THE UNIVERSITY OF GEORGIA
Center for Undergraduate Research Opportunities

CURO

2015 CURO SYMPOSIUM

PROGRAM & ABSTRACTS

CLASSIC CENTER • ATHENS, GEORGIA
MARCH 30 – 31

THE UNIVERSITY OF GEORGIA
CENTER FOR UNDERGRADUATE RESEARCH OPPORTUNITIES

2015

CURO

Symposium

Program and Abstracts

CURO Office
203 Moore College
The University of Georgia
Athens, GA 30602
(706) 542-5871

curo.uga.edu

Symposium chair:	Dr. Martin Rogers, Associate Director of CURO & Honors
Book of abstracts:	Eleana Whyte, Program Coordinator, CURO
Cover design:	Sam Pittard, UGA Printing
Edited and proofread by:	Eleana Whyte, Elizabeth Sears, Maria de Rocher, Mary Lee Cunill, Amber Kaufman
Published by:	Honors Program, the University of Georgia
Printed by:	Central Duplicating, the University of Georgia

Table of Contents

Welcome from Director and Associate Director 1

Acknowledgements 2

2015 CURO Symposium Schedule 3

2015 CURO Research Mentoring Awards 4

2015 CURO Symposium Best Paper Awards 7

2015 CURO Symposium Program, Monday, March 30 8

2015 CURO Symposium Program, Tuesday, March 31 26

2015 CURO Symposium Abstracts 34

Index of Presenters and Faculty Mentors 203

CURO

March 30, 2015

Dear Students, Faculty, and Guests,

Welcome to the 15th annual CURO Symposium, UGA's celebration of undergraduate research across the disciplines. Many individuals—administrators, faculty members, staff, graduate students, and, of course, undergraduate students—have collaborated to make the CURO Symposium the premier undergraduate academic event at UGA.

Each year, the Symposium has grown larger, and the 2015 Symposium is the largest to date, with 386 undergraduate researchers communicating their substantial accomplishments to their peers, mentors, and the public at large.

From its inception, the CURO Symposium has showcased research and scholarship in all disciplines. The 2015 Symposium continues that commitment, featuring presenters pursuing 79 different majors from 13 schools and colleges who are conducting research with 258 faculty members from 72 departments. Thus, this two-day event displays UGA's broad and substantial support of research and the invaluable commitment of UGA's administration and faculty to mentoring and providing exceptional learning opportunities for our undergraduates.

Thank you for your continued support of undergraduate research and CURO.

Sincerely,

Dr. David S. Williams, '79, '82
Associate Provost and Director

Dr. Martin P. Rogers, '01, '11
Associate Director

Acknowledgements

Special Assistance for 2015 CURO Symposium

Ms. Kate Belgum	Administrative Associate, External Affairs, Honors Program
Ms. Jami Gilstrap	Administrative Associate, CURO
Ms. Dorothé Otemann	Coordinator of External Affairs, Honors Program
Ms. Amanda Pruitt	Assistant to the Director, Honors Program

Technology Equipment and Support for 2015 CURO Symposium

Center for Teaching & Learning
Franklin College of Arts & Sciences
Honors Program
Odum School of Ecology
Terry College of Business

Reviewers for 2015 CURO Research Mentoring and Best Paper Awards

Dr. Martin Rogers	Associate Director of CURO & Honors
Dr. David S. Williams	Associate Provost and Director of Honors and CURO

Oral and Poster Session Conveners for 2015 CURO Symposium

Ms. Mary Lee Cunill	Communication Studies
Ms. Laura Fletcher	Presidential Graduate Fellow, Department of Psychology
Ms. Jami Gilstrap	Administrative Associate, CURO
Mr. Steven Honea	Academic Advisor, Honors Program
Ms. Linnea Ionno	Department of Public Administration and Policy
Ms. Michele Johnson	Department of History
Ms. Amber Kaufman	Department of Public Administration and Policy
Mr. Adrian Klemme	Institute of Higher Education
Ms. Emily Myers	Administrative Associate, Foundation Fellowship Office, Honors Program
Ms. Kathleen Pieper	Presidential Graduate Fellow, Department of Genetics
Ms. Ricky Roberts	Academic Advisor, Honors Program
Dr. Martin Rogers	Associate Director of CURO & Honors
Mr. Greg Rountree	Administrative Associate, Office of Recruitment, Honors Program
Ms. Heather Smith	Academic Advisor, Honors Program
Mr. Jeremy Wheatley	Academic Advisor, Honors Program
Ms. Eleana Whyte	Program Coordinator, CURO

Schedule

Monday, March 30, 2015

Oral Session I **11:15 a.m.-12:05 p.m.**
Athena Breakout Rooms A, B, C, D, G, H

Oral Session II **12:20-1:10 p.m.**
Athena Breakout Rooms A, B, C, D, G, H

Oral Session III **1:25-2:15 p.m.**
Athena Breakout Rooms A, B, C, D, G, H

Oral Session IV **2:30-3:20 p.m.**
Athena Breakout Rooms A, B, C, D, G, H

Awards and Keynote Session **3:30-4:30 p.m.**
Athena Room E

Poster Session and Reception **4:30-6:30 p.m.**
Grand Hall South & Atrium (downstairs – use escalator in lobby)

Tuesday, March 31, 2015

Oral Session V **9:30-10:45 a.m.**
Athena Breakout Rooms A, B, C, D, G, H, I, J

Oral Session VI **11:00 a.m.-12:15 p.m.**
Athena Breakout Rooms A, B, C, D, G

Oral Session VII **12:30-1:45 p.m.**
Athena Breakout Rooms A, B, C, D

Oral Session VIII **2:00-3:15 p.m.**
Athena Breakout Rooms A, B, C, D, G, H

Oral Session IX **3:30-4:45 p.m.**
Athena Breakout Rooms A, B, C, D, G, H, I, J

CURO Research Mentoring Awards

The Office of the Senior Vice President for Academic Affairs and Provost and the Honors Program established the CURO Research Mentoring Awards, formerly the EURM awards, in 2001.

These awards recognize outstanding faculty who consistently engage undergraduate researchers through CURO Programming (courses, the symposium, summer fellows, JURO, theses, et al.) and 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.

Before 2014, awards were designated as "Early Career" and "Master Level" and were granted to corresponding faculty ranks.

2015

Dr. Jeb Byers, Professor, Odum School of Ecology

Dr. Erik Hofmeister, DVM, DACVAA, DECVAA, MA (Anesthesia), Associate Professor of Anesthesiology, Chief of Small Animal Surgery and Anesthesia, College of Veterinary Medicine

2014

Dr. Carl Bergmann, Associate Vice President for Research-Facilities; Associate Director, Complex Carbohydrate Research Center; Executive Director, Animal Health Research Center; Senior Research Scientist

Dr. Andrew Owsiak, Department of International Affairs, School of Public & International Affairs

2013

Master Level Faculty Award

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

Early Career Faculty Award

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

2012

Master Level Faculty Award

Dr. Lawrence Shimkets, Department of Microbiology, Franklin College of Arts & Sciences

Early Career Faculty Award

Dr. Michael Yabsley, Warnell School of Forestry & Natural Resources

2011

Master Level Faculty Award

Dr. Eric Stabb, Department of Microbiology

Early Career Faculty Award

Dr. John Drake, Odum School of Ecology

CURO Research Mentoring Awards

Program Award
Savannah River Ecology Laboratory
Dr. Kenneth McLeod, Interim Director

2010

Early Career Faculty Award
Dr. John C. Maerz, Warnell School of Forestry & Natural Resources

2009

Early Career Faculty Award
Dr. Brian S. Cummings, Department of Pharmaceutical & Biomedical Sciences
Dr. Anna C. Karls, Department of Microbiology
Dr. Dawn T. Robinson, Department of Sociology

2008

Master Level Faculty Award
Dr. John J. Maurer, College of Veterinary Medicine

Early Career Faculty Award
Dr. Walter K. Schmidt, Department of Biochemistry & Molecular Biology

Program Award
Biomedical and Health Sciences Institute
Dr. Harry S. Dailey, Director

2007

Master Level Faculty Award
Dr. Timothy Hoover, Department of Microbiology
Early Career Faculty Award
Dr. Steven Stice, Department of Animal & Dairy Science

2006

Master Level Faculty Award
Dr. Patricia Hunt-Hurst, Department of Textiles, Merchandising & Interiors
Early Career Faculty Award
Dr. Rodney Mauricio, Department of Genetics
Graduate Student Award
Christopher Anderson, PhD candidate in Ecology
Graduate Student Recognition
Dawn Holligan, PhD candidate in Plant Biology

2005

Faculty Award
Dr. Gary Barrett, Odum School of Ecology
Dr. Sidney Kushner, Department of Genetics
Department Award
Department of Cellular Biology

CURO Research Mentoring Awards

2004

Faculty Award

Dr. William S. Kisaalita, Department of Biological & Agricultural Engineering

2003

Faculty Award

Dr. Jody Clay-Warner, Department of Sociology

Department Award

Department of Microbiology
Dr. Duncan Krause, Department Head
Dr. Timothy Hoover, Undergraduate Coordinator

Program Award

The Pratt Laboratory of Plant Genomics and Bioinformatics
Dr. Lee H. Pratt, Department of Plant Biology
Dr. Marie-Michèle Cordonnier-Pratt, Department of Plant Biology

2002

Faculty Award

Professor William D. Paul, Jr., Lamar Dodd School of Art
Dr. Katherine Kipp, Department of Psychology

Faculty Recognition

Dr. Susan Sanchez, College of Veterinary Medicine

Department Award

Department of Biochemistry & Molecular Biology
Dr. J. David Puett, Department Head

Program Award

"Physics Beyond the Boundaries": National Science Foundation, REU Program
Dr. Loris Magnani, Principal Investigator, Department of Physics & Astronomy
Dr. Heinz-Bernd Schuttler, Department Head, Department of Physics & Astronomy
Dr. Jonathan Arnold, Department of Genetics
Dr. Susmita Datta, Georgia State University
Dr. David Logan, Clark Atlanta University
Dr. William Steffans, Clark Atlanta University

2001

Faculty Award

Dr. Marcus Fechheimer, Department of Cellular Biology

Faculty Recognition

Dr. David MacIntosh, Department of Environmental Health Sciences
Dr. Dean Rojek, Department of Sociology

Department Award

Department of Genetics
Dr. John MacDonald, Department Head

Program Award

Savannah River Ecology Laboratory
Dr. Paul Bertsch, Director

CURO Symposium Best Paper Awards

Since 2001, CURO Symposium Best Paper Awards have recognized excellence in papers developed from work being presented at that 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 Award and Keynote Session, and each award carries $100 in financial support, generously provided by the UGA Alumni Association. Winners from the 2015 CURO Symposium are listed below.

Arts, Humanities and Media:

Brett Bennett	The Forgotten Radical: Southern Women and the New Left Student Protests of the 1960s

Life Sciences:

Anish Narayanan	Analysis of Cancer Mutations in Protein Kinases using Semantic Web Technologies

Physical and Environmental Sciences:

Timothy Montgomery	*Gracilaria vermiculophylla's* Impacts on Herbivory in Georgia's Coastal Ecosystems

Public and International Affairs:

Sarah Lane	Syrian Civil War Victims Receiving Medical Care in Israel: Humanity in a War Torn Region

Social Sciences:

Joseph Coppiano	Age Related Effects on Brain Activation during Cognitive Control Tasks in Subjects with Schizophrenia

Technology, Engineering and Math:

Emily Wall	Using Artificial Neural Networks to Predict Solar Radiation in Georgia

Program: Monday, March, 30, 2015

Oral Session I: 11:15 a.m.-12:05 p.m.
Athena Breakout Rooms A, B, C, D, G, H

Room A	**Patrick Wheat**	The Enigmatic Country: Analysis of Russian Expansionism in the Modern Age
	Eytan Palte	Democratic Institutions and the Human Right to Health
	Brent Buck	Threat from Abroad, Conflict Within: Border Settlement and Civil War Onset
Room B	**Daniel Kanso**	Republicanism in the American South: From Strom Thurmond to Lindsey Graham
	Zachary Jones	Who Saved Thad Cochran?: Racial Politics and Voter Mobilization in a Deep South Runoff
	Alexandra Lilly	How Did Female Candidates Fare in the 2014 Election?
Room C	**Kelsie Flanigan, Charlotte Goldman, Tyler Stollman**	The Role of Executive Functioning in Adherence for Pediatric Solid Organ Transplant Recipients
	Jerica Bornstein	Examining Communication Patterns and Trait Self-Control Using the Actor-Partner Interaction Model
	Jonathan Dickens	Executive Function Moderates Relationship between Mobility and Functional Independence in Older Adults
Room D	**Christina Ethridge**	Characterization of Leigh's Syndrome Patient Human Induced Pluripotent Stem Cells for Clinical Research
	Sandip Minhas	Purification of Hirano Bodies in *Dictyostelium discoideum*
	Kurt Mueller	Function of Kinesin Proteins in *Toxoplasma gondii*
Room G	**Brittany Whitlock**	Influence of Maternal Diet on the Offspring Gut Microbiota
	Allison Koch	Size Labeling for Infant Clothing: Cultural Perspectives on Childhood Growth
	Whitney Okie	Genetic Determination of Obesity Induced Inflammation and Blood Brain Barrier Alterations
Room H	**Adam Kramer**	Studying the Kinetics of N-glycan Release by PNGase F with MRM Quantitation of the Glycopeptides from Human Serum Glycoproteins

	Danish Singh	Genotype-Phenotype Correlations in POMGNT1 and POMGNT2
	Suraj Kapoor	Characterizing the Novel 1,2-Propanediol Dehydratase and its Activating Enzyme from *Roseburia inulinivorans*

Oral Session II: 12:20-1:10 p.m.
Athena Breakout Rooms A, B, C, D, G, H

Room A	**Minh Nguyen**	A #whitewashed Landscape: Internalized Racism, Linguistic Discrimination, and the Policing of Ethnic Identity on Twitter
	Patrick Semanie	Is Everyone on Twitter Better Than You?: Correlations between Twitter and Exercise Motivation among College Students
	Spencer Hanlin	Describing Scrambling in Japanese
Room B	**Sarah Lane**	Syrian Civil War Victims Receiving Medical Care in Israel: Humanity in a War Torn Region
	Elizabeth Hardister	Hurricane Forecasting and Healthcare Facility Evacuations
	Abby Tyre	Health Care Policy Evaluation: A Case Study Examination of Workplace Wellness
Room C	**Santana Mowbray**	The Effect of Race and Household Structure on Adolescent Alcohol Use
	Elizabeth Wilkes	Reviving Our Roots: Reconnecting Teens to Agriculture
	Emily Maloney, Nneka Ewulonu, Mallory Harris	Reducing Teen Pregnancy: The Case for Comprehensive Sex Education in Georgia
Room D	**Keller Sheppard**	Mitigating the Spatial Mismatch of Social Service Provision and Demand: The Potential of Faith-Based Facilities
	Olivia Stockert	Understanding and Preserving the Practice of Medicinal Plant Cultivation and Use in San Luis, Costa Rica
	Rachael Hart	Investigating Resting State Oscillatory Dynamics Associated with Schizophrenia and High and Low Cognitive Control
Room G	**Scott Smith**	A GDOT Case Study for the Beneficial Use of HVFA in Concrete Pavements

