conflict. Correlations indicate whole-class remote learning was detrimental to child outcomes, whereas more tailored contact between teacher and parent/child supported learning. In the aftermath of natural crises, children who already face personal or academic challenges are at greater risk of experiencing more negative outcomes, including poor school readiness. The results of this study provide important insight on appropriate responses to long-term school disruptions to inform future practice and policy to ensure all students are well supported academically and socially.

Changes in Expression Patterns of Genes Related to Cyclic Eggshell Mineralization in the Shell Gland of Laying Hens at Early and Peak Egg Production

Graham Spires, CURO Research Assistant
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The shell gland is a specialized tissue responsible for the calcification of an eggshell approximately every 24 hours after laying hens reach sexual maturity. This incurs a massive demand for calcium (Ca) and phosphorus (P), which is partially derived from the hens' bone. As hens age, they produce thinner eggshells; however, the mechanisms responsible are unclear. Therefore, the objective of this study was to examine the expression of calcium and phosphorus genes responsible for shell calcification at two ages within early (25wk) and peak (43wk) lay. Shell gland tissue was collected at 1:30, 6:00, 15:00, and 21:00 hours (h) after egg

laying. Total RNA was extracted, and reverse transcribed to cDNA then analyzed via RT-qPCR. An interactive effect of age and time was indicated ($P<0.0015$) for the Ca chaperone CALB1. Expression of this gene peaked on 43wks at 15:00h, which is the time of peak eggshell calcification. Expression of the calcium transporter ATP2B1 significantly increased ($P\leq0.05$) between 1:30h and 21:00h. Carbonic anhydrase 2, an enzyme responsible for bicarbonate production necessary for shell calcium carbonate formation, and SLC26A9, a bicarbonate transporter, were significantly increased ($P\leq0.05$) at 6:00h and 15:00h. Expression of several P transporters (SLC20A1, SLC20A2, and SLC34A2) was elevated at 15:00h and/or 21:00h, likely due to P requirements for cuticle development at the end stage of eggshell formation. Together, these results show hens utilize certain Ca and P transporters at different periods to optimize eggshell and cuticle formation, and this likely influences eggshell quality.

Parent-Toddler Language Interactions in Play: Comparison of Parent Words Used Across Toy Types

Maddie Grace St. Clair & Brooke Apple
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The quantity and quality of language input that infants and toddlers receive is associated with their language development, as well as future academic and social outcomes. Parents have a unique role in their child's language exposure; thus, expanding knowledge on contexts that support language development is important. This study is part of a larger project examining parent-toddler communication in play activities. Specifically, we explored the content-specific words parents used across four different play conditions: play with traditional toys (e.g., shape sorter, puzzle), play with electronic educational toys (e.g., ABC cell phone, talking farm), picture books (e.g., board books with animals and shapes), and functional and emerging pretend play (e.g., tea set, trucks and people). All four conditions represented similar color themes and three represented similar shape and animal themes. Parent-toddler dyads played with each of the four playsets for 15 minutes in their home in a counterbalanced order of conditions. Sessions were recorded through LENA Digital Language Processors (DLPs). Five minutes of each 15-minute session were analyzed in this study. Specifically, we coded parent's use of animal, shape, and color words followed by a secondary code of the communication function (e.g., comment, question, reading/singing). Results across conditions will be displayed through written descriptions and graphical illustrations. Future applications and research implications will be discussed.

The Hidden Costs of Private Probation

Adam Starks, Foundation Fellow, CURO Research Assistant
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Many counties and local courts across the country contract out misdemeanor supervision services to private entities that offer probation supervision services at no cost to taxpayers. Such companies collect court-imposed fines, supervision fees, restitution, and other compliance costs, including drug testing, GPS monitoring, and mandatory classes. Currently, there is minimal government oversight and few statutory limitations for these companies, allowing them to set supervision fees and compliance costs, collect them aggressively, and punish nonpayment with revocation and jail time with little judicial process. Media coverage and legal cases abound indicating that private probation companies abuse their role as government contractors to increase profits, acting as autonomous arbiters of the law who target low-income individuals. Although private probation companies market themselves as a cost-saving strategy for local governments, little research has examined such claims. This study is designed to answer the question: How do private probation companies affect costs for local governments? By measuring court costs, probation revocations, probation supervision revenues, and successful/unsuccessful probation terminations, I will construct a multivariate analysis of the economic and judicial impacts of private probation entities, using data from Georgia, which has one of the largest criminal justice systems nationwide, most active probationers per capita, and an extensive network of private probation companies.

A Gravitational Mass-Field Framework for Ad Hoc and Implicit Coordination In Swarm and Multi-Robot Systems

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Multi-robot coordination is critical to achieving reliable robotic missions exploiting the collective capability of swarm robots. In particular, the consensus and formation control problem has been extensively studied, where distributed controllers are proposed to enable robots to only rely on their local information and be able to share information only with their immediate neighbors. However, these controllers are usually explicitly designed based on the specific tasks at hand, which brings to transferability issues requiring the controllers' re-design for domain adaptations. Therefore, we propose a new framework inspired by gravitational mass-force fields that allow implicit coordination at a lower level for connectivity-preserving formation control while need-based ad hoc coordination is applied at a higher-level controller for realizing different levels of tasks at private, local, or global layers. We demonstrate the potential of the new controller framework through extensive simulations and real-world swarm robot experiments in a multitude of illustrative multi-robot tasks involving tight coordination: initiating rendezvous at different levels of coordination layers, accommodating sequential and parallel task execution, and boundary tracking of physical processes for environmental sensing.

Cognitive Function in Response to a Pecan-Enriched Meal

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To examine the effects of a pecan-enriched meal on executive function and attention and processing speed in healthy adults. Thirty adults (n=15 men, n=15 women) were recruited for a double-blind, randomized crossover trial with two testing visits for the two treatment conditions: an isocaloric pecan-enriched shake (68g pecans) or a high saturated fat shake as control (labeled as Shake "A" or "B"). The Computerized Mental Performance Assessment System (Brain, Performance, and Nutrition Research Centre, Northumbria University) was used to administer cognitive performance tests at fasting and hourly for 4h postprandially. Executive function was assessed via the N-back, Serial 7's, and Working Memory tests. Attention and Processing Speed were assessed using a Digit Vigilance test. Consuming Shake B resulted in quicker reaction times in the Numeric Working Memory subtests of Overall Reaction Time ($p=0.0016$), Correct Reaction Time ($p=0.0025$), Yes Reaction Time ($p=0.0036$), and No Reaction Time ($p=0.0063$) vs. Shake A. Additionally, consuming Shake B showed a trend for improved reaction times for the Alphabetic Working Memory subtests of Overall Reaction Time ($p=0.0848$) and Correct Reaction Time ($p=0.0860$) vs. Shake A. For the N-Back test, Shake A was faster in Correct Reaction Time than Shake B ($p=0.0340$). Preliminarily, Shake B led to quicker reaction times in the domain of executive function compared to Shake A. Faster reaction times indicate superior cognitive function, and improvements can demonstrate enhanced cognitive performance. Unblinding of treatment conditions will occur in March.

Flexor and Extensor Muscle Derived Extracellular Vesicles Play Converse Roles in Neuromuscular Junction Dismantling

Aiden Streleckis
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Neuromuscular junction (NMJ) dismantling, or the degeneration of the synapses between nerves and muscles, is a phenomenon that results in motor impairments and is seen in numerous neurodegenerative conditions, such as amyotrophic lateral sclerosis (ALS). The integrity and function of neuromuscular junctions rely on intercellular communications between nerves and different muscles, and the signals from the presynaptic nerve are known to be critical during this process. Our preliminary data gathered thus far suggests that, when denervated, flexor muscles such as the soleus display better regenerative capabilities in terms of myogenesis and reinnervation compared to extensor muscles such as the extensor digitorum longus (EDL), however, the underlying mechanism remains unclear. We hypothesize that extracellular vesicles (EVs), one of the key mediators for intercellular communication, derived from extensor muscles exacerbate neuromuscular junction dismantling while EVs derived from flexor muscles prevent it. To test this hypothesis, EVs from the EDL and Soleus in a sciatic nerve denervation mouse model will be collected and compared for NMJ formation and maintenance in an acetylcholine receptor cluster formation and dispersion assay. Our results showed that the extensor-derived EVs decrease neuromuscular junction formation and dispersion while the flexor-derived EVs promote neuromuscular junction formation and decrease dispersion. In addition to repeating the same assay in vitro with EVs derived from the soleus and EDL of an ALS mouse model, we also plan to evaluate the function of these EVs in vivo in treating the NMJ dismantling observed in ALS mice.