	Delmaries Gonzalez	Development of a Lightweight Weeding Robot
	Thomas McBrearty, Daniel Sanchez, Andrew Angoyar, Carson Aft	Algorithmic Forecasting through Big Data Analytics
Room H	**Jacob Kennedy**	Highly Mobile Kenyan Runners: Transnationalism through Sport
	Morgan Green	Field Test Significance in Adolescents with Chronic Ankle Instability
	Cristian Escalera	Comparison of Spinal Motions Used during Running to Their Spinal Flexibility

Oral Session III: 1:25-2:15 p.m.
Athena Breakout Rooms A, B, C, D, G, H

Room A	**Angel Chen**	Pollen Competition
	Hiral Patel	Understanding Floral Trait Evolution in Wild Sunflowers
	Benjamin Miller	Evolution of Root System Morphology and Nitrogen Uptake in Genus *Helianthus*
Room B	**Christine Kil**	Alleviating Inequities in Georgia's Public School Funding
	Kathryn Mauldin	Changing Cones: Students' Images of a Dynamic Situation
	Rahul Shah	Promoting Success for English Learners: Dual-Language Immersion in Georgia
Room C	**Melissa DeVelvis**	The Importance of Personality and Emotion in Women's Support for Georgia's Secession, 1860-1861
	Caroline Jackson	The Strategy of the Early British Feminist Movement: Emily Davies and Feminist Networks, 1865-1905
	Brett Bennett	The Forgotten Radical: Southern Women and the New Left Student Protests of the 1960s
Room D	**Samantha Harris**	Chief Executive Officers' Personality Characteristics and How These Characteristics Affect Marketing in Their Company

	Anne Chen	Female Labor Force Participation and Wages: What Has Changed in the Last 30 Years?
	Lyndon Lee	Change the Channel: Can Firms Influence Consumer Channel Choice through Marketing Contacts?
Room G	**Tyler Stollman, Charlotte Goldman, Kelsie Flanigan**	The Influence of Caregiver Emotional Functioning on Perceived Barriers and Adherence in Adolescent Solid Organ Transplant Patients
	Dionnet Bhatti	Acute Intra-vmPFC Injections of Galanin Reduce Expression of Conditioned Contextual Threat in Rats
	Joseph Coppiano	Age Related Effects on Brain Activation during Cognitive Control Tasks in Subjects with Schizophrenia
Room H	**Kim Nguyen**	Giving Up Appointment Television: How Millennials Are Changing What It Means to Watch Television
	Haley Vann	Visual Brand Identity on Pinterest
	Sonja Petrovic	Spoken Word Activism in the Age of Social Media

Oral Session IV: 2:30-3:20 p.m.
Athena Breakout Rooms A, B, C, D, G, H

Room A	**Piyush Joshi**	Integrating of Human Neural Progenitor Cells into a Developing Chicken Embryo for a Toxicology Model
	Elizabeth Wilkins, Catherine Callaway	Development of a Chimeric Chick Neural Tube Injury Model incorporating 3D, mESC-Derived Neural Aggregates
	Lindsey Taylor	The Effects of Interval versus Continuous Conditioning on Physiological and Kinematic Parameters of Equine Fitness
Room B	**Joan Han**	The Effects of Size on Development Time and Fecundity in *D. subquinaria*
	Sora Park	Using the Chemical Reporter Strategy to Analyze Glycoproteins in Pompe Disease
	Lauren Dennison	Extracellular Vesicle Dependent Transfer of a Virulence Factor Confers Human Infectivity to *Trypanosoma brucei brucei*

Room C	**Hannah Weiss**	Does Georgia's Voter Identification Law Disproportionately Affect African American Voter Turnout in Georgia?
	Kasey O'Brien	The Effects of Incumbent and Challenger Campaign Spending on Election Results
	Aaron Conley	The Politicization of Soccer in Brazil, and the Effect of the 2014 FIFA World Cup on Brazilian Politics
Room D	**Samuel Baxter**	Progression of Lithium Ion Batteries
	Heather Huynh	Increasing Adoption of an Internet Standard: Internet Protocol Version 6
	Andrew Martin, Paul Cray	Expanding Polymer Usage for 3D Printing in Tissue Engineering
Room G	**Benjamin Landes**	Financial Literacy in College Students
	Victoria Glover	Examining Perceptions and Expectations of African American Faculty and Students
	Jillian Maloney, Cara Smith, Mackin D'Amico	Perception of Student-Athletes on UGA's Campus
Room H	**Audrey Wright**	Investigating Interest in Ingesting Insects
	Johnathan Mayfield	The Effects of TnAV-2a on the Complex Interactions between the Parasitoid *Microplitis demolitor* and Various Lepidopteran Species
	Daniel Skowronski	Profiling the Spatiotemporal Regulation of DNA Methylation in a Social Insect

Awards and Keynote Session: 3:30-4:30 p.m.
Athena Room E

Welcome and Introductions	Dr. David S. Williams, Associate Provost and Director of Honors and CURO
Remarks	UGA President Jere W. Morehead
Introduction to Awards	Dr. Martin Rogers, Associate Director of CURO & Honors
CURO Research Mentoring Awards	Dr. David C. Lee, Vice President for Research

Program: Monday, March, 30, 2015

2015 Symposium Best Paper Awards	Dr. Rahul Shrivastav, Vice President for Instruction Mrs. Meredith Gurley Johnson, Executive Director, UGA Alumni Association
UGA Libraries' Research Awards	Mrs. Caroline Barratt, Librarian, UGA Libraries
Keynote Address	Dr. Sonia Altizer, Associate Dean of Academic Affairs & UGA Athletic Association Professor of Ecology, "Infectious Diseases on a Changing Planet: How Ecology Drives Epidemics"
Closing Comments	Dr. David S. Williams, Associate Provost and Director of Honors and CURO

Poster Session and Reception: 4:30-6:30 p.m.
Sponsored by the Office of the President
Grand Hall South & Atrium (downstairs – use the escalator in the lobby)

Poster # 1	**Carson De Mille**	The Effects of Dietary Wheat Gluten on Swine and Poultry Growth Performance
Poster # 2	**Mary Mehegan**	Concussive Traumatic Brain Injury Therapy Using iPSC-NSCs in a Porcine Model
Poster # 3	**Nicole Bisel**	The Role of Chondroitin Sulfate Glycosaminoglycans in Glioma Cell Progression
Poster # 4	**Hannah Mason**	Elucidating the Functional Role of Chondroitin Sulfate Proteoglycans in the Extracellular Matrix for Use in Rationally Designed Glycomaterials
Poster # 5	**Karishma Sriram**	Bone Fracture Putty: A Combined Stem Cells and Lentiviral Approach
Poster # 6	**Courtni Young**	The Effect of Anesthetic Variables on Patient Outcome
Poster # 7	**Katherine Hogan**	Investigating Heat Treatment of Serum and Plasma Samples as a Means to Improve the Detection Sensitivity of Heartworm Diagnosis in Dogs
Poster # 8	**Susan Jones**	PCR Detection of SRY Gene of Male Dog Mesenchymal Stem Cells in Female Dog Brains with Acute Ischemic Stroke
Poster # 9	**Nina Navalkar**	Investigating the Influence of Rac1 and Rho Family GTPases in Hair Follicle Biology
Poster # 10	**Eric Malaney**	Mammary Gland Specific Deletion of Rac1 on MMTV-

Poster # 11	**Ijeoma Okoye**	Examining the Digestibility of Methionine in Poultry
Poster # 12	**Christian Kim**	Identifying Virulence Genes Associated with Emergent *Avibacterium paragallinarum* Isolates Associated with Acute Endocarditis in Chickens Using a Bioinformatic Approach
Poster # 13	**Melissa Jennings**	Biosynthesis of Base J
Poster # 14	**Megha Kalia**	Mechanism of Developmental Regulation of Base J Synthesis in *Trypanosoma brucei*
Poster # 15	**Brian Windle**	Characterization of the Inositol Hexakisphosphate Kinase (IP6K) of *Trypanosoma brucei*
Poster # 16	**Stacey Ikebudu**	Upregulation of Transferrin Receptor in *Trypanosoma brucei*
Poster # 17	**Bryan Aguanta**	Subcellular Localization of a Regulator of Transferrin Endocytosis in *Trypanosoma brucei*
Poster # 18	**Nathan Howell**	Apicoplast Function in *Plasmodium falciparum*
Poster # 19	**Brandon Sims**	The Role of the Chaperone-Protein Interactions in Driving Protein Trafficking in the Malaria Parasite
Poster # 20	**Omar Martinez-Uribe**	Effects of Tempol, a Superoxide Dismutase Mimetic, in Alleviating *Plasmodium chabaudi* Oxidative Stress during Pregnancy
Poster # 21	**Zil Ali**	Effect of Tumor Necrosis Factor on Placental Malaria in B6 and TNF Receptor Knockout Mice
Poster # 22	**Ha Truong**	The Effects of TNFR1 and TNFR2 on Low Birth Weight as Seen in Malaria-Infected Mice Models
Poster # 23	**Kerryn Roome**	Fetal Outcome of Pregnant C57BL/6 Mice Infected Late Pregnancy with 10^3 *Plasmodium chabaudi chabaudi* AS
Poster # 24	**Caleb Studstill**	Cryptosporidiosis: New Methods for Combating an Important Disease
Poster # 25	**Jennifer Hardister**	Localization of Rv3351c Protein in *Mycobacterium smegmatis* and BCG
Poster # 26	**Ashitha Rajeurs**	Surveying *Mycobacterium tuberculosis* Gene Function by Complementation

Poster # 27	**Jaclyn Speer**	Development of an Improved Tuberculosis Vaccine
Poster # 28	**Preston Samowitz**	Evaluation of Novel Antiviral Drug NSC95397 for Treatment of Swine Influenza Infections in Pig Cells
Poster # 29	**Michael Cheng**	*S. cerevisiae* as a Model System for the Oligomerization and Aggregation of Aβ Peptides using Cup1p as a Reporter
Poster # 30	**Jesse Hu**	Design of Novel Reporters for Monitoring CaaX Proteolysis
Poster # 31	**Colby Samuelson-Ruiz**	Functional Consequences of Different CAAX Motifs
Poster # 32	**Sarah Evans**	Effect of O-GlcNAc Expression on Cancer Stem Cells and the Role of LGR6
Poster # 33	**Anish Narayanan**	Analysis of Cancer Mutations in Protein Kinases using Semantic Web Technologies
Poster # 34	**Samuel Kennedy**	Nano Formulation of Platin-A and Associated Inflammation
Poster # 35	**Nivita Sharma**	Formation of Mitochondria-Targeted Blood Brain Barrier Penetrating Biodegradable Nanoparticles for Stroke Treatment
Poster # 36	**Sheela Sheth**	Role of Glypican-1 in Prostate Cancer Cell Growth
Poster # 37	**Maria Orlando**	Analysis of the Effects of High-Fat and Low-Fat Diets on Blood Lipid Profiles
Poster # 38	**Mugdha Joshi**	Role of RGS10 in Regulating Neuroinflammation in Microglia
Poster # 39	**Seema Mustafa**	Carbohydrate T cell Recognition and Presentation
Poster # 40	**Hammad Khalid**	O-Linked Glycosylation Patterns at the Interface of Cervical Mucins and HIV Infection
Poster # 41	**Leah Caplan**	Genetic Interactions between Pigmentation Pathways and Protein Glycosylation
Poster # 42	**Rachel Vecchione**	Analysis of Heparan Sulfate Fragments by NMR Spectroscopy
Poster # 43	**Anoosh Bahraini**	Locating a Suppressor Gene for the LF4 Protein

Poster # 44	**Pei-Ying Chang**	Ultrastructural Change in the Mitochondria of *Euglena gracilis* Grown in Progressively Anaerobic Conditions
Poster # 45	**Jeffery Lanier**	Identification of the Mechanism for Ciliary Gliding in Heterotrophic Euglenids
Poster # 46	**Spencer Robinson**	Regulation of Mitochondrial Dynamics in *C. elegans*
Poster # 47	**Linda Egbosiuba**	Purification of Endopolygalacturonase from *Aspergillus niger*
Poster # 48	**Heather Steckenrider**	The Effects of a Fucosyltransferase 3 (FUT3) Gene Knockout in *Arabidopsis thaliana*
Poster # 49	**Fatai Olorunsola**	Investigating the Cell Walls of *Arabidopsis thaliana* Organs using Screenings with Glycan-directed Monoclonal Antibodies and Electron Microscopy
Poster # 50	**Chederli Belongilot**	Investigating Regulation of Germline Stem Cell Division Frequency in *Drosophila melanogaster*
Poster # 51	**Kip Lacy**	Factors Influencing Gut Microbial Community Structure in Mosquitoes
Poster # 52	**Maha Khan**	The Impact of Sugar during Larval Development on Growth Rate, Energy Stores, and Behavior
Poster # 53	**Kathryn Clark**	Introgression of a *Wolbachia* Infection into a Non-Native Host
Poster # 54	**Randall English**	Male Mate Choice between Sympatric and Allopatric Populations of *Drosophila subquinaria* and *Drosophila recens*
Poster # 55	**Sarah Cunningham**	Quantitative Modeling of Circadian Rhythms
Poster # 56	**Romik Srivastava**	Retinal Development with IFT122
Poster # 57	**Kaley Desher**	Stresses Induce Alternate Growth Phenotype in *K. lactis* Yeast Cells
Poster # 58	**Patrick Griffin**	Natural Epigenetic Variation of SVP Results in Acceleration of the Floral Transition in *Arabidopsis thaliana*
Poster # 59	**Kitra Cates**	In-Vitro DNA-Protein Interaction Analyses of *Glycine max* Transcription Factors