Female Athletes in Limited Contact Sports Have Slower Tandem Gait Times

Rachel Stup
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Normative data are critical for interpreting post-concussion deficits, such as during tandem gait (heel-to-toe walking), in the absence of personal baseline data. The purpose of this study was to determine how sex and sport type influenced tandem gait performance in order to develop specific future normative datasets that account for important characteristics. Division-1 college athletes (n=261) performed timed single- (ST) and dual-task (DT) tandem gait over a 3m walkway (participants walked down and back, 6m total). The dual-task portion included counting backwards by 6's and 7's, reciting months backwards, and spelling backwards. We ran a 2 (sex) by 2 (sport type [contact, limited/no contact]) ANOVA with Bonferroni adjustments to compare ST/DT tandem gait time and dual-task cost (DTC). The sex and sport type interaction was significant for ST ($p=0.030$) and DT tandem gait times ($p=0.024$), but there was no significant interaction ($p=0.619$) or main effects ($p>0.221$) for DTC. Limited/no contact females walked slower than males during ST (mean difference=1.1s, 95%CI: 0.2-2.0, $p=0.020$) and DT (mean difference=2.7s, 95%CI: 1.0-4.4, $p=0.002$). Limited/no contact female athletes were slower than contact sports females during ST (mean difference=2.2s, 95%CI: 1.1-3.3, $p<0.001$) and DT (mean difference=3.7s, 95%CI: 1.7-5.8, $p<0.001$). Sex and sport type may be important factors that affect single- and dual-task tandem gait performance. Including these factors in future assessments of tandem gait normative values will strengthen clinical protocols and ensure sports medicine professionals are providing the best possible care for athletes' post-concussion.

Comparing Student Perceptions to Researchers' Categories of Non-Content Instructor Language

Claire Sullivan & Akshitha Veeramachaneni
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Instructor Talk is the language used by instructors in the classroom that is unrelated to course content and has the possibility to influence learning experiences in the life sciences from the perspective of students. With previous studies having identified instances of Instructor Talk in majority of the categories within the previously developed framework, we plan to examine the degree of researcher and student alignment of perceptions of Instructor Talk. We will consider how closely these respective groups of individuals agreed on whether Instructor Talk was positively or negatively phrased by inviting members of a large upper-division biology course to partake in a survey. In the assessment, students will be given randomly chosen Instructor Talk quotations-half were positively phrased, and the other half were negatively phrased-and asked to evaluate whether they promoted a favorable or unfavorable learning environment. We hypothesize that the students will categorize the quotes in a manner similar to that performed by the researchers. Overall, our study will provide more insight into how students perceive various examples of Instructor Talk and will help facilitate professional development in inclusive teaching strategies in the sciences at the university-level and beyond.

Eating for Several Thousand: How Interactions between Temperature and Resource Concentration Influence the Assimilation of Energy in a Host (Daphnia dentifera) - Parasite (Metschnikowia bicuspidata) Relationship

Gabe Sullivan-Brugger
Dr. Alexander Strauss, Odum School of Ecology

Ingestion of energy (feeding) is probably the most fundamental biological process all organisms undertake. Interactions between consumers and resources form the foundation of ecological food webs and the assimilation of energy, but when present, parasites add to the equation. How does the host-parasite relationship influence energy reserves and energy flow? In this study, we use a foraging rate assay to investigate the effect of different temperatures and resource concentrations in aquatic systems using female neonate Daphnia dentifera, either infected or not, with the fungal parasite Metschnikowia bicuspidata. Data collected was then put into a dynamic energy budget model to understand how the host allocates energy to growth or how the parasite consumes these reserves. Using these different resource concentrations and temperatures, we see how these treatments affect feeding behavior when burdened by a parasite. Typically, the host will reduce their feed intake (illness-mediated anorexia) in response to infection and shift their energy and metabolism. From the information we gather here, we might see the potential direct effects temperature and resource concentration have on the parasite's growth and how these patterns might scale to a population- or community-level dynamics. Future studies will help to shed light on how crustaceans' behavior responds when parasitized and what host stage and genotypes might affect the allotment of energy.

Investigating the Molecular Mechanisms of Heparan Sulfate Assembly in Multiple Hereditary Exostoses

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Multiple Hereditary Exostoses (MHE) is a congenital skeletal disorder that affects 1 in 50,000 children. The disease is characterized by the formation of exostoses, which are cartilage capped-bone benign tumors that are typically found near the

growth plate of long bones. They cause a variety of health issues including growth retardation, skeletal deformities, and chronic pain, and currently there are no approved therapies for this disease. MHE is caused by heterozygous loss-of-function mutations in exostosin-1 (EXT1) or exostosin-2 (EXT2), which are genes that encode for key enzymes involved in the biosynthesis of heparan sulfate polysaccharides. Mutations in EXT1/EXT2 lead to a decrease in heparan sulfate (HS) levels and a disruption in key signaling pathways in chondrocytes at the growth plate and exostoses formation. The goal of my project is to understand the molecular mechanisms of EXT1 and EXT2 in HS biosynthesis regarding MHE. To do this, we have engineered human chondrocytes using CRISPR/Cas9 to monitor endogenous EXT protein levels in cells. We tested whether overexpression of wildtype EXT1 and/or EXT2 may restore heparan sulfate in mutant chondrocytes. Additionally, we are studying the interactome of EXT1/EXT2 to identify factors that may stabilize or regulate EXT1/EXT2 activity in the Golgi, which form a co-polymerase complex for HS assembly. Co-immunoprecipitation experiments coupled with mass spectrometry have enabled us to identify potential protein-protein interactions between EXT1/EXT2 and other factors in the Golgi. Overall, these studies will help us further understand the regulation of EXT1/EXT2 in hopes of finding novel therapeutic approaches to treating MHE.

Pound-Drever-Hall Frequency Locking Technique in Cavity-Enhanced Transient Absorption Spectrometer

Uyen Ta
Dr. Melanie Reber, Chemistry, Franklin College of Arts & Sciences

Ultrafast spectroscopy is an effective tool in investigating molecular dynamics in quantum mechanical systems of different molecules and clusters on the femtosecond timescale, the timescale in which molecules make and break bonds. Our lab is building an ultrafast cavity-enhanced transient absorption spectrometer that will enable sensitive detection of dilute samples in molecular beams. Molecular beams are a way to study cold, controlled, dilute samples and are ideal for precision spectroscopy. The spectrometer starts with a homebuilt ultrafast Ytterbium fiber laser with pulse durations shorter than 100 femtoseconds (100 x 10-15 seconds). The sensitive detection is obtained by coupling our laser light and signals into an optical enhancement cavity. This requires matching and locking the laser to the optical enhancement cavity, using the Pound-Drever-Hall locking technique to stabilize frequency. The enhancement cavity is housed in a vacuum chamber, where the molecular beam intersects with the lasers for ultrafast transient absorption studies.

Quantification of Transplanted Induced Neural Stem Cell Survival and Differentiation in a Longitudinal, Severe Pediatric Porcine TBI Model

Moira Taber
Dr. Holly Kinder, Animal & Diary Science, College of Agricultural & Environmental Sciences

Traumatic Brain Injury (TBI) in children is a leading cause of death and disability and is correlated with shortened life expectancy. TBI has limited treatment options, with a marked absence of restorative therapies available. Induced neural stem cells (iNSCs) have been demonstrated to differentiate into major neural cell types which, if directly transplanted at the site of injury, may facilitate recovery in TBI patients. Piglets are a highly effective translational model for studying TBI treatments in consideration for human medicine due to their similarities in neural development and brain structure to young children. Therefore, the objective of this study is to evaluate the potential of human iNSCs to survive, differentiate, and improve recovery when cerebrally transplanted into a piglet TBI model. TBI was surgically induced via controlled cortical impact and PBS (n=5) or DiR-labeled iNSCs (n=6) were transplanted 5 days later. Animals were sacrificed 12 weeks post-TBI for brain collection and analysis. DiR-labeling iNSCs prior to transplantation makes the transplantation site detectable in ex vivo brains via fluorescent microscopy. We expect to identify DiR-fluorescence in the brain tissue as an indication of iNSC survival 12 weeks post-TBI. Additionally, immunohistochemical analysis of brain tissue is expected to yield quantitative evidence of iNSC differentiation into NeuN+ neurons, GFAP+ astrocytes, and Olig2+ oligodendrocytes via colocalization with the human cell marker HNA. This study will demonstrate the applicability of the pig translational model and provide the framework for studying the potential effects of iNSC transplantation to promote recovery in TBI animals.

Bioengineering Heparan Sulfate to Create a Safe and Effective Heparin Alternative

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Heparin is one of the most widely utilized drugs in the world and is a potent anticoagulant that is routinely prescribed for treating deep vein thrombosis and pulmonary embolism during surgery and in the acute care setting. Currently, therapeutic heparin is a fractionated form of heparan sulfate derived from animal sources, predominantly from connective tissue mast cells in pig mucosa sourced from China. Heparin's anticoagulant activity is based on its ability to bind to and enhance the inhibitory activity of the plasma protein antithrombin III (AT) in the coagulation cascade. Unfortunately, 2-5% of patients on heparin therapy develop a life-threatening side effect known as heparin-induced thrombocytopenia (HIT), which results from the formation of heparin-platelet factor 4 (PF4) immunoreactive complexes. Thus, there is an urgent need for safer, alternative sources of heparin. Since PF4 binding to heparin depends on distinct binding sites compared to AT, we hypothesized that cells could be engineered to produce anticoagulant heparan sulfate with decreased PF4 affinity. In this project, we utilized genome-wide CRISPR/Cas9 screens to search for regulatory factors that could be harnessed to bioengineer an anticoagulant form of HS with enhanced affinity to AT and lower PF4 binding. From these screens, we uncovered novel regulatory factors and distinct HS proteoglycan proteins as modulators of both HS expression and AT binding. Future studies include validation of top hits using flow cytometry, mass spectrometry, and bio-layer interferometry to investigate site-specific glycosylation of proteoglycans and identify novel regulatory mechanisms of heparin biosynthesis in cells.

Examining the Relationship between Macular Pigment Optical Density (MPOD) and Blood Pressure

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Background: Dietary carotenoids lutein and zeaxanthin are found in dark green, leafy vegetables and brightly colored fruits. When consumed, these antioxidant, anti-inflammatory pigments circulate the body and concentrate in tissues such as the macula of the neural retina (where they can be measured non-invasively as macular pigment, MP) and the brain. Having a high MP optical density (MPOD) has been associated with reduced risk for age-related macular degeneration and other central nervous system diseases. Although it is known that MP directly affects these tissues and their diseases, it is possible that MP also simply reflects diet quality and, consequently, is a useful biomarker for systemic health. To answer this question, 37 participants (M=47.95= ± 11.38; 91.9% female; 16.2% non-white) were recruited. Automated oscillometric cuffs were used to measure blood pressure 3 times during the study visit. MPOD was measured using heterochromatic flicker photometry. MPOD was negatively associated with systolic (RS = -.337; p=0.021)

and diastolic blood pressure (RS =-.333; p=0.022). It is well known that lutein and zeaxanthin reduce the risk for diseases of the tissues that concentrate them, such as the retina and brain. Our results suggest that MPOD is also a biomarker for systemic health.

Increase in Perceived Efforts When Goal Pursuit is Successful
Kat Tanaka
Lily Boothby, Zhaojie Yan
Dr. Michelle R. vanDellen, Psychology, Franklin College of Arts & Sciences
In this study, we measured how people perceive effort in others when they are pursuing a goal. Thus, we examined how the outcome (success vs. failure) of pursuing a goal affects how people perceive effort in both high-effort and low-effort conditions. We hypothesized that the outcome (success vs. failure) would have more of an effect on the participants' perception of effort in the low (vs. high) effort condition. The participants viewed scenarios in which an athlete worked with high or low effort towards a goal and then either succeeded or failed. They then rated how much effort they thought the person expended, and results showed that while the effort was perceived to be higher in the success vs. fail scenario for both the high-effort condition and the low-effort condition, the perception of effort in the low-effort condition was more drastically different between fail and success conditions. Next, participants rated how much regret they believed the person felt about the effort. Regrets were perceived as lower for success than failure, and in the low-effort condition, differences in effort regret between success and fail conditions were more significant than in the high-effort condition. Lastly, participants reported how much the person valued the effort (i.e., think the effort was "worth it"), and we found that effort was valued more in the success (vs. failure) condition and that the low-effort condition had a greater difference in the amount of effort value between success and failure.

Hospital Administrators and their Effect on Performance and National Ranking Outcomes
Dawson Templin
Dr. Tim Quigley, Management, Terry College of Business
The United States is wrestling with an array of issues in healthcare, from health inequities to staff burnout. These challenges come in a period where healthcare systems have adapted more business-oriented practices with focus on efficiency which often prevents practitioners from achieving effective solutions. Specifically, it is often the case that hospital administrators are fundamentally different from the practitioners caring for patients as the later have medical degrees while the mix of backgrounds and experiences of hospital administrators is quite varied. Recently, increasing numbers of medical students are studying in joint MD-MBA programs to combine perspectives within management and medicine to alleviate concerns that exist to blend maximized hospital profits with focused patient care experience. The question is, do executives with these credentials have a differential impact on the organizations they lead? This study investigates how the educational credentials and other background traits of a hospital administrator affects a hospital's profits and national ranking. With an initial sample of publicly traded and non-profit hospitals, we aim to identify meaningful relationships between background traits and educational credentials of hospital administrators and outcomes such as revenue, growth, profit, patient satisfaction, care outcomes, and hospital rankings. This research will demonstrate the importance of CEO hospital administrators operating under a medical degree and how hospital systems may increase both profits and evaluated performance indicators.

Evaluating the Impacts of Hurricane Irma on Georgia Heirs Property Owners
Nathan Tesfayi, CURO Research Assistant
Dr. Marguerite Madden, Geography, Franklin College of Arts & Sciences
In September 2017, Hurricane Irma made landfall in southern Georgia, causing severe flooding and widespread destruction. Disaster recovery programs were inaccessible for heirs property owners due to title difficulties. The NASA DEVELOP team worked in partnership with The Georgia Heirs Property Law Center (The Center) to identify potential heirs properties impacted by Hurricane Irma. We created flood extent maps, a socioeconomic overlay, and identified potential areas of structural damage. We utilized surface reflectance data from Landsat 7 Enhanced Thematic Mapper Plus (ETM+), Landsat 8 Operational Land Imager (OLI) and Sentinel-2 MultiSpectral Instrument (MSI) and backscatter data from Sentinel-1 C-band Synthetic Aperture Radar (C-SAR). We produced flood extent maps by consolidating these Earth observations in NASA SERVIR's Hydrologic Remote Sensing Analysis for Floods (HYDRAFloods) tool in Google Earth Engine (GEE). To produce socioeconomic overlays, we used Computer Assisted Mass Appraisal (CAMA) data to identify areas of heirs properties likelihood. Our flood extent map results found that backscatter data was more reliable than surface reflectance, resulting in the heaviest flooding being found on the coast. With these maps, we created one socioeconomic overlay for Camden County, identifying areas where heirs properties were damaged by flood.

Uncovering the Role of Chromomethylase-3 in Gene Body Methylation using Neurospora Crassa
Aryan Thakur, Foundation Fellow
Dr. Bob Schmitz, Genetics, Franklin College of Arts & Sciences
Cytosine DNA methylation is evolutionarily conserved in plants and animals. However, some plants and insects possess gene body methylation (gbM), which is characterized by DNA methylation at CpG dinucleotides and is enhanced within a subset of transcribed regions (typically 5-15% of genes in the genome). CpG methylation in Arabidopsis thaliana is maintained by METHYLTRANSFERASE 1 (MET1), a cytosine DNA methyltransferase that semiconservatively methylates newly synthesized DNA during DNA replication. However, molecular mechanisms establishing CpG methylation at gbM genes is unknown. Recent studies using Eutrema salsugineum associate CHROMOMETHYLASE-3 (CMT3) with the de novo establishment of methylation at CpHpG sites in gbM genes, which eventually transition into CpG methylation. We are using Neurospora crassa, a fungal heterologous system, to further explore the molecular basis of CMT3 de novo methyltransferase activity. A CMT3 transgene from A. thaliana was transformed into dim-2 mutants of N. crassa, which lack cytosine DNA methylation. We aimed to investigate CMT3 methylation targets in dim-2 and wild-type strains of N. crassa. We failed to isolate the homothallic strain, but CMT3/WT strains were successfully isolated. N. crassa with/without CMT3 revealed no differences in their cytosine methylation levels. One reason for this may be that methylation levels were already saturated. However, the best system to functionally test the transgene (CMT3) function is to introduce the CMT3 in the mutant background that lacks the DNA methylation.

The Implications of Stereotype Threat on the Academic Performance of Black College Students
Dana Theoc, Foundation Fellow
Dr. Allison Skinner-Dorkenoo, Psychology, Franklin College of Arts & Sciences
Despite an increase in access to tertiary education for African American students, postsecondary graduation rates of Black students

are still among the lowest across all racial groups and negative stereotypes about the intellectual capabilities of Black persons continue to persist. Stereotype threat theory asserts that the possibility of confirming a negative stereotype can lead persons to underperform on tasks on which they are stereotyped. The proposed study will examine the effectiveness of various threat-increasing and threat-decreasing strategies on the academic performance of Black undergraduate students. I hypothesize that students exposed to threat-increasing conditions will experience increased feelings of threat and will demonstrate lower performance on an academic task as compared to participants exposed to threat-decreasing or control conditions. The results of the study are expected to provide a potential link between the racial stereotyping of Black students as underachievers and our understanding of existing academic achievement gaps.

Excerpts from "First Semester: A Musical"
Wyn Alyse Thomas, Foundation Fellow
Prof. George Contini, Theatre & Film Studies, Franklin College of Arts & Sciences
My research project involves seeking to create a full-length musical exploring how mental health and relationships (particularly for young women) are impacted during the first semester of college. There are few musicals that feature college characters or explore female mental health, ideas that are relevant and relatable for Gen Z theatre-goers. I have crafted a libretto and begun crafting a contemporary score that centers Alicia, a high-achieving student, as she struggles with relationship troubles, making friends, and academics all as she tries to get her anxiety under control and define her identity. Inspiration for this piece comes from my own experience last semester, but from talking to many different students about their experiences during first semester, whether it be about seeking mental health resources on campus, making new friends, relationships, or learning how to live on their own for the first time. I have written music and lyrics to 26 songs, talking to professors and composers about music theory and lyric writing in order to create music that thrusts the plot forward and draws in audiences. After writing the script, I had actors read the show aloud to listen for flow, find what resonated, and find any plot holes. Based on feedback from the reading and other theatre artists, I am now working to enhance the score and give more drive to each character. As I move forward I plan to finish sheet music and recordings, produce the show at UGA, and submit to festivals and publishers.