Poster # 60	**Amy Hodges**	The Role of Kinesins in Meiotic Spindle Development in Zea Mays
Poster # 61	**Alison McWhorter Anderson**	Examination of Localization of *Mycoplasma pneumoniae* in relation to Tethered Mucins MUC1 and MUC4
Poster # 62	**Chetan Hebbale**	An Overexpression Screen to Determine How *Legionella pneumophila* Effector Protein LegC7 Disrupts Class C Tethering Complex Formation
Poster # 63	**Stephanie Duff**	The Effect of Yopt2 and Ssae Proteins in Wasp Development of Aphids
Poster # 64	**Scott Schaffer**	Understanding the Role of *Helicobacter pylori acxABC* in an *Escherichia coli* Model System
Poster # 65	**Selin Odman**	Transcriptional Interference and Regulation of the Hyb Hydrogenase Operon of *Salmonella*
Poster # 66	**Anquilla Deleveaux**	Analysis of the Physiological Role of a Bacterial RNA Repair System in *Salmonella*
Poster # 67	**Justin Kimsey**	A Synthetic Lethal Mutant Screen in *Salmonella* Typhimurium to Identify Genes whose Products Cooperate with RNA Ligase, RtcB, in RNA Repair
Poster # 68	**Leah Brown**	Lignin-Modifying Enzymes in Termite Digestive Tract as Potential Biological Pretreatment Component in Cellulosic Ethanol Production
Poster # 69	**Vedika Rajasekaran**	Validation of CRISPR/Cas9 for Genome Editing of Fktn in C2C12 Mouse Myoblast Cell Lines
Poster # 70	**Noreen Syed**	Assembly of a Dual-Selection Cassette for Gene-Specific Targeting by CRISPR/Cas9 to Recapitulate Dystroglycanopathies
Poster # 71	**Claudia Alvarado**	Structural Studies of Non-Coding RNAs
Poster # 72	**Hanna Nune**	Cloning and Constructing of a Complete RNA Polymerase from *Acinetobacter*
Poster # 73	**Paige Lane**	Drug Discovery and Structural Studies of an Essential Transcriptional Regulator, ACIAD0746
Poster # 74	**Kathryn Moore**	Cloning, Expression and Purification of MexT and AmpR from *Pseudomonas aeruginosa*

Poster # 75	**Peter Liaw**	Design of a 1,5-Substituted Triazolyl-Bridged Peptide to Inhibit EGFR Activation
Poster # 76	**Sterling Tran**	The Src Homology 3 Binding Domain is required for Lysophosphatidic Acid 3 Receptor-Mediated Cellular Viability in Melanoma Cells
Poster # 77	**Ian Dunne**	Use of Pre-Pen Skin Testing as an Antimicrobial Stewardship Initiative in a Not-for-Profit Community Health System
Poster # 78	**Robert Barnes**	Engineering *E. coli* Strains for the Increased Production of Glucosylated Organic Compounds
Poster # 79	**Charles Van Brackle**	Using Model-Based Analysis to Develop a More Robust Measure of Flow-Mediated Dilation
Poster # 80	**Kathryn Youngblood**	Estuarine Flow Rates in Coastal Georgia
Poster # 81	**Bhaskar Lokanathan**	Electronic and Photonic Modeling of GaN/InGaN Multiple Quantum Well Light Emitting Diodes
Poster # 82	**Grace Power**	Controlling Contamination of Algal Grazers Using Nitrogen Sources
Poster # 83	**Emily Wall**	Using Artificial Neural Networks to Predict Solar Radiation in Georgia
Poster # 84	**Thomas McBrearty, Daniel Sanchez, Andrew Angoyar, Carson Aft**	Algorithmic Forecasting through Big Data Analytics
Poster # 85	**Andrew Kane, Samantha Cao**	A New Analysis Strategy for Designs with Complex Aliasing
Poster # 86	**Zack Stokes**	Design and Analysis of Reactive Red Dye 120 Absorption by Nanocellulose Gel
Poster # 87	**Nolan Williamson**	Simultaneous Vibration Isolation and Energy Harvesting
Poster # 88	**Bryan Grommersch**	Carbon Encapsulated and Magnesiothermically Reduced Diatoms as a Lithium-Ion Battery Anode
Poster # 89	**Haley Daniel**	Energy Systems Module
Poster # 90	**Mehreen Sultana**	Capabilities of Detecting Atmospheric Cosmic Ray Induced Muon Showers by the NOvA Far Detector

Poster # 91	**Zachary Chilton**	Automated Stellar Classification
Poster # 92	**James White**	The Relationship between CH, CO, and Dust in MBM 12
Poster # 93	**John Dupuy**	Atomic Hydrogen Sticking on Amorphous Water-Ice
Poster # 94	**Elizabeth McMillan**	The Photodissociation of SH+ in the Interstellar Medium
Poster # 95	**Katherine Zarada**	Time to Extinction in Deteriorating Environments
Poster # 96	**Mary Baxter**	Phylogenetic Investigation of Metal Hyperaccumulation Evolution in Wild Sunflowers
Poster # 97	**Allison Koch**	Clearing Natural Forest Lowers Decomposition Rates and Results in Less Diverse Macrofauna and Mesofauna Communities
Poster # 98	**Stuart Sims**	Will Butterfly Gardens Take Off? Butterfly Dynamics and Recruitment in Response to Planted Gardens
Poster # 99	**Ryan Chitwood**	Assessing the Effects of Different Types of Parental Care on Nestling Survival in a Migratory Songbird
Poster # 100	**Tabitha Phillips**	Analyzing Persistent Organic Pollutants in the Tissue of Stranded *Tursiops truncatus* along the Coast of Georgia, USA: Effects of State of Decomposition and Stranding Location
Poster # 101	**Jack Owen**	Do Non-Native Apple Snails Feed Preferentially on Non-Native Aquatic Plants in Lake Seminole, Georgia?
Poster # 102	**Timothy Montgomery**	*Gracilaria vermiculophylla's* Impacts on Herbivory in Georgia's Coastal Ecosystems
Poster # 103	**Elizabeth Dyer**	Evaluating the Climatic and Hydrologic Triggers for the Onset of Harmful Algal Blooms in Inland Water Bodies
Poster # 104	**Malcolm Barnard**	Utilization of *Spirogyra grevilleana* as a Method of Algal Filtration for Reduction of Limnetic Nutrient and *Escherichia coli* Levels
Poster # 105	**Madison Hamilton**	Multi-Walled Carbon Nanotubes Alter the Acute Toxicity of Diclofenac to *Ceriodaphnia dubia* in Sediment: Water Exposures

Poster # 106	**Meryom Pattillo**	Investigating Invertebrate Utilization of Bryophytes in a Mid-Order Piedmont River
Poster # 107	**Sam Santoso**	Stemflow as a Contributing Source to Early Runoff
Poster # 108	**Selena Roth**	Investigating the Effects of Removing Genes for DHPS Degradation in *Ruegeria pomeroyi* DSS-3
Poster # 109	**Rahul Shah**	Mapping the Genetic Basis of Leaf Physical and Chemical Defenses in Sunflower
Poster # 110	**Amna Jamshad**	The Genetic Basis of Leaf Phenolic Content in Cultivated Sunflowers
Poster # 111	**Erin Clark**	Mapping the Genetic Basis of Floral Traits in Cultivated Sunflowers
Poster # 112	**Mavis Wolf**	Nutrient Relations of a Sexually Dimorphic Plant Species
Poster # 113	**Julian Gendreau**	GATA Transcription Factors Substituting HANABA TARANU in *Arabidopsis* Embryo Development
Poster # 114	**Thomas Gottilla**	Understanding the Mating Systems of the Fungi Causing Gummy Stem Blight of Cucurbits
Poster # 115	**Sungwhan Park**	Tea Polyphenols Inhibit Activity of Pancreatic Lipase
Poster # 116	**Belema Abere**	Effect of Carbohydrate and Organic Acids on Anti-*Salmonella* Activity of Cecal Cultures from Broiler Chickens
Poster # 117	**Maddison Wenzel**	Antioxidant Potential of Anthocyanins in Micronized Tart Cherry Puree
Poster # 118	**Mark Zenoble**	Analysis of Cortex and Pith Size Contribution to Fruit Size in Different Apple Cultivars
Poster # 119	**Courtney Alvis**	Factors Influencing Folate Status in Hispanic Women
Poster # 120	**Meagan Patterson**	Folic Acid Knowledge and Use among Participants of a Community-Based Intervention Study in Pregnant Women
Poster # 121	**Randi Goldstein**	Effect of Feeding Method (Breastfeeding vs. Formula) on Postpartum Weight Retention

Poster # 122	**Mallory Osborne, Kaitlyn Barrow, Selena Soviravong, Kayla Patel, Rosie White, Katelynn Porto, Noopur Luthra**	Investigating Macular Pigment Optical Density in Pregnant Mothers during Prenatal and Postnatal Stages
Poster # 123	**Sarah Dawson**	The Associations between Visceral Fat and Appendicular Bone Geometry in Healthy Prepubertal Boys and Girls
Poster # 124	**Jordan Sylvester**	The Relationships between Dietary Protein Intakes and Cortical Bone in Prepubertal Black and White Boys and Girls
Poster # 125	**Derek Coger**	The Relationship between Insulin Resistance and Distal Radius Cortical Bone Geometry
Poster # 126	**Elizabeth Harris**	Genetic Determination of Serum Growth Differentiation Factor 15 throughout Lifespan
Poster # 127	**Erica Coe**	Csmd1—a Novel Candidate Gene Related to Kidney Disease
Poster # 128	**Sarah Yoo**	Influence of Genetic Background on Anthocyanin-Mediated Antioxidant Mechanisms
Poster # 129	**Laura Eckhardt**	Freggie's Green Machine: The Development of an Entertainment Education Nutrition Intervention for Low-Income Preschool Children
Poster # 130	**Andrew Peake**	Do You Know Why 6 - - 2 Is the Same as 6 + 2?
Poster # 131	**Justin Dooly, Darrian Bailey**	Understanding Elementary Reading Fluency and Reading Comprehension
Poster # 132	**Lisa Savchenko**	MindPlay Virtual Reading Coach
Poster # 133	**Jessy Whitenton**	An Examination of Two Different Instructional Approaches for Teaching Preservice Teachers Common Phoneme-Grapheme Relations
Poster # 134	**Susan Oh**	Efficacy and Effectiveness Study of Instructional Conditions When Using IRIS Modules in Teacher Preparation
Poster # 135	**Jane Whatley**	Identifying Leadership Qualities of Classroom Teachers for the Purpose of Guiding Pre-Service Teachers

Poster # 136	**Allison Fialkowski**	Evaluating Pre-Medical Students' Experience with/Understanding of Autism Spectrum Disorders
Poster # 137	**Charlotte Goldman, Kelsie Flanigan, Tyler Stollman**	Pre-Camp Characteristics Predicting Camp Outcomes for Children with Tourette Syndrome
Poster # 138	**Zoheb Sulaiman**	Investigating Student Satisfaction and Social Ties in a Biology Research Network
Poster # 139	**Ananya Moorthy**	Exploring Evolution in the Classroom: Developing a Hands-On Activity Using *Mimulus guttatus*
Poster # 140	**Alexander Ashkeboussi**	Vector Field Augmentation - Augmented Reality and Learning
Poster # 141	**Stephanie Kors**	Child Neglect, Depressive Symptoms, and Substance Use among Children and Adolescents Reported to Child Protective Services
Poster # 142	**Jessica Giannotti, Elizabeth Tiarsmith**	Parenting Intervention Targeting Emotion Communication: Characteristics of Completers and Non-Completers
Poster # 143	**Rebecca Lanier**	Worried, Concerned, and Untroubled: Patterns of Adolescent Worry
Poster # 144	**Emily Maloney**	The Relationship between Adverse Child Experiences, Family Needs, and Child Outcomes
Poster # 145	**Clayton Cowart**	Factors Associated with HPV Diagnosis and Perceived Risk for Cervical Cancer among Unmarried, Sexually Active College Student Females
Poster # 146	**Stefania Barzeva**	Invalid Test Performance during ADHD Evaluations of College Students
Poster # 147	**Carley Borrelli**	Characterizing the College Diet
Poster # 148	**Jillian Maloney, Cara Smith, Mackin D'Amico**	Perception of Student-Athletes on UGA's Campus
Poster # 149	**Bryant Anthony**	How Quality of Parenting Affects the Emotions and Attitudes about Hooking Up
Poster # 150	**Margaret Sparks**	Anti-Binge Drinking Public Health Campaigns: Their Effectiveness in Targeting Female College Students

Poster # 151	**Emily Edwards**	How Can We Create a Sustainable Campus? An Assessment of Students' Awareness and Attitudes toward Food Waste and Sustainability in On-Campus Dining Halls
Poster # 152	**Mara Steine**	The Effectiveness of Counseling and Psychiatric Services at the University of Georgia: An Empirical Investigation
Poster # 153	**Seyi Amosu**	Perceived Social Consequences of Seeking Psychological Help
Poster # 154	**John Williams**	Physical Activity Effects on Social Physique Anxiety
Poster # 155	**Jayme Astarita**	Effects of Physical Activity and Alcohol Consumption on Metabolic Syndrome
Poster # 156	**Sahar Sabet**	Can People with Low Self-Esteem Directly Self-Enhance?
Poster # 157	**Kelsie Walker**	The Influence of Appeal on Overconsumption
Poster # 158	**Jacob Young**	Seeing Danger?: How Weapon Priming Changes Beliefs that the World is Threatening
Poster # 159	**Eric Kure**	Speed Effects on Angular Displacement of Back during Gait
Poster # 160	**Katherine Hsieh**	Ankle Joint Laxity in Those with Chronic Ankle Instability
Poster # 161	**Caroline Ray**	Effect of Music on People with Developmental Disabilities during Physical Activity
Poster # 162	**Alyssa Ford, Alia Church**	Metabolism and Blood Flow in 4 Regions of the Gastrocnemius
Poster # 163	**Kelly-ann Peters, Joanna Szymonik**	The Impacts of Iron Deficiency Anemia on Mitochondrial Capacity
Poster # 164	**Zoe Yurchuck, Rebecca Baltenberger**	Multiple Muscle Stimulation to Enhance Health
Poster # 165	**Meagan Marshburn**	Impact of Intermittent Glucose Oscillations on Vascular Endothelial Cell Inflammation
Poster # 166	**Mitra Kumareswaran**	Changes in Neural Activation Following Daily Practice of Saccade Tasks

Poster # 167	**Joel Owen**	Vocal Repertoire and Call Structure of Red-and-Green Macaws (*Ara chloropterus*)
Poster # 168	**Thomas Johnston**	Social Dynamics Affect Learning of a Technical Skill in Infant Capuchins
Poster # 169	**Margaret Bergmann, Rhianna Baldree, Kristen Smith**	Nut-Cracking Skill and Efficacy in Wild Capuchin Monkeys
Poster # 170	**Steven Pugh, Mckenzie Benson, Rebecca Gaines, Mary Catherine Kelley**	The Impact of Rest and Game Location on NBA Team Performance
Poster # 171	**Parker Thomas, Rebekah Trotti, Christopher Morgan, Kyle Ledesma**	The Effects of Travel on Team-Based Performance
Poster # 172	**Marie Rapoport**	Convergent and Divergent Validity of the WISDM-68
Poster # 173	**Joshua Lukemire**	Use of a Breath-Hold Paradigm to Remove FMRI Variability due to Vascular Factors in Older Adults
Poster # 174	**Zach Borg, Benjamin Listyg**	Examining Entitlement: How Age and Length of Time in a Position are related to a Sense of Entitlement in CEOs
Poster # 175	**Amber Davidson, Kelsey Hamilton**	The Role of Leader Experience on Employee Turnover
Poster # 176	**Juhi Varshney**	Gender as a Moderator of Work-Family Conflict Coping Strategies
Poster # 177	**Jessica Parks**	UGA Employee-Benefit and Retirement Preparedness
Poster # 178	**Sapna Mistry**	Promoting Products, Cutting Costs: Advertising Industry Strategies and Tactics in the United States, 1973-1976
Poster # 179	**Chelsea Harvey**	*The Motion Picture Story Magazine*: Early Niche Markets, "Fan Communities," and Multi-Platform Transmedia Storytelling in the 20th Century
Poster # 180	**Sophie Frankham-Smith**	Image Effects on Young Women's Perceptions and Engagement in Healthful Behaviors