Simple and Quick Monitoring Method of Cyanobacteria Culture Using Qubit 4
Tiffanie Torrey
Dr. Branson W Ritchie, Small Animal Medicine & Surgery, College of Veterinary Medicine
Qubit 4 is widely used in molecular biology laboratories to measure the concentration of nucleic acids and proteins because of its affordability and simple operation. Qubit 4 also has two-channel fixed-range fluorometer function. The first channel has an excitation wavelength at 470nm with detection wavelength ranging from 510nm to 580nm and 665nm to 720nm. The second channel has excitation wavelength at 635nm with detection wavelength from 665nm to 720nm. We report that, using extracted pigments, the first channel can be used to read chlorophyll autofluorescence when read at 665nm to 720nm, and the second channel for phycocyanin autofluorescence. The reading of fluorescence from two pigments were quantitative and accurate (R2 > 0.99) when the readings were compared to the ones obtained using a full-range fluorometer. One-month long culture of cyanobacteria, Synechocystis PCC6803, in well-defined media BG11 was monitored for culture turbidity at 750nm and cellular autofluorescence levels of chlorophyll and phycocyanin by Qubit 4. Throughout the culture, OD750 and chlorophyll levels mirrored each other, peaking on day-21 and declining thereafter. However, phycocyanin peaked earlier on day-7 to -10 and declined after. At the cellular level, plateauing culture phycocyanin level while culture density keeps increasing indicates phycocyanin concentration decrease per cell, a phenomenon, known as nitrogen starvation-induced chlorosis. In summary, quick daily monitoring of phycocyanin levels by Qubit 4 enables detection of nitrogen availability in the culture media. Taken together, our results indicate Qubit 4 is a single equipment required to monitor growth and nitrogen availability in cyanobacteria culture media.

Resolving the Inconsistency in the Physical and Psychological Differences of the Natural Slave and Natural Master of Aristotle's Politics
Joshua Simon Track
Dr. Athanasios Samaras, Philosophy, Franklin College of Arts & Sciences
The natural master and slave are both concepts central to Aristotle's Politics and his ontology of the human. Regarding the despotic rule of the natural master over the slave, Aristotle describes both physical and psychological differences between the two roles, as based on a difference of physical strength and logos. Free Greek men need physical strength to fight in war, and this bravery and strength requirement is admired in Greek society as well as Aristotle's description of the Greek citizen. However, the Greek slave must have enough strength for labor, and this creates the problem that Aristotle cannot distinguish between the Greek slave and the Greek master based on physical appearance. Aristotle attributes the deficiency in deliberation and a lack of spirit to slaves and also to barbarians which ascribes the slave status specifically to barbarians in a culturally racist view. He attributes wisdom and moral excellence to specifically Greek citizens, on the other hand. Aristotle's theory of the psychological inferiority of the slave may be consistent on his premises, however Aristotle would be unable to distinguish between the natural slave and natural master on physical appearance along, as he tries to do in the Politics.

Stellar Flares of Young Stars in the Solar Neighborhood
Andrew Tran, CURO Summer Fellow, CURO Research Assistant
Dr. Inseok Song, Physics & Astronomy, Franklin College of Arts & Sciences
High-cadence optical photometric data from the Transiting Exoplanet Survey Satellite (TESS) are very useful for characterizing astrophysical events in young stars, such as stellar flares or rotation dependent quantities. Using detrended light curves of ~600 members of young, nearby moving groups (10-150 Myr) available from the TESS Science Office Quick-Look Pipeline (QLP), we systematically detected stellar flares from over 2100 sector light curves. Candidate stellar flare events were flagged first by using the flare package AltaiPony. Then, we fitted each flare candidate with a previously devised 4th-order polynomial function named "aflare", using scipy.curve fit to obtain parameters pertaining to flare energy and local continuum background level. We utilize our detected flare results to investigate various stellar astrophysical relations dependent on rotation or previously derived connections between stellar physical parameters and flaring events. We discover that the flare frequency distribution (FFDs) of NYMG members deviates from the commonly used power-law distribution. Younger stars show lognormal distribution of FFD while older stars show a power-law like FFD, and the transition appears to happen around 20 Myr of age. We will continue to investigate this phenomenon with respect to other astrophysical parameters.

Child Body Mass Index and Lunch Meal Consumption: Secondary Analyses of Three Congregate Meal Programs

David Tran, CURO Summer Fellow, CURO Research Assistant
Dr. Sina Gallo, Nutritional Sciences, College of Family & Consumer Sciences

The present study examined middle childhood and adolescent populations between 7–14 years of age from three different studies: a dietary assessment validation study conducted at the Georgia 4-H Rock Eagle summer camp (Eatonton, GA), a middle-school diet study at an Alabama middle school (Birmingham, AL), and a Clarke County School District dietary recall accuracy study (Athens, GA). Energy intake and meal consumption were recorded via direct observation techniques from the mentioned studies to investigate correlation between dietary lunch meal consumption child Body Mass Index (BMI). Child weight and height were measured to calculate BMI and compared to CDC growth charts to assess percentile or Z-score with energy intake (kcal) measured using the Nutrition Data System for Research (NDSR). Results showed that those participants categorized with higher BMI had a statistically significant and positive correlation with lunch meal energy consumption (kcal) (B=5.824 ±1.639, p-value <0.001), despite accounting for covariates including gender, race/ethnicity, and age. Future research efforts would strive to follow a study design by which adolescent data is represented in different settings at a larger scale and with the same dietary assessment techniques to provide an improved understanding of children's daily lives and dietary routines.

Utilization of Community Health Resources by Rural Georgia Residents

Rose Tran, CURO Research Assistant
Dr. Alexa Lamm, Agricultural Leadership, Education & Communication, College of Agricultural & Environmental Sciences

Rural communities lack access to health resources, creating barriers to health promotion initiatives. The consumption of nutrient-rich foods for rural residents is hindered by geographic distances to food resources, difficulty accessing locations due to mobility/transportation, and lack of affordability. The purpose of this study was to determine the likelihood of rural Georgia residents using resources that improve access to healthy foods and physical activity spaces. A sample of rural Georgia residents (N = 750) was obtained via Qualtrics using non-probability opt-in sampling. Respondents were asked to indicate the likelihood of using 10 resources if they were available in their community on a five-point Likert scale (1 = Extremely unlikely, 5 = Extremely likely). Descriptive statistics were analyzed using SPSS. Respondents indicated they were likely to use free or discounted weekly boxes of fresh fruits and vegetables (M = 3.96, SD = 1.16), farmers' market coupons (M = 3.75, SD = 1.169), and mobile trucks or food markets (M = 3.53, SD = 1.16). Respondents were neither likely nor unlikely to use free cooking classes (M = 3.16, SD = 1.35), free classes on home gardening (M = 3.25, SD = 1.31), and free nutrition classes (M = 3.39, SD = 1.29). Mean values ranged from 3.16 to 3.96. Results indicated interventions that provide financial support and greater availability may be most beneficial for rural communities. Rural residents are neither likely nor unlikely to utilize programs that require time commitments. Extension efforts should focus on affordability rather than education and programming.

Analysis of Hemisphere Volumetrics, Cerebral Blood Flow, and White Matter Integrity in Response to a Proprietary Neuroprotective Agent in a Piglet Model of Traumatic Brain Injury

Kristy Ling Trung
Dr. Franklin West, Animal & Diary Science, College of Agricultural & Environmental Sciences

Traumatic brain injury (TBI) is a leading cause of deaths and hospitalizations in children. Pediatric TBI patients can endure disrupted early developmental processes resulting in functional impairments such as behavior, cognition, and motor function. Currently, there is a lack of effective and FDA-approved treatments for TBI resulting in an increased interest in testing neuroprotectant therapies that can reduce inflammation, edema, and tissue damage following TBI. Therefore, the objective of this study was to determine if a proprietary neuroprotective treatment can mitigate acute inflammatory responses and improve brain recovery in a piglet TBI model. Pigs underwent controlled cortical impact surgery to induce TBI and received a subcutaneous injection of a low dose (LD) neuroprotectant (n=4), high dose (HD) neuroprotectant (n=4), or placebo (n=4) every 8 hours for 5 days. Lesion volume, hemorrhage volume, and midline shift were assessed via T2 weighted (T2W) imaging, cerebral blood flow was assessed via arterial spin labeling (ASL), and white matter integrity was assessed by diffusion tensor images (DTI) at 1 and 7 days post-TBI. Treatment with the LD and HD neuroprotectant agent is expected to decrease lesion size, hemorrhage volume, and midline shift as well as improve mean cerebral blood flow and white matter integrity in comparison to the placebo-treated pigs on day 1 and 7 post-TBI. If this neuroprotectant agent is found to mitigate negative physiological effects such as acute inflammation and tissue damage after TBI, this may ultimately lead to better survival and increased recovery in early developmental processes in pediatric patients.

On Campus Caffeine Consumption

Jasmine Udeshi
Dr. Jennifer L Gay, Health Promotion & Behavior, College of Public Health

There is a high prevalence of caffeine consumption among college students because of its stimulatory effects. Students can have several motivations for caffeine use including academic performance or for physical activity. The purpose of this study was to determine the extent and motivations behind caffeine consumption on campus. College students completed an online survey where they self-reported their motivations behind caffeine consumption including drink preference and daily intake. Preliminary results from a sample of about 350 indicate that the participants are about 82.4% female and 16.4% male. Nearly all (91.4%) participants are undergraduate students, and 72.6% of the sample consumes caffeine daily. Motivations behind caffeine consumption are important to analyze through a public health lens because although caffeine studies have determined its beneficial effects, the drug can still have negative consequences if misused. Public health programs on college campuses can formulate programs to highlight the importance of consuming a safe amount of caffeine. Also, learning motivations behind consumption can aid in determining an effective alternative to caffeine.