Poster # 181	**Jasmine Clayton**	Potential Health Risks of Teen Online Behaviors
Poster # 182	**Minh Nguyen**	A #whitewashed Landscape: Internalized Racism, Linguistic Discrimination, and the Policing of Ethnic Identity on Twitter
Poster # 183	**Jose Leandro**	Storytelling for Social Justice: Fostering Activism through Collective Memory Work
Poster # 184	**Alexandra Snipes**	A De-Demonized Future for the Radical Right in France? Media Framing of Marine Le Pen
Poster # 185	**Benjamin Leigh**	The Impact of Foreign Aid on Democracy in Africa
Poster # 186	**Jordan McKissick**	Procedural Polarization: Examining Changes in the Construction of the Roll Call Voting Record, 1877-2012
Poster # 187	**Cameron Niakan**	The Impact of Runoffs: Electoral Reform and Duvergerian Factionalism in Metropolitan Atlanta
Poster # 188	**Mary Elizabeth Nuttall**	The Influence of Structural Factors on Mental Health of Young Women in Post-Conflict Liberia
Poster # 189	**Taylor Jordan**	Structural and Cultural Factors Influencing HIV Testing and Risky Sexual Behaviors in Young Liberian Women
Poster # 190	**Sarah Lane**	Syrian Civil War Victims Receiving Medical Care in Israel: Humanity in a War Torn Region
Poster # 191	**Jacqueline DiStefano**	The Refugee Health Care Process: Israel and Syria
Poster # 192	**Danielle Augustine**	Filipinos' Perceptions of the Immigration Journey to the United States
Poster # 193	**Travis Jones**	Regional Sourcing of Obsidian Artifacts through Chemical Analysis (pXRF): A Case Study in Western Canada

Program: Tuesday, March, 31, 2015

Oral Session V: 9:30-10:45 a.m.
Athena Breakout Rooms A, B, C, D, G, H, I, J

Room A	**Jiacheng Chen**	Paper Art in Expanded Forms
	Lazarus Roth	Reflections on the City: Urban Space and Ideology
	Connor Hamm	Thomas Cole's Architectonic America
Room B	**Carson Aft**	The Impact of Monsoon Severity on Southeast Asian Bond Markets
	Kirstie Hostetter	Measuring Willingness to Pay for Sea Level Rise in Coastal Communities of Georgia
	Blake Mathews	Financial Stress among College Students
	Thomas McBrearty	The Impact of Severe Weather Events on Market Returns
Room C	**Mehreen Sultana**	Capabilities of Detecting Atmospheric Cosmic Ray Induced Muon Showers by the NOvA Far Detector
	Lewis Schendowich	Microwave-Assisted and Benzotriazole-Mediated Synthesis of 1,2,4-Triazole-Based Peptidomimetics
	Logan Morrison	High Dynamic Range Imaging For X-ray Image Acquisition
	Lauren Tolbert	Pretreatment of Cellulose Powder and Nanocellulose Gel Production
Room D	**William Robinson**	Resolving Offensive and Defensive Realism
	Matthew Oldham	Evaluating the United States Counterterrorism Strategy Regarding Violent Extremism
	Thomas Trahan	Fostering Peaceful Nuclear Infrastructure Sharing in Southeast Asia
	Paola Rivera	State-Driven Development Initiatives under Kenya's Vision 2030 and Perceptions by Project-Affected Persons in the Northern Rangelands
Room G	**Babajide Oluwadare**	Analysis of P1 Function in *Mycoplasma pneumoniae* Adherence and Gliding
	Tyler Simmonds	The Complete Genome of *Diachasmimorpha longicaudata* rhabdovirus: A Symbiont of Parasitoid Wasps

	Alexander Hedaya	Superparasitism as a Strategy to Overcome Resistance in an Aphid-Parasitoid Interaction
	Tiffany Jenkinson	Tissue Factor-Altered Mice Show Upregulated Pro-Inflammatory Cytokine Gene Expression in Experimental Cerebral Malaria
Room H	**Allison Fialkowski**	Evaluating Pre-Medical Students' Experience with/Understanding of Autism Spectrum Disorders
	Zoheb Sulaiman	Investigating Student Satisfaction and Social Ties in a Biology Research Network
	Mitra Kumareswaran	Addressing the Lack of Access to Public Assistance for Adults with Autism
	Jesse Cann	A Look at the Relevance of Sociology Concepts, Theories, and Methods through the Lens of Health Professionals
Room I	**Amanda Seamon**	Incidence of Anesthesia-Related Fatality in Birds
	Kayla Hargrove	Necessity of Universal Pre-Operative Blood Work in Otherwise Healthy Canines
	Alyssa Wuellner, Kayla Hargrove	Prevalence of Pain in Dogs with Cancer
	Jordyn Whitfield	Quantifying Replicating and Latent CFPHV in Symptomatic and Asymptomatic Infected Turtles
Room J	**Elizabeth Ridgeway**	Nostalgia Inverted: The Golden Age Motif in Strepsiades' Pre-Dramatic History
	Trace Calloway	*The Kalevala* as Tolkien's Inspiration
	Meredith Paker	Theatrical Imagery in Nabokov's *Invitation to a Beheading*

Oral Session VI: 11:00 a.m.-12:15 p.m.
Athena Breakout Rooms A, B, C, D, G

Room A	**Pomi Yun**	The Effects of Preferred Listening on Anxiety, Nausea, and Claustrophobia of Cancer Patients during Radiation Treatment
	Caroline Ray	Effect of Music on People with Developmental Disabilities during Physical Activity

	Taj Shorter	Asymmetric Functional Movement Screen Scores and Injury Occurrence in Collegiate Female Athletes
Room B	**Giselle Fernandez**	Insects in Shakespeare's Works
	Hannah Klevesahl	*Oklahoma!*: The Building of the Dream Ballet in Two Different Mediums
	Jennifer Milley	Practical Grant Writing
Room C	**Laura Pontari**	Closing the Achievement Gap: Elementary Second Language Education in Philadelphia Schools
	Seyi Amosu	Overview of Interdisciplinary Clinics and Community Agencies
	Carver Goodhue	Policy Solutions to Cycles of Poverty and Food Insecurity in Athens, GA
	Bailey Palmer, Mallika Madhusudan	Reducing the Disparity between Federal Sentencing of Crack and Powder Cocaine
Room D	**Joy Maduka**	Type of Infant Feeding, Weight, and Body Composition Changes in Early Infancy
	Mallory Little	Disruption of Signaling at Oocyte MTOCs Leads to Meiotic Division Errors and Embryonic Loss
	Matthew Weber	High-Fat Diet Consumption and Behavioral Dysfunction: What Are the Roles of Maternal vs. Post-Weaning High-Fat Intakes?
	Meredith Paker	The Welfare Effects of Off-Label Prescriptions
Room G	**Charles Bond**	Review of the Potential for Coproducing Bioplastics and Biofuels from the *Spirulina*
	Rachel Usher	Response of Stream Biofilms across an Urbanization Gradient

Oral Session VII: 12:30-1:45 p.m.
Athena Breakout Rooms A, B, C, D

Room A	**Erin Hollander**	Fighting Pain with Pills: Overprescribing and the Opioid Addiction Epidemic
	Amber Davidson	Exploring Resistance to Change through Concern for Diversity

	Davis Parker	Rolling the Dice: The Economic Impact of Casinos
	Anthony Reyna	College Students' Credit Experience and Behavior
Room B	**Kristen Farley**	*Escherichia coli* Uses an IlvA/TrpD-Dependent Mechanism for Thiamine Synthesis
	Leah Brown	Lignin-Modifying Enzymes in Termite Digestive Tract as Potential Biological Pretreatment Component in Cellulosic Ethanol Production
	Fahim Thawer	Role of tRNA Nucleotidyl Transferase and 3' Exonucleases in the Biogenesis of Functional tRNAs in *Escherichia coli*
	Amy Webster	Molecular and Genetic Analysis of the Ab10 Meiotic Drive Haplotype in Maize and Teosinte
Room C	**Morgan Walker**	The Prevalence of Hemoparasites in Seabird Populations on Middleton Island, Alaska
	Alyssa Wuellner	The Severity of Cases Admitted into a Small Animal Hospital and the Phase of the Full Moon
	Emily Vermillion	The Mini-FLOTAC: An Analysis of a Novel Fecal Egg Counting Technique
	Shibo Xu	Effects of Bisphenol A on Macrophages when Controlled with Genistein
Room D	**Sarah Perry**	Differential Consumption of *Eurypanopeus depressus* When Infected by *Loxothylacus panopaei*
	David Stoker	Leaf Litter Quality, Not Local Adaptation of Macroinvertebrate Communities, Drives Leaf Decomposition in Forested Headwater Streams
	Kaleigh Davis	Sponge Colonization across Varying Salinity Regimes

Oral Session VIII: 2:00-3:15 p.m.
Athena Breakout Rooms A, B, C, D, G, H

Room A	**Tifara Brown**	Something to Pass Down: Black Family Stories and the Legacy of Slavery and Jim Crow
	Lucille Reynolds	The Evolution of Quail Hunting Attire in South Georgia and Northern Florida

	Laura Nelson	"Please Excuse Me as I Am in Need:" Bondage and Freedom in Civil War-Era Athens
	Connor Hamm	Towards a Parametric Architecture?
Room B	**Kaitlyn Beck**	The Figure of Constantine the Great in Cynewulf's "Elene"
	Kelsey Lowrey	The Presentation of Victimhood and Virtue in the Holocaust-Focused Works of George Tabori
	Manisha Banga	On Sexuality in Female Ancient Greek Monsters
Room C	**Jason Moraczewski**	Assessment of Proteomic and Glycomic Profiling of Medaka (*Oryzias latipes*) to further the Understanding of the Physiological Response to Low Level Ionizing Radiation
	Erin Hollander	Cas Protein Function in Adaptation of *Streptococcus thermophilus* Type II-A CRISPR-Cas System
	Viral Patel	Expression and Purification of PRMT1 and Mutant Variants
	Justin Dumrongkulraksa	Identification of CRISPR Adaptation Complexes and Associated Nucleic Acids in *Pyrococcus furiosus*
Room D	**Stefania Barzeva**	The Physiological Functioning of Children with Anxiety: A Review of the Literature
	Vanessa Aguilera	Preschoolers' Emotion Knowledge: Relationships to Parental Socialization and Child Behavior Problems
	Megan Kelley	The Effects of Prior Knowledge of Trial Type on Saccade Task Behavior
	Meredith Osborne	The Effects of Lutein and Zeaxanthin on Cognitive Function and Neural Efficiency in Older Adults with and without Cognitive Impairment
Room G	**Holly Boggs**	An Analysis of International Media Coverage of North Korean Nuclear Events
	Margaret Touchton	Truth & Testimony
	Rachel Surminsky	The Evolution of Presidential Unilateral Powers and Congressional Reaction Mechanisms

	Sarah Hedges	Women's Participation in Non-State Militaries Founded on a Secular or Religious Ideology: The Case of Chechnya and Dagestan, Hamas, The PKK
Room H	**Aneek James**	Embedded Bi-Directional FBG Curvature Sensor
	Frederick Hohman	3D Printing the Trefoil Knot and its Pages
	Jackson Hopper	Abundancy and Multiply Perfect Numbers

Oral Session IX: 3:30-4:45 p.m.
Athena Breakout Rooms A, B, C, D, G, H, I, J

Room A	**Kristin Henry**	Something Old, Something New? A Postfeminist Analysis of the Myth of the "Big Day"
	Aashka Dave	Participatory Media: Self-Image and Perception in Women
	Molly Dodd	Hollywood's Risqué Years: Female Body Exposure in Pre-Code Film
Room B	**Caroline Coleman**	Behavioral Testing for Cognitive Deficits in Traumatic Brain Injury Piglets
	Kathryn Sellman	Behavioral Testing on Piglets to Assess Cognitive Deficits of a Traumatic Brain Injury
	Courtney Haviland	Effectiveness in Curing Existing Intramammary Infections and Preventing New Cases in Bred Holstein Heifers
	Onyinyechi Ochiobi	Ryanodine Channel Protein in Insects: A Novel Pesticide Target
Room C	**Christopher Morgan, Kyle Ledesma, Rebekah Trotti, Parker Thomas**	The Effects of Travel on Team-Based Performance
	Mckenzie Benson, Steven Pugh, Rebecca Gaines, Mary Catherine Kelley	The Impact of Rest and Game Location on NBA Team Performance
	Madison Krieger	The Potential Protective Effects of Anthocyanins on Liver Insulin Signaling

	Shubam Sharma	Body Mass Index and Performance-Based Functional Independence in Older Adults
Room D	**Erin Todd**	American Film's Portrayal of CEOs: An Increase in Complex and Confusing Personalities from the 1930s
	Shelby Reilly, Adam Lowe	The Relationship between CEO Risk-Taking Behavior and Employee Attraction and Retention
	Dennis Hardigree, Alex Cole	Correlation between Narcissism and Turnover within the Workplace
Room G	**Catherine Klein**	Inefficiencies of Water Use in Animal Agriculture
	Shreya Ganeshan	Cutting Commercial Energy Costs in Atlanta – One LED Retrofit at a Time
	Mathieu Trunnell	Modeling a Baseline of Forest Energetics: A Method for the Evaluation of Sustainable Practices and Technologies
	Jonah Driggers	Cutting Carbon in the Empire State of the South: A Policy Proposition for Putting Georgia ahead of the Curve
Room H	**Tyler Daugherty**	Spintronics in π-Conjugated Semiconductors: Investigating MEHPPV OLED Magneto-Property Temperature Dependence
	John Stroud	Properties of the Monkey Saddle
	Timur Cetindag	Asteroseismological Age Dating Utilizing a Bayesian Monte-Carlo Search
	Michael Biddle	Continuing Investigation of Electronically Excited States in Indole: Transitioning from Gaseous to Condensed Phase Studies
Room I	**Megan Cannon**	Neural Correlates of Schizotypal Traits in Healthy Participants with High and Low Cognitive Control
	Megan Murphy	Neural White Matter Alterations in Schizophrenia
	Nathan Farr	The Effects of Ethinylestradiol and Levonorgestrel on the Central Nervous System and Behavior in Rats
	Kharine Jean	The Predictive Power of Self-Reported Computer Usage on Processing Speed and Reasoning Scores

Room J	**Yimeng Shi**	An Investigation of Anaerobic Methane Oxidation by Consortia of Methanotrophic Archaea and Bacterial Partners Using Process-Based Modeling
	Malcolm Barnard	Utilization of *Spirogyra grevilleana* as a Method of Algal Filtration for Reduction of Limnetic Nutrient and *Escherichia coli* Levels
	Jack Owen	Using Environmental DNA to Detect and Track Dispersal of the Island Apple Snail Invasion in Lake Seminole, Georgia
	Rachel Ehlinger	Technique of Soil Fractionation for AMS Radiocarbon Analyses

Effect of Carbohydrate and Organic Acids on Anti-*Salmonella* Activity of Cecal Cultures from Broiler Chickens

Belema Abere, CURO Research Assistant
Dr. Mark Harrison, Food Science & Technology, College of Agricultural & Environmental Sciences

This project will examine the ability of undefined cecal cultures from broiler chickens to metabolize glucose to produce substances that inhibit growth of the foodborne pathogen, *Salmonella* Typhimurium. Ceca will be collected from a local commercial poultry processing facility. Cecal cultures will be prepared by inoculating bacterial media with cecal contents and incubating the inoculated media. Test media will be prepared by supplementing a basal medium with various concentrations of glucose. Supplemented test media will be inoculated with 1) cecal culture 2) a nalidixic acid resistant strain of *Salmonella* Typhimurium, or 3) cecal culture and nalidixic acid resistant strain of *Salmonella* Typhimurium. Inoculated media will be incubated for 14 days and media will be sampled in 7 day intervals to enumerate total cecal bacteria and *Salmonella* Typhimurium. Findings from the study will provide information on substrates that can be used by cultures of probiotic bacteria to inhibit colonization of intestinal tract of poultry by *Salmonella* Typhimurium.