Cabaret's Buddhist Hells and Psychedelics: Comparing Sally Bowles to Jean Ross in an Unconventional Performance

Aayush Umesh, CURO Research Assistant
Prof. George Contini, Theatre and Film Studies, Franklin College of Arts & Sciences

Based upon the travels of author Christopher Isherwood in Weimar Berlin, the hit musical Cabaret comments on the dangers of political indifference, personifying this phenomenon in the character Sally Bowles. However, what if Isherwood's self-conception as an objective observer — exemplified by his iconic line "I am a camera" — was a distortion of the truth? This project uncovers the truth of Bowles' identity, seeking to answer the question: "who is the real Sally Bowles?" I decided to create a performance piece which draws from Cabaret, I Am a Camera, The Berlin Stories, and more, to explore the rarely-addressed controversy of Bowles' identity. She is compared, contrasted and confronted with her real-life model (and in many

ways, antithesis), Jean Ross, via a psychedelic journey that takes her through a mindscape reminiscent of the Buddhist hells (Narakas) — a nod to Isherwood's later Dharmic philosophy.
The piece exposes uncomfortable truths in the fictionalization of Ross; centers Bowles by diving headfirst into her psyche; creates a moment of reconciliation between Isherwood and Bowles, exploring their complex relationship in a critical manner; and synthesizes East and West via mystical and psychedelic experiences in performance. There is much to continue studying about Dharmic themes in Cabaret, especially considering Isherwood's later Vedic scholarship. There is also a depth of knowledge to uncover about the usage of psychedelic experiences in constructing dramatic narratives, particularly in a society whose perspective on psychedelics has shifted radically in recent years (largely owing to the work of contemporary advocates including ethnobotanist Michael Pollan).

Curation and Analyses of Drug-Distribution across Tissues
Srisneha Vallabhajosyula, CURO Research Assistant
Dr. Eugene Douglass, Pharmaceutical & Biomedical Sciences, College of Pharmacy
ABC-transporter enzymes are expressed by tissue endothelial cells, which alter the concentration of small molecules in various tissue compartments. It has been demonstrated that these "blood-tissue barriers" have a direct impact on the effectiveness and toxicity of anti-cancer, anti-microbial, psychiatric, and anti-epileptic drugs. As of now, this phenomenon is best understood or best known for the blood-brain barrier tissue, while it is still abstract for other tissues. Furthermore, the canonical pharmacokinetic theory that the free drug concentration in each tissue compartment is equal. This project attempts to clarify the understanding of drug distribution by 1) collecting the remaining literature on 73 drugs across 23 tissues and 2) performing bioinformatic and chemo-informatic analyses on the dataset. More knowledge on the ABC-transporters and chemical properties will enable better treatment of the disease sites within the specific tissues of cancer design, antibiotic, and anti-viral drugs.

Mitochondrial Capacity Immediately Following Exercise
Parker Jace Vaughan, CURO Research Assistant & Shelby Mallon
Dr. Kevin McCully, Kinesiology, Mary Frances Early College of Education
This study will compare mitochondrial capacity in the calf before and after exercise, while maintaining high levels of oxygen in the muscle. Subjects will undergo two mitochondrial capacity tests using Near Infrared Resonance Spectroscopy (NIRS) before and after exercise. Exercise will consist of calf presses for one minute using an air-powered resistance device. To maintain high levels of oxygen in the calf, participants will be instructed to press every three seconds for one minute. A NIRS device will be used to measure oxygen levels throughout the experiment. Accelerometer data of the calf presses will be collected, and adipose tissue measurements of the calf will be taken via ultrasound imaging. The anticipated finding of this experiment is decreased mitochondrial capacity following exercise. This drop in mitochondrial capacity is likely due to a decreased pH in the calf muscle. By maintaining high oxygen levels in the calf, it is unlikely that lowered mitochondrial capacity is due to increased free radical production. The mitochondria are the "power plants of the cell" and provide much of the ATP energy needed for muscle contractions in exercise. Because of this, the relationship between mitochondrial capacity and exercise is particularly interesting to the scientific community. We hope that out study will provide insight into the function of the mitochondria during exercise.

Mapping Teacher Dispositions to Instructor Talk Frameworks
Akshitha Veeramachaneni, CURO Research Assistant & Jaidyn Schultz
Dr. Dax Ovid, Physiology & Pharmacology, College of Veterinary Medicine
Learning environments in classrooms are largely shaped by the instructors, and studies show that these learning environments have a strong impact on student success. The term "dispositions" is used in many assessments of instructors to determine whether they have the qualities to teach well. Currently, many instructors are judged using dispositional assessments, examining them for values and qualities that their institution deems important, an unstandardized approach that can differ based on the assessor. The definition of the term dispositions is still very ambiguous, but examining non-content instructor language, also known as Instructor Talk, can help to quantify them. Instructor Talk is a framework developed to categorize different types of instructor speech, ranging from explaining teaching practices to building community between students. This research will examine both theoretical and real-life dispositional assessments and identify the extent to which the existing Instructor Talk framework can be mapped onto them. Based on our preliminary comparisons, the Instructor Talk framework may be an effective tool and promising strategy for teachers to be assessed. This finding could support professional development on teacher dispositions and enable equitable student success.

Polycaprolactone-based Nanofiber Scaffolds for 3D Cell Cultures
Polina Vertegel
Dr. Vladimir Reukov, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences
Tissue engineering is a growing field that seeks to create cell-culture substrates that mimic the extracellular matrix (ECM) of biological tissues. The traditional method of producing artificial ECM-analogous scaffolds is electrospinning, but this method lacks precision in controlling fiber orientation, diameter, and spacing. More recently, touch-spinning has been used as the preferred approach because it allows for greater control over fiber formation. This study evaluates the suitability of dry-spun polycaprolactone fibers for use in 3D cell culturing. The touch-spun nanofiber layers were analyzed using optical and scanning electron microscopy, and their biocompatibility was assessed by culturing NIH3T3/GFP fibroblasts on the fibers for up to seven days. The results of optical microscopy showed that fibroblasts attached to the fibers and proliferated on denser regions of the scaffold. These findings indicate that the touch-spun polycaprolactone scaffolds support continuous cell growth. Future work will explore the creation of tissue constructs using human umbilical vein endothelial cells (HUVECs) and smooth muscle cells (SMCs) as a model for vascularization.

Investigating the Role of Neuropeptide Signaling in Planarian Stem Cell Differentiation and Function
Andres Villalobos
Dr. Rachel Roberts-Galbraith, Cellular Biology, Franklin College of Arts & Sciences
Regeneration, the ability to regrow tissues after injury, is found throughout nature. The freshwater planarian, Schmidtea mediterranea, has one of the most impressive regenerative abilities in the animal kingdom. Planarian regeneration can be attributed to a population of adult pluripotent stem cells. Thus far, the signals that enable stem cells in planarians to continuously divide, quickly migrate to injury, and appropriately differentiate are poorly understood. Our study focuses on the role of neuropeptide signaling in maintaining a population of stem cells capable of sustaining homeostasis and regeneration. Previous work showed a failure to regenerate after neuropeptide signaling is inhibited by knockdown of prohormone convertase 2 (pc2), which encodes an enzyme

essential for neuropeptide processing. We hypothesized that pc2 knockdown animals regenerate poorly due to a stem cell defect. Indeed, we found that adult stem cells are reduced after pc2(RNAi). Although the stem cells are decreased in number, they are not eliminated, and preliminary results suggest that they are still able to respond to injury, though not to a degree that supports regeneration. Currently, we are investigating how pc2 knockdown affects stem cell differentiation and impacts the number of early stem cell progeny. We hope that the results of our work can be translated to other model organisms to more accurately understand the different signals received by stem cells in regenerative and non-regenerative organisms.

Fruit Shape of Watermelon Associated with Variation in ClSUN25-26-27a Alleles

Douglas Vines, CURO Honors Scholar
Dr. Cecilia McGregor, Horticulture, College of Agricultural & Environmental Sciences

Watermelon (Citrullus lanatus) is an economically important horticultural crop, with 3.4 billion pounds produced in the US in 2021. Fruit shape is an important trait for watermelon production as it impacts shipping, packing, and consumer preference. Currently, little is known about the genetic control of fruit shape in this crop. A candidate gene, ClSUN25-26-27a (Cla011257) co-localized with QFSI3.1, was identified as a major contributor to watermelon fruit shape. ClSUN25-26-27a is a member of the SUN gene family, which has been extensively studied in tomato in relation to fruit morphology, in which a gene duplication produces an elongated shape. Previously, three alleles of ClSUN25-26-27a were shown to be associated with fruit shape variation in cultivated watermelon: the wild type, which has a round fruit shape, a SNP, which has a blocky fruit shape, and a 159bp deletion in the 3rd exon, which has an elongated fruit shape. This study identified four additional alleles for ClSUN25-26-27a in watermelon wild relatives C. amarus and C. colocynthis with 12 nonsynonymous SNP across exons 2 and 3 of the gene. To determine the effect of these novel alleles on fruit shape, each allele was introgressed into a common C. lanatus background through marker-assisted backcrossing. The resulting near isogenic lines will be phenotyped in replicated field trials to determine the effect of each allele on fruit shape.