The Impact of Monsoon Severity on Southeast Asian Bond Markets

Carson Aft, CURO Research Assistant
Dr. Jeff Netter, Banking & Finance, Terry College of Business

Considering how essential the issuance of bonds can be to the functionality of governments, it is important to understand the deep relationship that they have with the exogenous. Beyond market conditions, clearly many things can have deep impacts. As markets become more quantified and global, it is possible to observe and isolate these external effects. It is from this, that the most natural question arises: How much difference does the weather make? It is obviously too ambitious to aim the microscope at the entire world, but specificity lends itself to clearer results. The more specific question becomes: Does monsoon severity impact local bond markets? This is the question to answer. The significance is that it helps form an understanding of how financial markets, a very abstract construction, interact with something as concrete as the weather. A better understanding leads to more accurate valuation of international bonds, which is important on both national and international scales. It is also appropriate to test whether different timescales impact how strongly the weather changes the markets. For the analysis of daily data, a GARCH model is implemented, looking at daily returns as the best quantifier of bond markets. As for monthly data, the better analysis takes place by observing realized volatility of bonds as a function of both weather deviations as well as recent market volatility. Preliminary data analysis as well as the literature review point in the direction of weather having a significant impact on bond markets in many Southeast Asian countries.

Subcellular Localization of a Regulator of Transferrin Endocytosis in *Trypanosoma brucei*

Bryan Aguanta
Dr. Kojo Mensa-Wilmot, Cellular Biology, Franklin College of Arts & Sciences

Human African Trypanosomiasis (HAT), also known as sleeping sickness, is a neglected disease endemic to rural communities in Sub-Saharan Africa, and is caused by the protozoan parasite *Trypanosoma brucei*. Because all current treatment methods for HAT are difficult to administer and carry a high risk of adverse reactions in patients, there is a need for the characterization of cellular signaling pathways within the parasite, as this may

highlight new targets for drug discovery efforts. *T. brucei* proliferates in the bloodstream of a mammalian host and takes up host transferrin as an essential source of iron via endocytosis. Preliminary findings suggest that the enzyme glycogen synthase kinase-3, beta isoform (GSK3β), is an essential regulator of transferrin endocytosis in *T. brucei*. However, its localization within the cell has yet to be defined. We hypothesize that GSK3β localizes to organelles in the trypanosome endocytic pathway, such as the endocytic vesicles and endosomes. To evaluate this hypothesis, we will use endogenous protein tagging constructs, followed by immunofluorescence assays, which will allow us to visualize the distribution of GSK3β in relation to proteins in known cellular structures. We will also use protein tags to identify other proteins with which GSK3β may interact. In doing this, my goal is to aid future drug discovery endeavors by defining the localization and protein interaction network of an important signal transduction component in the trypanosome.

Preschoolers' Emotion Knowledge: Relationships to Parental Socialization and Child Behavior Problems

Vanessa Aguilera
Dr. Anne Shaffer, Psychology, Franklin College of Arts & Sciences

Understanding causes of emotions is a crucial part of social development (Seidenfeld et al., 2014). Supportive parental responses to children's emotions predict better child emotional understanding (Denham et al., 1994). Poor emotion understanding, in turn, is associated with increased internalizing problems and emotion regulation difficulties in school-aged children (Fine et al., 2003; Hudson & Jacques, 2014). However, research has yet to evaluate relations of child emotion knowledge to parental emotion socialization and child emotional/behavioral problems among preschoolers. We hypothesize that supportive emotion parenting is positively correlated with emotion understanding, and in turn, that accurate emotion understanding is negatively associated with child emotional/behavioral problems. The sample includes 110 mother-child dyads with children ages 3-5. Emotional knowledge was measured via a puppet task (Denham, 1990), scoring accurate and inaccurate identified causes of various emotions. Mothers reported child internalizing and externalizing behaviors (CBCL; Achenbach & Rescorla, 2000) and their own emotion socialization practices (CCNES; Fabes et al., 1990). Preliminary analyses indicate that supportive parental responses to children's emotions were associated with increased accuracy in identifying causes of fearful (r=.23, p=.04) and angry (r=.25, p=.03) emotions. Greater child internalizing problems were associated with higher *inaccurate* causes of happy emotions (r=.24, p=.04) and lower *accurate* causes of sad emotions (r=-.27, p=.02). No significant relations were found between child externalizing problems and emotion knowledge. These findings suggest that emotion knowledge is salient for internalizing, but not externalizing, child problems. Further analyses will compare groups based on child enrollment in formal preschool and other socio-demographic variables.

Effect of Tumor Necrosis Factor on Placental Malaria in B6 and TNF Receptor Knockout Mice

Zil Ali
Dr. Julie Moore, Infectious Diseases, College of Veterinary Medicine

Malaria is a deadly infectious disease that kills over one million people per year, especially pregnant women and children. Placental malaria has been linked with poor pregnancy outcomes such as low birth weight, stillbirth, and abortion. Unfortunately, there is insufficient knowledge about malaria-associated unsuccessful pregnancies. We believe that a key player necessary for

understanding this is tumor necrosis factor (TNF), a pro-inflammatory cytokine. TNF stimulates cells through two surface receptors, TNFR1 and TNFR2. The effects of TNF through these receptors are cell death and cell survival, respectively. We hypothesize that mice lacking TNFR1 will be more likely to overcome a poor pregnancy compared to TNFR2 knockout and B6 (CF7BL/6) mice. TNFR2 knockout mice are expected to have more unsuccessful pregnancies. Each strain of mice will be divided into infected pregnant, infected not-pregnant and uninfected pregnant mice. The mice will be injected intravenously with 1000 *Plasmodium chabaudi* AS-infected red blood cells. The weight and anemia will be assessed at baseline (day 0). On different gestation days (day 9-12), the mice will be sacrificed and the uteroplacental unit and liver will be removed. Half of the organs will be flash frozen in liquid nitrogen and half will be fixed in formalin to be processed for histology. RNA and proteins will be isolated from tissues and markers of apoptosis, necroptosis, and autophagy will be assessed by PCR and western blot. This study is ongoing but we expect it to reveal insight into our understanding of the molecular mechanisms of malaria-associated poor pregnancy outcomes.

Structural Studies of Non-Coding RNAs

Claudia Alvarado, CURO Research Assistant
Dr. Cory Momany, Pharmaceutical & Biomedical Sciences, College of Pharmacy
Dr. Liming Cai, Computer Science, Franklin College of Arts & Sciences
Dr. Russell Malmberg, Plant Biology, Franklin College of Arts & Sciences

RNA plays a central role in many biological processes. RNA can be genetic information, catalyze reactions as ribozymes, or regulate expression of macromolecules. The number of non-coding RNAs (ncRNA) is currently unknown, and only a few ncRNA 3-D structures have been obtained. Our research goal is to optimize experimental methods so that we can produce ncRNAs in large scale, crystalize them, and determine their structures. Initial studies will focus on *E.coli* sRNA families, specifically: Spot-42, GcvB, and RyhB. Methods that will be evaluated include the use of *in vivo* expression of RNA molecules engineered inside tRNA anticodon loops, co-transcription of up- and down-stream ribozymes, the use of crystallization chaperones, and the use of *E. coli* strains with reduced RNAase activities. Assembly of the production systems requires that appropriate DNA segments encoding the RNA molecules be introduced into T7 promoters/terminators and ribozymes be created using PCR amplification. The pET28 vector has been modified to introduce BspQI sites for rapid, single step cloning of sRNA. *In vivo* expression calls for T7 components and the sRNA encoding DNA to be duplicated (up to 50 copies) in tandem into a vector. sRNA interactions with Hfq, an RNA binding protein, will be studied through construction of a vector to allow for over expression and purification of Hfq. The sequences encoding GcvB have been PCR amplified. Structures obtained from crystallography will be compared to those predicted by bioinformatics approaches.

Factors Influencing Folate Status in Hispanic Women

Courtney Alvis, CURO Research Assistant, CURO Graduation Distinction
Dr. Dorothy Hausman, Foods & Nutrition, College of Family & Consumer Sciences

Folate, a water-soluble B vitamin, is essential during pregnancy to support maternal physiological changes as well as fetal growth, organ differentiation, and cell division. There is an inverse relationship between low folate status in the periconceptual period and the likelihood of having a baby with neural tube defects (NTDs). To reduce this risk, folic acid fortification of flour has been mandatory in

the US since 1998. It is recommended women capable of becoming pregnant consume 400 μg of folic acid daily from supplements, fortified foods, or both while also consuming food folate from a varied diet. Despite these measures, Hispanic women have a lower folate status and increased risk for NTD affected pregnancies when compared to African American and Non-Hispanic White women. The primary goal of my research project is the characterization of potential nutrition-related factors that have a detrimental effect on folate status in Hispanic women of child bearing age based on published reports of dietary intake and blood folate levels. In addition, I will also be analyzing preliminary diet recall data from Hispanic, African American, and Non-Hispanic White women of child bearing age from an ongoing study being conducted by my research group. I anticipate the Hispanic women will consume fewer folic acid fortified foods and have a lower total folate intake as compared to the other race/ethnic groups. This would mean that further support is needed to improve the folate status of Hispanic women such as fortification of corn masa flour, a staple in most of their diets.

Overview of Interdisciplinary Clinics and Community Agencies

Seyi Amosu
Dr. J. Maria Bermudez, Child & Family Development, College of Family & Consumer Sciences

Interdisciplinary clinics are a form of community agency that aims to provide clients with services in several related fields in one convenient location. Although several theories exist highlighting the benefits of interdisciplinary work for clients and providers, not much research has been produced in the subject area. The goal of this study is to review the nature of interdisciplinary clinics and to specifically examine client characteristics from the interdisciplinary clinic at the University of Georgia. A random sample of closed case files from the ASPIRE Clinic, located at the University of Georgia, was used to collect demographic information about the client population. The demographic variables included age, gender, race/ethnicity, relationship status, number of children, highest level of education, employment status, annual income, and session fee. Results revealed that the predominant client profile was Anglo women with some college education, varied relationship statuses, and mostly employed full-time. Results of this study add to the growing body of literature about interdisciplinary clinics and who is utilizing such clinics. Suggestions for future research are offered, as well as suggestions for outreach strategies for increasing the utilization of interdisciplinary clinic services by diverse populations.

Perceived Social Consequences of Seeking Psychological Help

Seyi Amosu
Dr. Nathan Carter, Psychology, Franklin College of Arts & Sciences

The purpose of this study is to better understand attitudes towards seeking professional psychological help by examining the influence of perceived social consequences of seeking psychological help. A set of scales was developed to measure perceived social consequences (PSC) of seeking psychological help in regard to: a) friends; b) family; and c) acquaintances. We hypothesized that individuals with a high level of perceived negative consequences from their social groups would have negative beliefs about mental illnesses as well as a high level of stigma about seeking help personally. This in turn was expected to lead to low willingness to seek help as well as low intentions to seek counseling. Results from this study provide evidence that an individual's perceived social consequences related to acquaintances have

the most impact on his/her intentions to seek out and attend therapy, in the sample of college students. Suggestions for future research are offered, as well as recommendations for outreach aimed at combating the effects of social consequences on therapy attendance on college campuses.

How Quality of Parenting Affects the Emotions and Attitudes about Hooking Up

Bryant Anthony, CURO Graduation Distinction
Dr. Leslie Gordon Simons, Sociology, Franklin College of Arts & Sciences

Hooking up is a popular phenomenon on many American college campuses. College students are aware of the phenomenon and some undergraduate students actively engage in various activities that coincide with hooking up while others choose not to participate in the hook-up culture. Past research has found that hooking up is associated with an increased use of alcohol and other drugs as well as an increased risk of experiencing sexual coercion. Both of these behavioral outcomes are associated with risky sex. Few studies, however, have examined the emotional feelings and consequences of hooking up. This paper will focus on the association between hooking up and the positive and negative emotions after hooking up. Furthermore, this study will seek to find whether these feelings vary by gender or if family and individual factors, specifically quality of parenting and attachment style, alter a person's risky sexual behavior. It is reasonable to project that students who have a secure-based attachment will be less likely to hook up in adult romantic relationships in college than students who have an insecure-based attachment. It is also reasonable to project that of those college students who do hook up will report more positive feelings if they are male or have a secure-based attachment. The results collected in this study were collected through a sample of 965 students attending the University of Georgia in the fall of 2013.

Vector Field Augmentation - Augmented Reality and Learning

Alexander Ashkeboussi, CURO Research Assistant
Dr. Kyle Johnsen, College of Engineering

Science and engineering education involves the teaching of abstract concepts of physical sciences. Courses such as 'Fluid Mechanics' rely on traditional deductive teaching methods that often result in students being unable to recall or understand these unintuitive ideas. The emergence of augmented reality and the ubiquity of high performing mobile platforms allows the development of guided, interactive learning applications. The purpose of this research is to first develop an interactive vector-field augmented system that allows 'Fluid Mechanics' students to learn principles of hydrostatics. Then, the relative understanding of the lessons by students using this inductive learning system compared to a control group will illustrate the value of augmented reality as a tool in physical sciences course education.