Investigations into the Specificity of Farnesyltransferase

LaRyel Alyssa Waldon
Dr. Walter K Schmidt, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

CaaX protein prenylation is the modification of proteins by isoprenoid lipids such as farnesyl (C15) or geranylgeranyl (C20). The outcomes of this study are expected to lead to a better understanding of protein prenylation, which may aid in disease treatment and prevention in areas such as cancer and progeria. This research project leverages the yeast Ydj1 chaperone and yeast system for investigations into the target specificity of human farnesyltransferase (FTase) and involved two phases. First, the development of a yeast system to express and evaluate the properties of human FTase was used to compare the specificities of human and yeast FTases; the latter has recently been reported to have broader target specificity than previously appreciated. The results obtained by taking advantage of a Ydj1-dependent thermotolerance phenotype and biochemical gel shift assay indicate that human and yeast FTases behave similarly and that there is a broader range of non-canonical CaaX motifs that are farnesylated, including many but not all CKQX sequences. Because obtained results indirectly predict farnesylation, the second phase develops a system that could allow for biophysical confirmation of farnesylated sequences. The second phase of the project included the construction of plasmids encoding GST linked with different CKQX motifs for use with protein purification methods. Our results indicate that all but three CKQX motifs are prenylated, but the exact isoprenoid lipid associated with these sequences remains unknown and will require optimization of our GST Ydj1 protein purification methods coupled with mass spectroscopy to confirm the type of lipid present.

Institutional Bias or Failure? Evaluating Outcomes of the IMF's Low-Income Lending Facilities

Joshua Walker
Dr. Carolina Caetano, Economics, Terry College of Business

This paper presents a novel method for evaluating the success of International Monetary Fund lending programs for balance of payments problems by estimating the effect of past loans on future loans. I theorize that a loan will have a negative impact on future loans if it was successful in accomplishing its goal and reducing the need for more funds. To demonstrate this idea, I use data from the IMF's Rapid Credit and Extended Credit facilities for the eight-member states of the West African Economic and Monetary Union, applying a test useful for detecting omitted variable bias in models with bunching of the treatment. The model yields significant results with small, positive effects of lagged loans on future loans, which may indicate political and bureaucratic bias within the institution itself or a lack of lending success, as abundantly suggested by previous research.

Correlation between Mental Distress and Spirituality Related to Ancestral Veneration

Ansley Warnock
Dr. Bram Tucker, Anthropology, Franklin College of Arts & Sciences

In recent years, a wealth of research into spirituality/religiosity (S/R) and mental health has emerged, mostly portraying S/R as a protective factor against mental distress. The bulk of these studies, however, deal primarily in Christian beliefs. Research into African spiritual beliefs and mental health, on the other hand, frequently attempts to either reconcile the aforementioned spiritual beliefs with accepted western ideals of psychotherapy or discern the mechanism that makes these cultural practices valuable in the first place. Using a set of questionnaire data from NSF-funded research project BCS 1733917, PI Tucker from the southwestern region of Madagascar to regress beliefs about ancestral veneration against a metric of mental distress, this study to attempts to bridge this gap. I predict that these results will favor existing literature regarding S/R and mental health. Beyond that, I attempt to use a combination of factor analysis and regression analysis to determine what kind of spiritual beliefs (those about ancestral commitment versus those related to anxiety about ancestors, for example) tend to most predict an individual's resiliency. Significant results from this would lend quantitative evidence to research regarding the mechanism of S/R's benefits.

The Role of Rapport-Building Behaviors in Human-AI Interactions in the Workplace

Lilli Claire Watson
Dr. Neal Outland, Psychology, Franklin College of Arts & Sciences

Research on social engagement and team dynamics has traditionally focused on human-human interactions. However, as artificial intelligence (AI) technology advances and becomes more common in organizations, understanding critical social engagement tactics, such as rapport-building techniques, in relation to AI–human interaction is increasingly urgent. While team dynamics research has emphasized the importance of rapport-building techniques in human-only collaborations for work efficiency and satisfaction, little is known about how this translates to people working with AI in

contemporary workplaces. Current studies provide evidence for how people show rapport-building techniques in human interactions, but there is limited evidence on the implications of this in human-AI ones. Therefore, this study aims to answer how social engagement with an AI team member impacts team effectiveness and work satisfaction, as well as whether or not rapport-building behaviors in AI-to-human interactions have the same positive impacts as they do for human-to-human interactions in the workplace. To address our research questions, we will conduct quantitative and qualitative analyses using data collected from online participant and student samples about perceptions of and interactions with AI agents. Based on previous literature, we expect our results to show a positive correlation between human-AI rapport and productivity, along with positive correlations between trust and innovation. By expanding existing research on rapport and other team processes in human-AI teams, this study aims to broaden the literature on how human interactions with AI over time impact team performance.

Building Blocks: How Children Learn Subsistence and Spiritual Knowledge

Liza Watson, CURO Research Assistant

Dr. Bram Tucker, Anthropology, Franklin College of Arts & Sciences

How do age and ethnicity impact when children learn spiritual and subsistence knowledge in Southern Madagascar? The research aims to analyze the association between age, ethnicity, and cultural knowledge for children across 3 ethnicities between the ages of 5-15. Children will show more confidence in knowledge around age 10 and the effect of ethnicity is being tested for. The project I am working with from southwestern Madagascar (BCS 1733917, PI Tucker) explores the relationships between people's cultural knowledge and their socioeconomic choices. I analyze the data sets that contain children's answers to understand whether the knowledge they posses about ancestors and subsistence is contingent on their age or ethnicity. I will be analyzing the cross-site variation and using factor-analysis to determine the association between the questionnaire responses with either their ethnicity and/or age. The goal is to understand how children are acquiring their understandings of their roles within their communities. Depending on the results of the analysis, further tests will be done with the Village and Household datasets to understand sources of social cohesion. Cross-site analysis of ethnicity and children's knowledge will also be conducted to see if certain values are shared across site locations between ethnic groups. My role in the project will be to test the children's data set to portray a facet of how knowledge informs Malagasy social cohesion. I will work with my teammates on presentations about social cohesion and my independent research on children will be one of the three questions we present about.

The Impact of Aerobic Fitness Status on Metabolic Flexibility

Sarah Watson

Dr. Nathan T. Jenkins, Kinesiology, Mary Frances Early College of Education

Metabolic flexibility is defined as the body's ability to match substrate utilization to availability, or efficiently switch between carbohydrate and fat metabolism. Regular physical activity has been shown to increase mitochondrial capacity and improve metabolic flexibility. This suggests that shifts between anaerobic and aerobic metabolism could vary with fitness levels. There has been minimal investigation into the relationship between exercising metabolic flexibility and fitness status, especially in females. As such, the purpose of this study was to assess differences in exercising metabolic flexibility and behavioral patterns between a group of high and low-fit females. We hypothesized that the females classified as "high-fit" would have greater rates of metabolic flexibility compared to the low-fit group. Participants underwent a variety of fitness assessments, behavioral pattern questionnaires, and a high-intensity interval exercise on the rower to assess substrate utilization. Following post hoc analysis, the two groups significantly differed in terms of aerobic fitness and the amount of vigorous activity completed each week but were otherwise similar in all other assessed areas (dietary habits, quality of life, body composition, sedentary patterns, age, etc.). Upon further analysis, we did not find any statistically significant differences in metabolic flexibility between the two groups. Our results suggest that aerobic fitness status alone is not enough to significantly alter metabolic flexibility in a young, healthy, female population during an interval rowing exercise.

Evolutionary Insights into the Unique Modes of Auto-Regulation in the DCLK Family Kinases

Grace Watterson, CURO Summer Fellow, CURO Research Assistant

Dr. Natarajan Kannan, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Doublecortin Like Kinases (DCLKs) are a conserved family of microtubule-associated proteins that regulate diverse cellular processes. The human genome encodes three DCLK Ser/Thr kinases (DCLK1-3), which are abnormally regulated in human cancers and neurodegenerative disorders. However, an incomplete knowledge of their unique sequence, structure and regulatory features presents a major bottleneck in the development of selective DCLK inhibitors. Here we define the hallmarks of DCLK family evolutionary divergence and functional specialization using a combination of statistical sequence analysis, structural comparisons and molecular dynamics simulations. We find that DCLK family members have evolutionarily diverged from other CAMKs through a unique tethering mode employed by the C-terminal tail, which prevents ATP binding in DCLK1 by docking to the ATP binding pocket. The 'acceptor' tethering sites in the kinase domain, including a divergent G-loop, are unique to the DCLK family and facilitate conformational regulation of the kinase domain by the C-terminal tail. Our studies provide new insights into DCLK autoregulatory mechanisms and open new avenues for the design of selective DCLK inhibitors.

College Students and Caffeine

Meredith Wessel

Dr. Jennifer L Gay, Health Promotion & Behavior, College of Public Health

Previous research shows that nearly all college students consume caffeine to help them feel awake, improve focus, or because they like the taste. It is recommended that healthy adults consume less than 200-300 mg of caffeine per day, but prior research indicates many college students consume closer to 400-500 mg. This study compares caffeine consumption by students' goal content (i.e., why consume caffeine). It is hypothesized that UGA students consume caffeine more for coursework completion as opposed to energy for physical activity or physical performance. As part of a larger study, participants (n=500 UGA students) between the ages of 18-25 years old reported their caffeine intake, coursework load, studying habits, physical activity, diet habits, and sleep. Preliminary results indicated that the sample was 82.4% female, 16.4% male, and 91.4% were undergraduate students. Nearly three-quarters consume caffeine daily with most students consuming it either once or twice. This information is important because it helps us better understand why college students consume caffeine. Results from this study may inform future interventions designed to better regulate caffeine consumption in this population.