Effects of Physical Activity and Alcohol Consumption on Metabolic Syndrome

Jayme Astarita, CURO Research Assistant
Dr. Ellen Evans, Kinesiology, College of Education

The transition to college marks a period when many unhealthy behaviors can be developed in young adults. Unfortunately, only 22 % of college students accumulate the recommended amount of physical activity (PA). Low levels of physical activity in these emerging adults may influence health outcomes later in life. In addition to too little involvement in PA, 18-24 year olds have the highest rates of alcohol use among US adults. Metabolic Syndrome (MetS) is a clustering of

cardiovascular disease risk factors (hypertension, dyslipidemia, elevated waist circumference, impaired fasting glucose) that may be influenced by alcohol-related behaviors and PA. The prevalence of MetS for the adult population is estimated to be about 20 to 25% and continues to rise. Due to the high prevalence of alcohol consumption and reported low levels of PA in college students, the primary aims of this study are to examine the independent and interactive associations of alcohol and PA on MetS risk. Study participants (aged 18-24 yrs.) were enrolled at the University of Georgia. PA was measured objectively using the NL-1000 accelerometer (minimum 4 days, >10 hours/day). Blood markers (glucose, triglycerides, HDL) were measured using standard clinical practice following a 12-hour fast. Alcohol consumption was measured as the number of standard drinks containing alcohol consumed in the past 7 days. It is anticipated that greater alcohol consumption will be associated with an unfavorable MetS risk profile, and PA will be inversely associated with MetS risk.

Filipinos' Perceptions of the Immigration Journey to the United States

Danielle Augustine, CURO Research Assistant
Dr. Denise Clark Lewis, Child & Family Development, College of Family & Consumer Sciences

This poster addresses the influence of migration on transnational Filipino family relations. It highlights decisions influencing migration and migration experiences, perceptions, challenges, and struggles of Filipino immigrants. Data were collected through semi-structured, in-depth interviews in both Tagalog and English languages with nine Filipino immigrants. One member of the research team is fluent in both languages; all interviews conducted in Tagalog were translated into English. Data analysis was completed using ATLAS.ti 7 Qualitative Data Analysis software. Two members of the research team performed independent analyses, met to reach consensus on codes, and co-developed a codebook. Using ecological systems and life course theoretical lenses, researchers identified four major themes regarding Filipino immigrants' reasons for migrating to the United States: (1) career opportunities, (2) educational opportunities, (3) political unrest, and (4) family cohesion. Stress, exhaustion, and legal issues (e.g., obtaining visas and traveling with children), were common challenges associated with the migration process. Participants experienced culture shock and adjustment difficulties related to unrealistic expectations of life in the United States. Some of these included differences in language pronunciation, environment, weather, and securing employment. Perceptions of American lifestyle, separation from family, and mastering life skills increased stress. Regrets associated with immigration were separation from Philippine-based family and not instilling Filipino customs in children. Participants reported that having realistic expectations of the United States and open mindedness helped make the adjustment process easier. Most participants reported satisfaction with the migration journey and a positive outlook for their families' futures in the United States.

Locating a Suppressor Gene for the LF4 Protein

Anoosh Bahraini, CURO Research Assistant
Dr. Jacek Gaertig, Cellular Biology, Franklin College of Arts & Sciences

Cilia are cell projections that contain microtubules, and mediate important sensory and motile functions. The Long Flagella Protein 4 (LF4), a MAP kinase, serves as a regulator for the length of the cilia (making cilia shorter). When this gene is overexpressed in the ciliate *Tetrahymena*, the cilia shortens to

the degree where the cell can no longer swim. The phosphorylation target of LF4 is unknown and therefore the mechanism of cilia length regulation by LF4 is not understood. The goal of our experiments is to identify a suppressor gene that allows cilia to assemble despite the overproduction of LF4. We optimized a simple method that selects rare motile cells among the large non-motile population of *Tetrahymena* based on the ability of swimming cells to overcome gravity. We attempted to isolate dominant suppressors by mutagenizing a strain of *Tetrahymena*, crossing it to an LF4-overproducing strain and selecting for heterozygous progeny, but this approach did not produce the desired suppressors. Currently, we are screening for homozygous suppressors by mutagenizing an LF4-overproducing strain and producing its progeny using a self-fertilizing cross known as UniParental Cytogamy (UPC).

On Sexuality in Female Ancient Greek Monsters

Manisha Banga
Dr. Benjamin Wolkow, Classics, Franklin College of Arts & Sciences

This paper employs a literary and feminist approach in an examination of the intersections between sexuality and monstrosity in female ancient Greek monsters. The uniqueness of the female monster lies in the presence of sexuality—insofar as sexuality is synonymous with desirability—in her narrative. This results in the construction of either hypersexuality or desexualization, resulting in an unattainable or undesirable female monster. The researcher argues that the destruction of normative female sexuality, wherein female sexuality is inherently submissive, is a prevalent theme in the construction of female monsters. The first case explores hypersexual monsters and studies the Sirens along with the triad of the Empousa, Lamia, and Mormo. These sexual monsters are dangerous and unattainable because their aggressive actions attract men and ultimately result in male deaths. The second case explores desexualized monsters and studies Medousa, Scylla, and the Amazons. These three mythological entities have their feminine sexuality destroyed in various ways, resulting in desexualized and undesirable monsters. In all cases, the monsters' sexuality is unnatural and ultimately dangerous to men. By subverting the inherently submissive female sexuality, these monsters threaten patriarchal civilization and thus acquire monstrosity. This paper seeks to understand these relationships between femininity, sexuality, and monstrosity.

Utilization of *Spirogyra grevilleana* as a Method of Algal Filtration for Reduction of Limnetic Nutrient and *Escherichia coli* Levels

Malcolm Barnard, Ramsey Scholar
Dr. James Porter, Odum School of Ecology

The freshwater alga *Spirogyra grevilleana* can be used in an algal filtration system to reduce levels of *Escherichia coli,* nitrates and phosphates. Multiple samples of m3 of water were collected from a 2.32 ha lake in North Metro Atlanta, Georgia, USA and maintained under constant laboratory conditions with sixteen hours of continuous lighting on a daily basis. This water was run at a rate of m3 hr-1 continuously through the filtration devices under laboratory conditions with two concentrations of *S. grevilleana*. Samples from both trials were tested over time for *E. coli*, nitrate, phosphate, dissolved oxygen, and pH levels. At either the high or low concentration, the algal filtration devices utilizing *S. grevilleana* reduced *E. coli* by 100% with negligible deviations. In the first trial, the *S. grevilleana* significantly reduced nitrate concentrations by 30% and phosphate concentrations by 23% while maintaining dissolved oxygen and pH levels. Utilizing *S. grevilleana* in an algal filtration device could potentially provide a sustainable, flexible, and low-cost method of

E. coli reduction in freshwater lakes worldwide. Initial results indicate that the use of *S. grevilleana* in conjunction with an algal filtration device is potentially capable of creating potable water.

Engineering *E. coli* Strains for the Increased Production of Glucosylated Organic Compounds

Robert Barnes, CURO Research Assistant
Tian Xia, Graduate Student
Dr. Mark Eiteman, College of Engineering

Glucosylation alters the functionality and bio-availability of many complex and interesting organic compounds such as flavonoids. Specific glucosides are often expensive and difficult to obtain in large quantities. Glycosyltransferases mediate the transfer of glucose from the donor molecule UDP-glucose to the acceptor organic molecule. We have an interest in the design of effective processes to produce these glycosylated compounds, and have studied such processes using two model conversions: quercetin to quercetin-3-glucoside by the glycosyltransferase UGT73B3 and indole-3-acetic acid to 1-O-indole-3-acetyl glucose ester (IAGE) by the glycosyltransferase UGT84B1. *E. coli* strains transformed with these glycosyltransferases and grown under optimal conditions accumulate over 1 g/L of these glycosylated derivatives.

Invalid Test Performance during ADHD Evaluations of College Students

Stefania Barzeva, CURO Research Assistant, CURO Graduation Distinction
Dr. Jason Nelson, Psychology, Franklin College of Arts & Sciences

An increasing number of students with Attention-Deficit Hyperactivity Disorder (ADHD) are entering college. Between 2000 and 2008, rates of postsecondary enrollment for students with ADHD nearly tripled. This increase may be partially attributed to malingering (i.e. fabricating psychological symptoms) for secondary benefits (e.g. extended testing time), as indicated by the high rates of poor symptom validity during ADHD assessments of college-aged individuals. The purpose of the current study was to establish the estimated rate of invalid performance during ADHD assessment based on embedded symptom validity test (SVT) failure and to examine the differences between valid- and invalid-performing individuals. Test scores were collected from the archives of 362 students who had undergone a comprehensive psychological evaluation to determine eligibility for academic accommodations. Participants were included if they were administered embedded SVTs within the Integrated Visual and Auditory Continuous Performance Test, Wechsler Adult Intelligence Scale, and Conner's Adult ADHD Rating Scale. Invalid performance was defined as scoring below the established cutoff of at least one SVT. Twenty-three percent of individuals demonstrated invalid performance on at least one SVT. Individuals who performed below the cutoff of at least one SVT endorsed more ADHD symptoms and demonstrated lower cognitive ability and academic achievement compared to individuals who did not perform below any cutoffs. The significance of this study lies in its contribution to the literature that examines postsecondary ADHD assessment regarding the identification and rates of malingering, diagnostic validity, unfair secondary gains in academia, stimulant medication abuse, and the fair distribution of resources.

The Physiological Functioning of Children with Anxiety: A Review of the Literature

Stefania Barzeva, CURO Research Assistant, CURO Graduation Distinction
Dr. Cynthia Suveg, Psychology, Franklin College of Arts & Sciences

Abstracts

Anxiety disorders are the most prevalent category of psychiatric disorders, with over half of diagnosed individuals reporting onset during childhood. Anxiety disorders affect cognitive, behavioral, and physiological functioning of children. Although research has progressed immensely in understanding childhood anxiety, research examining the physiology of children with anxiety disorders has only recently commenced. Studies consistently estimate that the majority of children diagnosed with anxiety disorders endorse at least one physical symptom. Many of the symptoms of anxiety have important physiological origins that could be measured objectively, and perhaps more accurately than self-reports, with standardized physiological assessments such as heart rate and respiratory sinus arrhythmia (RSA). Heart rate and RSA can be used as indicators of parasympathetic nervous system activity which functions in decreasing emotional reactivity. Children with anxiety disorders often have difficulties decreasing physiological expressions of emotional reactivity, but more research is needed to establish the underlying mechanisms. A review of the current literature is necessary to advance our knowledge in this domain through summarizing our current understanding and noting the gaps in knowledge of the physiology of children with anxiety. The purpose of this review was to (1) summarize the extant literature on the relations of physiological functioning, such as heart rate and RSA, of children with anxiety, (2) to analyze the results of these studies in the broader context of developmental psychopathology, and (3) to acknowledge limitations and propose future directions in the application of physiological assessments in the treatment of childhood anxiety.

Phylogenetic Investigation of Metal Hyperaccumulation Evolution in Wild Sunflowers

Mary Baxter, CURO Research Assistant

Dr. Anne Marie Zimeri, Environmental Health Science, College of Public Health

Plants that have the ability to accumulate extremely high concentrations of metals in their foliage are considered hyperaccumulators. The evolution of plant hyperaccumulation has become of increased interest due to its application towards using plants to clean up environmental contaminants (phytoremediation) or extract valuable metals from soil (phytomining). There are varying hypotheses as to the adaptive benefits of hyperaccumulation. The elemental defense hypothesis, which suggests that high leaf metal concentrations help deter herbivores and inhibit microbial growth, has the most empirical support. We examine the elemental defense hypothesis using a generalist herbivore *Vanessa carduii* (Painted Lady butterfly larvae), and 14 wild sunflower species (*Helianthus*). Species of *Helianthus* were grown under high concentrations of nickel and cadmium, harvested, and then fed to *V. carduii* under nonchoice and choice conditions. *V. carduii* larvae assigned to non-choice experiments were fed either a metal-grown or a control leaf, while larvae assigned to choice experiments were given a choice between a metal-grown and a control leaf of the same species. The percentage of each leaf eaten was measured, and other leaves of each plant were used to measure concentrations of nickel and cadmium along with other putative leaf defense traits such as leaf mass per area, leaf water content, and trichome density. The evolutionary history of nickel and cadmium hyperaccumulation in *Helianthus* was explored using ancestral state reconstruction, and the relationship between herbivory deterrence and leaf metal concentration was assessed. This study constitutes the first ever phylogenetically explicit assessment of the elemental defense hypothesis.

Abstracts

Progression of Lithium Ion Batteries
Samuel Baxter
Dr. Tina Salguero, Chemistry, Franklin College of Arts & Sciences

Lithium Ion batteries have come a long way since their original development. Over the years materials scientists of all kinds have implemented new cathode and anode materials that can increase the performance and cost effectiveness of these batteries. As far as cathode materials go, one that has attracted much attention from researchers is Lithium Cobalt phosphate. The material itself has many beneficial characteristics including High thermal stability, High capacity/potential, inexpensiveness, and it is chemically stable in the electrolyte solutions of a battery. Within the battery, the lithium ions that migrate throughout the electrolyte solution have to travel through the LiCOPO4 material in order to intercalate into the anode material at the other side of the battery. In order to optimize this migration of Lithium ions, we are creating a path of least resistance for them to travel. This path of least resistance involves taking an exfoliated nanosheet morphology of the material and implementing it in the battery instead of its bulk counterpart. There are many steps in this process, but the worthwhile result of a nanosheet battery make the struggle worth pursuing.

The Figure of Constantine the Great in Cynewulf's "Elene"
Kaitlyn Beck, CURO Summer Fellow
Dr. Jonathan Evans, English, Franklin College of Arts & Sciences

The goal of this research project was to examine the Old English poem entitled "Elene," which is Old English for Helena, the mother of Constantine the Great. The primary focus of the project was Constantine the Great, one of the most important political and religious figures in history. I looked at how successful the propaganda of Constantine, particularly his personal connection to Sol Invictus and Jesus Christ, was through how it continued in the poem. To help answer that question, I also tried to determine who the main character of the poem was, and what was Constantine's role within the text. Most of my research involved dealing with primary texts. I looked at "Elene" in Old English and Eusebius' *Life of Constantine*. I also examined scholarly material related to the study. Through my research, I found that while Constantine was certainly elevated to a saint-like status, he was not the true focus of the poem. While Cynewulf is undoubtably influenced by Eusebius' propaganda, it seems that he uses it for his own purposes in highlighting the True Cross in his poem "Elene."

Investigating Regulation of Germline Stem Cell Division Frequency in *Drosophila melanogaster*
Chederli Belongilot, CURO Research Assistant
Dr. Cordula Schulz, Cellular Biology, Franklin College of Arts & Sciences

Stem cells are undifferentiated cells that have the potential to become various cell types. Elucidating the pathways that regulate stem cell division may provide insight into novel therapeutics in repairing or replacing damaged tissue, aging, and cancer. Specifically, the regulation of division frequency in germline stem cells is not well characterized. Using *Drosophila melanogaster* as a model organism, we are investigating the pathway that is responsible for the increase in division frequency in response to mating that is shown in *Drosophila*. To do this, mating experiments are performed using organisms with a specific RNA interference construct in their genome. When the RNAi is active, it can block the translation of a selected candidate protein involved in the pathway. The flies then either go through three rounds of mating with

Drosophila virgins, or remain unmated. Controls that do not have activated RNAi also go through this process. After mating, the testes are dissected, fixed, and then stained with antibodies that label different cells in the testes. Fasciclin III labels the hub, Vasa labels germline stem cells, and Phospho-histone 3 labels the nuclei of dividing cells. Once they are stained, the testes tips are imaged, so the fraction of dividing stem cells can be calculated from each experimental group. If an activated RNAi group shows no increase in stem cell division frequency when mated, the protein coded by the RNA targeted by the RNAi is a likely part of the pathway controlling germline stem cell division frequency in *Drosophila*.

The Forgotten Radical: Southern Women and the New Left Student Protests of the 1960s

Brett Bennett, CURO Summer Fellow
Dr. Brian Drake, History, Franklin College of Arts & Sciences

The narratives of the 1960s student protests revolve around the major campuses of Berkeley, Columbia and other Northern and West Coast universities and much emphasis is placed on the male-dominated roles of speaking and writing. However, were women and southern universities such as the University of Georgia also involved in radicalism and the New Left movement? While ignored in most histories of the decade, student left protests reached the Deep South as well. Students at the University of Georgia staged sit-ins, marches, and formed radical groups. Yet, even within these so-called 'radical' groups, women struggled to be allowed the same opportunities to speak and organize as their male peers. If the Southern radical is overlooked in historical narrative, the female radical is nearly forgotten, as she had to fight for her voice to be heard within even the New Left movement itself. The narrative that leaves out women and the South fails to show the widespread effect and impact of the student left. Using old issues of the *Red and Black* and the papers of major UGA administration members I found the story of radicalism at UGA, focusing particularly on how women involved in sixties radicalism set the stage for the women's liberation movement, arguably one of the biggest successes of the New Left.

The Impact of Rest and Game Location on NBA Team Performance

Mckenzie Benson, Steven Pugh, Rebecca Gaines, Mary Catherine Kelley
Dr. Karl Kuhnert, Psychology, Franklin College of Arts & Sciences

In today's globalized society, travel has become an accepted element of work. However, travel is associated with factors that have the potential to affect performance. Previous research shows a negative relationship between traveling and performance. It has been found that people perform better in familiar environments. Rest has the capacity to counteract the negative effects of traveling. Sports data have been used to analyze these relationships due to the availability of information. For example, the game's home versus away status can be used to measure an unfamiliar environment, point differentials can measure performance, and days rest can objectively measure time between games. For this study, we examined home versus away status and the amount of rest between games using NBA data. We expected that teams playing at an away location would attain less sleep, and therefore away games would amplify the negative impact of lack of rest on performance. Results show that teams performing at away games, who received less rest, performed worse. Teams lost more frequently at away locations than at home. Results support the original prediction of a negative relationship between away game location and performance. Results found from this study can be applied to the

work environment by suggesting that managers give employees adequate rest time while traveling. Traveling employees given ample rest time could offset some of the negative effects of travel. Therefore, business managers should allow for recovery time upon arrival at their business trip destination or run the risk of increased exhaustion and decreased performance.

Nut-Cracking Skill and Efficacy in Wild Capuchin Monkeys

Margaret Bergmann, Rhianna Baldree, Kristen Smith
Dr. Dorothy Fragaszy, Psychology, Franklin College of Arts & Sciences

Skill is defined as fluid and effective performance of a specific action, or set of actions, under varying circumstances. Wild bearded capuchin monkeys typically crack tough palm nuts by placing them on a log or stone anvil, and striking them with stone hammers that weigh a considerable portion of a monkey's body mass. To evaluate nut cracking skill we videotaped twelve habituated male and female adult and adolescent monkeys using an unfamiliar stone hammer of an average weight and size. We documented the monkeys' behavior with the stone during nut-cracking in slow- motion playback. We coded three exploratory actions with the stone (preparatory lifts, spins, and flips), the position of the monkey's hands on the stone each time it moved the stone, the angle of the strike, and outcome (stone dropped; nut cracked). We determined the frequency of actions and outcomes for the first 20 strikes of each individual and report these data for six monkeys. The monkeys cracked 0 to 3 nuts in 20 strikes and produced between 0.6 and 2.35 exploratory actions per strike. The three kinds of actions occurred in approximately equal proportions. Monkeys rarely struck the nut at a slant but four monkeys dropped the stone 1 to 7 times. Exploratory actions may help the monkeys position the stone for an effective strike but in our sample the frequency of these actions did not predict efficiency. Supported by UGA, National Geographic Society, and the PRIMARCH project (European Research Council).

Acute Intra-vmPFC Injections of Galanin Reduce Expression of Conditioned Contextual Threat in Rats

Dionnet Bhatti, CURO Research Assistant, CURO Graduation Distinction
Dr. Philip Holmes, Psychology, Franklin College of Arts & Sciences

Rationale. Previous work has implicated galanin in the modulation of anxiety-like behaviors, yet its potential for facilitating the extinction of aversive memories has not yet been investigated. *Objective.* We evaluated the role of galanin in the medial prefrontal cortex (mPFC) on the expression and extinction of conditioned threat by measuring freezing behavior in a contextual threat-learning paradigm. We asked: Does galanin reduce the expression of the conditioned threat response and does it enhance the acquisition of the learned extinction? *Methods.* Sprague-Dawley rats were conditioned to an aversive context on day one. 20 minutes before the extinction trial on day two, the rats received bilateral microinjections of galanin (0.6 nmol/side) or vehicle (aCSF) into the ventromedial prefrontal cortex (vmPFC). On the third day, the rats were placed into the context once again to further assess the retention of the extinction. *Results.* Bilateral intra-vmPFC injections of galanin reduced freezing, evident in the first few minutes of the extinction session immediately following the intracranial injections. No differences in freezing were evident during the drug-free extinction session occurring on the third day. *Conclusion.* Our results suggest that galanin suppresses the expression of contextual threat-induced defensive behavior without affecting the retention of the extinction learning or

disrupting the initial acquisition of the learned threat association.

Continuing Investigation of Electronically Excited States in Indole: Transitioning from Gaseous to Condensed Phase Studies

Michael Biddle, CURO Summer Fellow
Dr. Susanne Ullrich, Physics & Astronomy, Franklin College of Arts & Sciences

Skin cancer is the most widespread form of cancer in the United States, and is possibly initiated by ultraviolet (UV) radiation damaging DNA contained in skin cells. Certain constituents within our skin, like the polymer eumelanin, naturally protect our bodies from DNA photodamage. However, the mechanism responsible for this UV-shielding is not yet fully understood. Studying the relaxation dynamics of the eumelanin chromophore indole is an important step in explicating the UV photo-protective properties of the eumelanin polymer itself. Multiple techniques, utilizing various excitation wavelengths, were used to study relaxation dynamics of indole in the gas phase. These techniques include time resolved photoelectron spectroscopy, time resolved kinetic energy release, and time resolved ion yield. The 1La and 1Lb states (both possessing $1\pi\pi^*$ character) and the $1\pi\sigma^*$ relaxation pathway were shown to be involved in relaxation at excitation wavelengths ranging from 201 nm – 273 nm, the involvement of the latter ceasing at wavelengths greater than ~263 nm. As eumelanin in the body is in the condensed phase, the next logical step is to replicate a more biologically relevant environment by investigating indole dynamics in various solvents. These solvents will be of differing polarities – such as cyclohexane, ethanol, and water – in order to determine the effects on relaxation dynamics. Time resolved transient absorption spectroscopy (TR-TAS) will be employed to investigate the temporal evolution of neutral electronically excited states and the appearance of solvated electrons (in polar solvents).

The Role of Chondroitin Sulfate Glycosaminoglycans in Glioma Cell Progression

Nicole Bisel, CURO Research Assistant
Dr. Lohitash Karumbaiah, Animal & Dairy Science, College of Agricultural & Environmental Sciences

Glioblastoma multiforme is an aggressive, devastating type of brain tumor characterized by a highly invasive nature. Chondroitin sulfate proteoglycans (CSPGs) and their associated glycosaminoglycan (GAG) side chains have often been implicated in promoting tumor invasiveness. However, conclusive evidence to suggest that CSPGs or their associated CS-GAGs induce brain tumor invasion is currently lacking. We aim to provide evidence that suggests that tumor cell proliferation, migration, and invasion can be affected by the level of sulfation of CS-GAGs in the tumor extracellular matrix. Our goal is to demonstrate that the sulfation of the CS-GAG chains (and not the core protein itself) directly effects tumor cell progression. This will be tested *in vitro* by encapsulating the invasive glioma cell line U87MG-EGFP into differently sulfated CS-GAG hydrogels. We hypothesize that hydrogels containing the oversulfated GAG CS:E will inhibit general tumor growth while hydrogels containing monosulfated GAGs (CS:A and CS:C) will enhance tumor cell progression. Here we will establish a baseline for brain tumor growth in a neutral environment by encapsulating the U87MG-EGFP cells in 1% agarose gels. The nature of cell progression in these control hydrogels will act as a reference point from which we will compare tumor growth in the differently sulfated CS-GAG hydrogels. If glioma malignancy is indeed correlated with the level of sulfation of CS-GAGs, this work could contribute to our knowledge of treatments for brain cancer and potentially

lead to better patient prognoses in clinical medicine.

An Analysis of International Media Coverage of North Korean Nuclear Events

Holly Boggs, CURO Research Assistant
Dr. Brock Tessman, International Affairs, School of Public & International Affairs

Recently, Shin Dong-hyuk, a North Korean defector, admitted to falsifying key aspects of his testimony before the United Nations. That prior testimony was crucial in generating support for a UN Security Council Resolution that proposed sanctions against North Korea for human rights abuses. Shin's testimony, and his falsifications, highlight the role that subjective interpretations play in global politics: states and international organizations frequently make major policy decisions based on interpretations of reality that have been filtered through the lens of individuals and – even more importantly – global media coverage. The first part of this research project analyzed international media coverage of events related to North Korean nuclear weapons and missile tests between 2009 and 2013. Newspaper editorials addressing four North Korean nuclear tests and rocket launches were collected, and then a method of content analysis was used to assess editorial coverage between newspapers and countries according to frequency and ratio of positive-to-negative tone. This project expands upon prior research by exploring three new propositions: that China's media coverage of specific events will be more consistent in tone than that in other countries; frequency of coverage in 2012 will be, on average, lower than in other years because of domestic leadership transitions in South Korea, Japan, and the United States; for South Korea and Japan, geographic proximity to North Korea increases perceived vulnerability and will lead to more frequent, negative editorial coverage of the North's nuclear and missile tests. Findings offer insight about the extent of global media subjectivity in international relations.

Review of the Potential for Coproducing Bioplastics and Biofuels from the *Spirulina*

Charles Bond, CURO Summer Fellow
Dr. Sudhagar Mani, College of Engineering

The potential for coproducing bioplastics and biofuels from algae is known, but the question of what technological processes are necessary has yet to be answered. This research lays the groundwork for such an answer by reviewing the possible technologies and techniques that could be used in such a commercial-scale coproduction system based on the algae *Spirulina*. Alternative systems were roughly designed and compared, with an emphasis on reducing costs to be competitive with petroleum-based fuels and plastics. Varied methods of cultivation, biomass drying, lipid and/or protein extraction, and fuel conversion are considered. Through examining these options, this research makes recommendations for future research, such as experimentation with supercritical fluid extraction of lipids from dried algae for conversion into biodiesel via transesterfication, and the conversion of subsequent residual protein-rich biomass into bioplastics via mixing and molding with glycerol. Through this research, the case is made that a system that produces both renewable fuels and biodegradable plastics is possible, but that the costs must be comprehensively assessed before it is known whether it can compete economically with conventional petroleum products.

Examining Entitlement: How Age and Length of Time in a Position are related to a Sense of Entitlement in CEOs

Zach Borg, Benjamin Listyg
Dr. Brian Hoffman, Psychology, Franklin College of Arts & Sciences

Recent literature indicates that narcissism ratings have been rising over time (Westerman et al., 2011). Higher narcissism rates are a potential cause of concern for organizations, as employee entitlement, a subset of narcissism, is related to counterproductive work behaviors (Fisk, 2010). Yet again, little research examines how leader tenure and age, for example, is related to narcissism. It makes sense that how long a leader has worked at a company could be related to how narcissistic the leader is. However, despite its potential negative organizational impacts, little research examines the relationship between leader tenure and narcissism. To examine this relationship, surveys were administered to CEOs from firms of varying size within a Western European country (n = 156). Our entitlement items came from the Narcissistic Personality Inventory (Raskin & Terry, 1998). Age was self-reported by each CEO, and CEO tenure within their organization was also self-reported. Partial correlations controlling for firm size were run to examine the relationship between CEO age and entitlement. Our results show that younger CEOs tend to score higher on entitlement (r = -.22, p = .01) and that the less time CEOs had been with their organization, the higher their levels of entitlement were (r = -.20, p = .02). These findings suggest that in order to prevent this rise in entitlement amongst younger leaders within organizations, on-boarding programs should be developed to appropriately train new young managers for when they take on more senior positions.

Examining Communication Patterns and Trait Self-Control Using the Actor-Partner Interaction Model

Jerica Bornstein, CURO Summer Fellow, CURO Graduation Distinction
Dr. Michelle vanDellen, Psychology, Franklin College of Arts & Sciences

High self-control is associated with positive relationship outcomes but less is known about how self-control is related to processes that facilitate relationships outcomes. We conducted a study to examine how self-control is related to communication patterns between romantic partners. In this study, 38 couples (76 participants) reported on personal qualities such as mental health, self-control, and personality characteristics. They additionally reported on relationship processes, including communication patterns. Results revealed main effects of actor and partner self-control on mutually constructive communication and demand/withdraw. Additionally, actor and partner self-control interacted to predict mutual avoidant communication patterns. One reason people with high self-control may have better relationships is because they communicate better within those relationships.

Characterizing the College Diet

Carley Borrelli, CURO Research Assistant
Dr. Jim Stringham, Psychology, Franklin College of Arts & Sciences

Little is known about the composition of the college student diet. Diet is often measured using the Food Frequency Questionnaire (FFQ) or self-reporting of daily food consumption. Prior studies have noted that these methods are often skewed and time-consuming. This study aimed to simplify characterization of the college diet by reporting food group percentages. To characterize regular food consumption, we administered a questionnaire that assessed food intake in six groups: fruits, vegetables, protein, dairy, grains, and junk food. Participants were asked to assign percentage estimates of volumetric consumption to each group, with the sum of all groups adding up to 100. Forty college students, aged 18-23, completed the questionnaire. Analysis of results showed that junk food was significantly inversely related to vegetable consumption (r = -0.408, p = 0.009) and grain consumption (r = -0.342, p = 0.031)

respectively. Consumption of grains was also significantly inversely related to fruit consumption ($r = -0.312$, $p = 0.050$). Mean food group values were: 12.05% for fruit consumption, 16.975% for vegetable consumption, 27.975% for grain consumption, 9.85% for dairy consumption, 24.3% for protein consumption, and 8.9% for junk food consumption. These findings characterize the food group percentiles for the college diet and suggest that, in terms of energy consumption, substitution may take place between junk food, vegetables, and grains. Further research is necessary to draw concrete conclusions about these relationships.