Assessing the Functional Role of Descending Neural Pathways Using Conditioned H-Reflex

Ana White

Jing Xu, Kinesiology, Mary Frances Early College of Education

There are two major components of dexterous hand movement: finger individuation and precision grip. Both are resultant of descending signals traveling along the corticospinal tract. Each component may involve a different pathway within this tract, specifically the direct motoneuronal pathway and the indirect, likely propriospinal, pathway. When these pathways are damaged by neurological insults such as stroke, hand dexterity is affected. Understanding these pathways is imperative to gaining further insight regarding dexterous hand movement after stroke. To investigate the descending pathways, transcranial magnetic simulation (TMS) was used to elicit conditioned H-reflex in the flexor carpi radialis (FCR) muscle. Different interstimulus intervals were used to explore if or when H-reflex facilitation occurs in young adults and older adults. An electrode placed near the participant's brachial pulse point was used to stimulate the median nerve, which innervates the FCR, at various intensities. TMS pulses at 90% of active motor threshold were administered at different interstimulus intervals in relation to median nerve stimulation. Peak-to-peak amplitudes of H-wave and M-wave in unconditioned and conditioned H-reflexes were calculated and compared. Facilitation was defined as the ratio of the amplitude of conditioned H-reflex to amplitude of unconditioned H-reflex. Facilitation was calculated for each participant, then averaged across all participants. Peak-to-peak amplitudes of conditioned H-reflex were greater than those of unconditioned H-reflex, with the first occurrence of facilitation being at -3 ms. Facilitation was smaller and more inconsistent than hypothesized in both groups. Overall, facilitation of conditioned H-reflex was greater in young adults than in older adults.

Wind Disaster Strikes: Mapping 30 Years of Georgia's Severe Wind Events

Max White, Foundation Fellow

Dr. Michelle Ritchie, Health Policy & Management, College of Public Health

Severe weather is responsible for billions of dollars in property and crop damage per year in the United States. Understanding the spatial distribution of this damage is essential to designing effective disaster management policies. The Storm Events Database collected by the National Center for Environmental Information provides a robust, 30-year history of severe weather events which can be used to explore these spatial trends. The thunderstorm wind category within the database stands out as a holistic metric for severe weather because it includes observed meteorological variables while incorporating infrastructure vulnerability and community response. This study analyzes the spatial-temporal characteristics of thunderstorm winds in Georgia using descriptive statistics and three methods for spatial analysis: a) Kernel density estimation, b) linear density estimation along major roads, and c) time cube analysis of correlation coefficients. Analyzing thunderstorm winds from these three different mapping perspectives indicates rural clusters of severe weather risks which were not apparent before. Knowledge of these risk clusters could help emergency managers and utility providers to better serve their stakeholders and build weather-ready rural communities.

Creation of Pseudo-Names for Sound-Symbolic Perception Research

Savannah Jane Williams, CURO Research Assistant

Dr. Peggy Renwick, Linguistics, Franklin College of Arts & Sciences

While the relationship between sound and meaning is largely arbitrary, certain lexical classes are more susceptible to the effects of sound symbolism, a hypothesized relationship where speech sounds represent non-phonetic properties. Sound-symbolic principles are manifested in the phonological distribution of personal names in English. Previous research using pseudo-words has demonstrated that these sound-symbolic characteristics may be salient to English speakers. With that in mind, the present study develops a pseudo-name generator, with the goal of using the generated pseudo-names in a future study of sound-symbolic perception. The name generator, constructed using Python, retrieves the pronunciations for a select set of English names from the CMU pronouncing dictionary. The phonemes in these names are then placed into a phoneme bank, from which the syllable generator selects at random to construct syllables containing a consonant followed by a vowel, or a vowel in between two consonants. These syllables are then passed to a word generator function, which constructs words according to English stress patterns. The result of the program is a list of 40 pseudo-names, ranging from 1 to 4 syllables in length. The pseudo-names generated by the program will eventually be used in a perception study where participants will be asked to assign the pseudo-names to characters, and the resulting data will be examined to determine if the sex-based sound-symbolic nature of English names are salient to English speakers.

The Role of Stakeholder Engagement in Natural and Nature-Based Infrastructure

Kate Winters

Dr. Felix Luis Santiago Collazo, School of Environmental, Civil, Agricultural, & Mechanical Engineering, College of Engineering

Tybee Island is facing the threat of sea level rise, which worsens tidal flooding and severe weather impacts for residents. Natural and Nature-Based Infrastructure (NNBI) is a strategy to implement green spaces thoughtfully designed to address flooding issues while providing ecosystem benefits. Stakeholder engagement is critical to these additions being accepted and well-maintained by residents and municipal authorities. To improve public opinion of strategic NNBI solutions, we adopted a tiered plan for getting feedback from the citizens affected directly by these changes. We split focus among discussions with city officials, subject area experts, and the Tybee Island residents. To educate and inspire the community, we devised physical representations to visualize the complex stormwater impacts they have experienced. The models included a side-by-side comparison of each NNBI strategy and the current conditions; this allowed for a clear, direct demonstration of the positive impact NNBI can have on Tybee Island. These models will be presented to residents through two focus groups: rain storage methods and marsh migration. These engagement strategies could help to cement NNBI as a standing feature of Tybee Island and other coastal communities adjusting to sea level rise in the future.

We're Here and Possibly Queer: Analyzing the Ambiguous Communication of Queerness in Filmic Promotional Materials

Marti Wolf

Dr. Dawn T. Robinson, Sociology, Franklin College of Arts & Sciences

This project examines how the marketing materials of mainstream romance films featuring relationships between women mirror those of romance films centering queer women. Understanding the ways in which corporations mobilize identity markers of marginalized groups to extract profit can help people who have or support those identities practice critical and conscientious consumption. In this thesis, I attempt to formalize the qualitative similarities and examine the degree to which structural and critical factors are associated with these similarities. Comparing trailers and posters of non-explicitly queer (NQF) Hollywood films and explicitly queer films (EQF), I investigate how studios mobilize markers of queerness and profit off of the "pink dollar." I analyze a sample (n=38) of

American romance films released between 2000 and 2020 that meet a set of structural and narrative criteria, allowing for the direct comparison of NQF and EQF marketing materials. Guided by social identity theory and film scholarship, I systematically review the visual, auditory, and textual contents of the materials, culminating in a set of stylistic and narrative themes across and between the films. I then examine whether use of these features varies by director gender, financial outcome, and critical reception. Formalizing the qualities of films that explicitly feature women-loving-women can advance research on how prospective audiences differentially interpret ambiguity around female friendship and sexuality. This work can inform production and consumption practices, holding studio marketing firms accountable for patterns of queerbaiting and heightening consumer awareness of marketing tactics that invite queer readings.

Instructor Talk in Undergraduate Lab Courses
Elizabeth Wolfson
Dr. Erin Dolan, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences
Course-based undergraduate research experiences (CUREs) are gaining attention in the sciences as an effective way to broaden access to research opportunities and promote students' development as scientists. CUREs are lab courses in which students address a research question with unknown outcomes whereas traditional lab courses engage students in learning knowledge and skills by executing well-known and understood lab activities. Although CUREs have been shown to improve student outcomes when compared to traditional labs, the cause of this effect is largely unknown. Our team is testing the hypothesis that the ways instructors talk in CUREs vs. traditional lab courses is the cause of differences in student outcomes. Using qualitative content analysis, our team created a system of codes to capture and highlight the diverse ways that instructors talk within these lab courses. The team collected audio recordings >40 from lab courses across the country and created a framework that includes conceptual and operational definitions for each dimension of instructor talk. The codes fit five main ideas that we hypothesize to be influential in a student's learning and development and distinctive between CUREs and traditional lab courses: psychosocial support, career support, building relationships, questioning, and science practices. We believe these types of instructor talk may increase students' self-efficacy and spark their interest in pursuing a career in science research. Overall, our team hopes to produce a valid and reliable conceptual framework of instructor talk in lab courses that can be used in the future to improve the teaching of lab courses.

Analyzing the Association of PKD2 with Swimming Velocity in Chlamydomonas reinhardtii in Response to Reduced Flagellar Motility
Blair Workman, CURO Research Assistant
Dr. Karl F. Lechtreck, Cellular Biology, Franklin College of Arts & Sciences
Autosomal dominant polycystic kidney disease (ADPKD) is an inherited disorder affecting one in one thousand people worldwide; a cure remains unavailable. PKD is caused by mutations in PKD1, a putative transmembrane receptor, and the ion channel polycystin-2 (PKD2). This transient receptor potential (TRP) channel is located in the membrane of motile and primary cilia but how channel malfunction causes kidney disease remains unknown. The interaction of polycystin-1 and polycystin-2 in renal tubules promotes the normal development and function of the kidneys and mutations in either one of the proteins causes cyst formation by uncontrolled cell proliferation. I will use Chlamydomonas as a unicellular model to determine 1) novel binding partners of PKD2 in the ciliary membrane, 2) how PKD2 binds to the axonemal microtubules to organizes into a peculiar "race stripe" pattern in two rows along the cilium, and 3) the function of the PKD2 complex in ciliary motility. We identified MST1, the main subunit of the hair-like extracellular mastigonemes, and the single pass transmembrane protein small interactor of PKD2 (SIP1) as binding partners of Chlamydomonas PKD2. Western blot analysis of pkd2, mst1 and sip1 mutants revealed that all three proteins are required for ciliary assembly of the complex and that MST1 and SIP1 are essentially absent from pkd2 cilia; the latter shows that PKD2 is central for the assembly of the race stripes. The pkd2, mst1 and sip1 mutants swim with reduced velocity indicating a role of the PKD2 complex in ciliary motility. Occasionally, we observed that GFP-tagged PKD2 dissociates from the axoneme and integrates into transmembrane ciliary adhesions. Currently, I challenge the cells with high viscosity medium to test if mechanical stress on the mastigonemes and ciliary membrane causes the release of PKD2 from the race stripes. To identify additional proteins that interact with PKD2, we will fuse PKD2 to TurboID, an engineered promiscuous biotin ligase that will biotinylated proteins in its vicinity, facilitating the identification of such proteins. My goals are to determine how PKD2 is targeted to the race stripes and how this pattern promotes swimming motility.

Analysis of Attentional Selectivity and Sustained Visual Attention in Schizophrenia
Soniya Yalamanchili
Dr. Brett Clementz, Psychology, Franklin College of Arts & Sciences
A defining characteristic of schizophrenia is deficits in selective attention. Electroencephalography (EEG) can non-invasively measure attentional resource allocation in the primary visual cortex using steady-state visual evoked potential (ssVEP). This study compares groups with differing levels of cognitive control, which were either high (HCC) or low (LCC) and it was hypothesized that there would be a large discrepancy and more attentional selectivity between those with higher levels of cognitive control (healthy subjects) compared to those with lower levels (schizophrenia subjects). There were 47 individuals who had schizophrenia and 78 healthy comparison subjects. Participants were shown a stimulus that consisted of 5 green horizontal bars flickering at 8.33 Hz and 6 gray bars flickering at 3 different frequencies (central bar=7.69, middle peripheral bars=7.14 Hz, outside bars=6.67). EEGs with 256 sensors were used to measure brain waves and the Fast Fourier Transformation (FFT) was used to break up the signals from the brain into the frequency domain to determine that the brain signal was directly related to the stimulus. ANOVA was used to group for differences in attentional selectivity based on the stimuli (width changes) that the subject saw - outside bar, peripheral bar, middle bar, and the unattended image. Our analysis showed that in contrast to prior studies, there was no difference in attentional selectivity between healthy subjects and schizophrenic subjects. This suggests that neural deficits associated with schizophrenia are not related to basic sensory allocation.

A Letter's Landscape: Exploring the Odes of John Keats
Kate Yarbrough
Dr. Roxanne Eberle, English, College of Arts & Sciences
This presentation comes from a longer sequential reading of the odes of John Keats, inspired primarily by his "Ode to Psyche" and Helen Vendler's landmark 1983 criticism The Odes of John Keats. This paper was named "'We live, and go on thinking': Landscape Construction and Exploration in the Odes of John Keats". For CURO, I will examine how the life writings of John Keats, specifically, his 3 May 1818 "Chamber of Maiden-Thought" letter, manifests in the setting of his poetry. I do so to present the importance of considering poetry not as something existing in a vacuum, but as a historical, cultural, and deeply personal document of one

human psyche. I ultimately found his "Chamber of Maiden-Thought" metaphor as a key to unlocking a reading of the odes as one shared Keatsian mindscape, and a reading of Keats as a three-dimensional cinematic poet, even before the motion picture was created. This is significant because, while cinematic readings of Romantic poets exist (for example, Andrew Burkett's 2016 Romantic Mediations: Media Theory and British Romanticism), this is a contemporary study of Romanticism not often applied to John Keats. Further, my idea of a cinematic Keats relies specifically on a dated document from the 19th century, which uniquely straddles the past and the present and situates Keats as an artist of both.

"A Part of Her That Was Always Watching Her": Voyeurism and Feminine Adolescence in A Hat Full of Sky

Maggie Yarbrough
Dr. Danielle Bienvenue Bray, English, Franklin College of Arts & Sciences

This paper is a critical feminist reading of A Hat Full of Sky, a middle-grade YA novel by highly celebrated adult comic-fantasy author Terry Pratchett. The novel features a pre-teen girl protagonist, Tiffany, a newly-apprenticed witch who undergoes a coming-of-age story as she overcomes the "hiver," a swarming parasitic creature that threatens to take over her mind. As one of Pratchett's only attempts at a young girl's perspective, I argue that the ways he attempts to gender Tiffany are complicatedly problematic. Reading through feminist theory from many disciplines (featuring Simone de Beauvoir, Laura Mulvey, and contemporary feminist scholars in children's literature), I argue that male gaze are both implicit and imperative to Tiffany's character and the novel's arc. I then explain why critical feminist readings of children's fantasy are necessary when considering how stories can empower children and pre-teens to define who they are.

The Influence of Oxygen Levels and pH during Exercise on Mitochondrial Capacity

Samantha Ye & Benjamin Tharp
Dr. Kevin McCully, Kinesiology, Mary Frances Early College of Education

This study will follow up on previous studies to evaluate low oxygen or low pH levels during exercise on mitochondrial capacity after exercise. Subjects will perform plantar flexion exercise for one minute with either low oxygen levels or high oxygen levels with high intensities. Oxygen levels will be measured with near infrared spectroscopy (NIRS). Mitochondrial capacity tests will be performed using NIRS before and after exercise. Muscle pH may be measured in separate experiments to be performed at the 7 Tesla magnet at Auburn University. The NIRS measurements of mitochondrial capacity have been performed and initial exercise protocols have been developed. After performing a full trial, a STIM ratio of 10-fold was achieved, which displays adequate stimulation (>3-fold). In one subject, the average of four pre-mito tests was 1.7 + .10 sec -1. The post exercise mito tests resulted in rate constants of 1.5, 1.6, and 2.2 sec-1. This suggests a transient decline in mitochondrial capacity followed by full recovery, consistent with previous studies. The protocol is essentially established, and we will complete data collection this semester. Strenuous exercise appears to temporarily inhibit mitochondrial capacity, and future studies are needed to determine if this is due to the effects of low oxygen or low pH.

Optimizing the Efficiency of Command-Execution Testing Procedures

Akhila Yellapragada, CURO Research Assistant & Vedika Ghildyal
Dr. Deepak R. Mishra, Geography, Franklin College of Arts & Sciences

The Multiview Onboard Computational Imager (MOCI) is a 6U Cube Satellite that is under development at The University of Georgia Small Satellite Research Laboratory. It will acquire imagery from Earth's surface in low earth orbit (LEO) and will utilize custom Structure from Motion (SfM) algorithms to produce 3D models of Earth's surface & landscapes. The purpose of this research is to analyze various methods of execution, such that each command and its edge cases may be tested using the most efficient method. The method resulting in the highest efficiency would then be used to iteratively run the test from beginning to end, up until the launch period of the satellite. Allowing for faster test execution would provide the chance to detect any possible errors that could be encountered while the satellite is in its 24-hour testing phase and in orbit. The overall efficiency of each testing method will be gauged by the amount of real-time work it takes for a person to conduct the test, the wall clock-time duration of the test, and compiler time, where applicable. The significance of this test to the mission is marked by the cyclic interdependence of the MOCI Mission Operations (MOPS), Flight Software (FSW), and Ground Station (GS) teams. Optimizing the efficiency of this test would enhance operations amongst the three teams; it will provide a more collateral approach to detecting and targeting issues for the FSW team to address and streamline the process of transmitting signals over a communication link to the ground station during its testing period.

Scallops on Ice: Is the Fossil Record of the Antarctic Scallop Biased by Sea Ice Conditions?

Oskar Zuchner
Dr. Sally Walker, Geology, Franklin College of Arts & Sciences

The Antarctic scallop, Adamussium colbecki, flourishes in one of the southernmost marine habitats on Earth. Sea ice is implicated in the postmortem transport of shells, and must be considered when studying the fossil record of A. colbecki. Seafloor anchor ice traps scallops and periodically detaches, floating upwards to adhere to the underside of the sea ice; biota and sediments are gradually exposed at the ice surface through ablation. Annual or multiannual ice usually faithfully records the seafloor habitat, but ice at the pressure ridge is subject to diurnal tides and cracking. Ideally, scallops in both environments would have a 1:1 correspondence in size class distribution and frequency and type of shell repair. If confirmed, this would indicate that sea ice conditions do not bias the Antarctic scallop fossil record. We hypothesize that there is no difference in size class distribution or frequency and type of repairs between A. colbecki in stable and dynamic sea ice environments. We examined this hypothesis at an annual sea ice site and the pressure ridge at Herbertson Glacier in western McMurdo Sound, Ross Sea, Antarctica. All scallops within 1m of a transect deployed on the sea ice surface were collected, measured, and weighed. Preliminary results indicate high fidelity in length, width, and frequency of large repairs from scallops in both ice environments. Therefore, we conclude that sea ice conditions do not appear to bias the fossil record of the Antarctic scallop, as size class distribution and repair frequency were comparable between sites.

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