Lignin-Modifying Enzymes in Termite Digestive Tract as Potential Biological Pretreatment Component in Cellulosic Ethanol Production

Leah Brown, CURO Research Assistant, CURO Graduation Distinction
Dr. Joy Doran-Peterson, Microbiology, Franklin College of Arts & Sciences

Cellulosic ethanol provides an environmentally advantageous alternative energy source, and is produced by fermentation of sugars from cellulose (and hemicellulose) harbored in the cell walls of relatively untapped biomass resources (e.g., switchgrass and pine). A primary economic obstacle is the biomass pretreatment to overcome the barrier of lignin, a phenolic heteropolymer contributing to the structure of plant cell walls. Current pretreatments require harsh physical and chemical conditions to degrade lignin and release the fermentable carbohydrates. However, a biological pretreatment may exist within the digestive tract of termites, who can extract most of the available sugar in its exclusively lignocellulosic diet. To investigate the mechanism of lignin modification in termites, a transcriptomic differential expression analysis was employed. Termites were fed either filter paper (cellulose) or pine wood (lignocellulose) for seven days to establish distinct expression profiles based on diet. Termite foregut and midgut segments (where lignin modification has been demonstrated to occur) were extracted. RNA was isolated, sequenced, and assembled into a *de novo* reference transcriptome, from which differentially expressed genes were analyzed to identify putative lignin-modifying motifs. Each differentially expressed transcript was automatically annotated against a protein database and manually annotated to confirm automatic annotation results. Two promising transcripts up-regulated in the wood-fed termites were found, and their respective genes were synthesized and placed on an expression vector. Protein products will be purified and assayed for substrate specific activity on model lignin compounds to assess their potential as supplementary components in pretreatment of lignocellulose for the production of ethanol.

Something to Pass Down: Black Family Stories and the Legacy of Slavery and Jim Crow

Tifara Brown
Dr. Barbara McCaskill, English, Franklin College of Arts & Sciences

This project began with a photograph posted on a Facebook page connecting my Louisiana-born relatives, entitled "The Descendants of Coffee and Ella Webb." The image contains these two of my maternal ancestors: Edward "Coffee" Webb (1882-1944), the alleged white son of a Rapides Parish slave owner, and his alleged wife Ella (1885-1954), an enslaved woman. However, Coffee's archival record (such as his death certificate and his World War I registration card) contradicts this story by indicating that Coffee was African American. Discrepancies aside, the Webbs take pride in these maternal ancestors, alongside early paternal relatives, even though their family may be rooted in a union

considered socially taboo and racially corrupting. Instead of evaluating whether or not these stories are true, this research examines how and why such stories of survival, loss, and recovery have functioned during slavery and Jim Crow in African American families descended from Southern bondspeople. In order to consider the relationship between such stories and the families who tell them, this research evaluates archival documents, oral histories, and literature about enslavement and segregation. This investigation finds that instead of wealthy heirlooms, such stories pass down values and codes of conduct: resilience, pride, dignity, sacrifice, and community cohesion. Additionally, this research finds merit and legitimacy in these narratives within the communities that continue creating and remaking them despite the fact that scholars have privileged written over oral texts.

Threat from Abroad, Conflict Within: Border Settlement and Civil War Onset
Brent Buck
Dr. Andrew Owsiak, International Affairs, School of Public & International Affairs

Does the removal of a salient external threat effect the likelihood of civil war? I argue that once a state resolves an external threat to its security the probability of civil war temporarily increases through the mechanisms of demilitarization and decentralization. Previous research has argued that the presence of external territorial threat decreases the probability of civil war both during and after the resolution of the threat. This article challenges those findings by using a series of case studies to illustrate: 1) demilitarization and decentralization follow a state's settlement of its borders 2) that the processes of demilitarization and decentralization decrease the state's capacity to repress its people and maintain order, thereby increasing the probability of civil war following a state's resolution of its borders. Thus, this paper builds on the existing body of research on state capacity arguments for civil war onset and seeks to critique the previous findings linking civil war onset with external threat by claiming the probability of civil war increases (rather than decreases) following the resolution of the threat. These findings suggest that states with recently settled borders must be wary, lest their progress toward interstate peace devolve into intrastate war.

The *Kalevala* as Tolkien's Inspiration
Trace Calloway, CURO Honors Scholar
Dr. Jonathan Evans, English, Franklin College of Arts & Sciences

This research examines the roots of J.R.R. Tolkien's *Lord of the Rings* and his published collection of Middle-earth's myths in *The Silmarillion*, specifically by examining the Finnish *Kalevala*, a compendium of traditional Finnish oral myths collected by Elias Lonnrot. By examining Lonnrot's work, Tolkien's letters, and the research of several other authors in *Tolkien and the Invention of Myth* edited by Jane Chance, I uncover previously undiscussed parallels between Lonnrot's *Kalevala* and Tolkien's *Silmarillion*, and I argue that this Finnish work and its language served as a primary inspiration for Tolkien's interest in myth-making.

A Look at the Relevance of Sociology Concepts, Theories, and Methods through the Lens of Health Professionals
Jesse Cann, CURO Research Assistant
Dr. James Coverdill, Sociology, Franklin College of Arts & Sciences

In recent years there has been much debate over how informed physicians should be on concepts from the behavioral and social sciences. This debate has ultimately led to the restructuring of the Medical College Admissions Test to include an entire section that focuses on these theories and ideas. The

aim of my research was to demonstrate just how relevant many of the concepts from Sociology are to the medical field by helping Dr. Coverdill in redesigning an Introductory Sociology (SOCI 1101) course to emphasize material of particular importance and interest to those who aim to enter the health professions. This was accomplished by searching through medical and health-focused social science journals to identify and screen material for incorporation into lectures or as readings of the class. What was discovered is that sociological ideas are widely found throughout the domain of healthcare from the socialization of medical students learning to deal with death to the disparity of healthcare quality and access between different social classes. Framing these ideas with material and illustrations grounded in the health professions allowed for the development of an introductory sociology course that will be especially appealing and useful to those who seek to enter the health professions. In a broader sense, making prospective health professionals aware of the issues they may face in the world of medicine is the first step in finding solutions to these issues.

Neural Correlates of Schizotypal Traits in Healthy Participants with High and Low Cognitive Control

Megan Cannon
Dr. Jennifer McDowell, Psychology, Franklin College of Arts & Sciences

Schizotypal Personality Disorder (SPD) is part of the schizophrenia spectrum, a group of related disorders that differ in severity. Research shows that schizotypal traits occur in some healthy people and are related to symptoms seen in schizophrenia, including difficulties in cognitive control. Previous research reveals brain activation (measured by fMRI) during cognitive control tasks is correlated with schizotypal traits in healthy populations. Previous studies only examined healthy populations as one group. Healthy populations vary on their cognitive control ability. This study examined whether the relationship between schizotypal traits and brain activation is different in people with low versus high cognitive control. For this study, healthy participants were sorted into high or low cognitive control groups based on results of working memory tasks. Each subject completed the Schizotypal Personality Questionnaire (SPQ) and performed antisaccades in the MRI scanner. The antisaccade task is a measure of cognitive control that involves inhibiting a reflexive response to glance toward a target and instead direct a glance in the opposite direction. Results show a significant negative relationship between positive and negative scales of SPQ and activation in the thalamus in the high cognitive control group. There was a significant positive relationship between positive and negative scales of SPQ and activation in the prefrontal cortex and striatum in the low cognitive control group. These results suggest there are possible neural differences along the schizophrenia spectrum, specifically related to those with poorer cognitive functioning. Understanding these differences could provide information on susceptibility to disorders like schizophrenia.

Genetic Interactions between Pigmentation Pathways and Protein Glycosylation

Leah Caplan, CURO Research Assistant
Dr. Michael Tiemeyer, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Glycoprotein glycans regulate cell-cell interactions, but little is understood about the genetic and biochemical pathways that influence cell- and tissue-specific glycosylation. We generated mutations in *Drosophila melanogaster* (*sff* and *ms16*) that alter the expression of neural-specific glycans in the embryo. In the course of analyzing these mutations, we noticed that their phenotypic

penetrance was affected by mutations in the *white* gene, which encodes for an ABC transporter that transports tryptophan and guanine into the cell. Its absence (*w-*) results in white-eyed adults and is accompanied by neurological and behavioral defects, suggesting that *white* functions in metabolic processes other than just pigmentation. The ABC transporter formed by *brown* and *white* transports guanine into the cell while other pigmentation genes, *cinnabar, vermillion,* and *henna*, modify transported substrates for the production of pigment precursors. The genes *cinnabar* and *vermillion* assist in the modification of tryptophan substrates and *henna* of guanine substrates. To comprehensively determine the extent to which pigmentation genes might also influence tissue-specific glycosylation, we screened pigmentation mutants for genetic interactions with *sff* and *ms16* in regards to the expression of neural-specific glycans. All four pigmentation mutants exhibited genetic interactions with the *sff* and *ms16* glycosylation mutants, indicating that multiple components of pigment production pathways also impact glycoprotein glycosylation. We hypothesized that pigmentation precursors transported by ABC transporters contribute to the formation of nucleotide sugars, essential substrates for glycosylation reactions. To test this hypothesis, nucleotide sugar levels in wildtype and mutant embryos will be quantified by high pressure liquid chromatography.

In-Vitro DNA-Protein Interaction Analyses of *Glycine max* Transcription Factors

Kitra Cates
Dr. Robert Schmitz, Genetics, Franklin College of Arts & Sciences

Soybeans (*Glycine max*) serve as an integral world crop used for oil production, livestock and aquaculture feed, and are a major protein source in the human diet. Soybean root nodules, formed from a symbiotic relationship with soil *Rhizobia*, facilitate nitrogen fixation and nutrient exchange between the two organisms. Research concerning regulatory pathways associated with transcription in nodules is necessary to study the influence of *Rhizobia* on the genetic regulatory pathways in legumes. WRKY-35 and NF-YA1, two transcription factors involved in stress response and nodulation in *Glycine max*, were artificially synthesized for Gateway cloning purposes. The synthetic genes were cloned into an entry vector plasmid, *pDONR207*, and transformed into *Escherichia coli*. Sequential cloning into a destination vector, *pixHALO*, added a HALO motif sequence to the gene sequences and placed the genes under an inducible promoter. Next steps in this project are to demonstrate protein: DNA interactions. Cloned genes will be expressed and translated using an established *in vitro* protocol. We plan to use the synthetic hybrid protein to isolate DNA targets of our transcription factor. Purification with an anti-HALO antibody coupled with high throughput sequencing will identify any targets of our transcription factors, providing novel data on the role of these transcription factors in nodule development and function. This study will serve to simultaneously develop a novel *in vitro* DNA-protein interaction protocol, built to parallel the widely-used, but extremely costly, chromatin immunoprecipitation sequencing protocol. This will provide an efficient, scalable production of transcription factors and the potential to manipulate regulatory networks of interest.

Asteroseismological Age Dating Utilizing a Bayesian Monte-Carlo Search

Timur Cetindag, CURO Research Assistant
Dr. Inseok Song, Physics & Astronomy, Franklin College of Arts & Sciences

Estimations of stellar ages have historically been very difficult for all but very young stars, and this has placed constraints on astrophysical modeling of stellar interiors and stellar evolution. Modern techniques can

measure the ages of mature (several billion years [Gyr] old) Sun-like stars with large (50-80%) uncertainties while age-dating precisions for young (<1 Gyr) stars are much better (<10%). The poor stellar age-dating precision has limited further detailed analysis of various stellar astrophysics. Over the past several years, with the extreme sensitivity and high cadence survey by the Kepler Space Telescope, scientists began detecting subtle variations in brightness due to stellar interior oscillations, whose study is called asteroseismology. Because these oscillations probe the stellar interior, analogous to Earth's interior being analyzed by terrestrial seismic waves, asteroseismology can be utilized to study the internal state of a star and greatly increase the age-dating precision down to the ~1% level for even old stars. In our research, we comb through a collection of ~2500 stars that are of interest to the Kepler Asteroseismic Science Operations Center (KASOC) and search for oscillation signatures of young, hot, active stars. Our goal is to (1) detect unambiguous stellar oscillations among young stars, (2) estimate ages of these young (<1 Gyr) oscillating stars, and (3) compare and cross-calibrate age-dating methods for young (<1 Gyr) and old (1-10 Gyr) stars. We approach this issue by utilizing a Bayesian Monte-Carlo simulation to search for an oscillation signal in the frequency power spectrum of each target.

Ultrastructural Change in the Mitochondria of *Euglena gracilis* Grown in Progressively Anaerobic Conditions

Pei-Ying Chang
Kathryn Dye, Graduate Researcher
Dr. Mark Farmer, Biological Sciences, Franklin College of Arts & Sciences

Some eukaryotes can survive in anaerobic conditions by generating ATP via fermentation and chemiosmosis coupling alone. Based on presence of genes in *Euglena gracilis* it is hypothesized that in this single celled protist glucose can be converted into wax esters generating ATP through substrate level phosphorylation. To test this hypothesis, cells of *Euglena gracilis* were grown in progressively anaerobic conditions. The independent variable of light was also added in the second set of experiments to prevent *Euglena gracilis* from producing oxygen through photosynthesis. Following repeated transfers of cells to conditions with progressively less free oxygen, a stable culture of mostly anaerobic *Euglena gracilis* were established. Using a combination of microscopy techniques (both electron microscopy and fluorescence microscopy) the mitochondria of oxygen deprived *Euglena gracilis* cells were examined for changes in structure and/or physiological function.

Pollen Competition

Angel Chen, CURO Research Assistant
Dr. Shu-Mei Chang, Plant Biology, Franklin College of Arts & Sciences

In hermaphroditic plants, fitness is comprised of female and male components. Female fitness is often measured as seed production of a plant, and male fitness can be measured as siring success through pollen grains. Though seed production has been studied extensively, we know less about how pollen success varies among individuals. In *Ipomoea purpurea* (common morning glory), previous studies showed plants that produce larger pollen grains consistently outperform their smaller pollen counterparts (Foltz & Chang, unpublished data). We have two main goals for this study: first, test the hypothesis that faster pollen tube growth rate is the reason underlying the success of larger pollen grains and second, examine whether small pollen grains can be maintained and coexist with larger pollen grains in nature. To test the first hypothesis, we analyzed the effect of pollen size and inbreeding level on pollen tube growth rate in the common morning glory, *Ipomoea purpurea*. We compared two lines

of plants that produce either large or small pollen and are either outcrossed or inbred and found that larger pollen produce pollen tubes that grow significantly faster than those produced by smaller pollen while inbreeding level has no significant effect on growth rate. To address the second goal, we performed a common garden experiment allowing plants to interact naturally with their pollinators and analyzed differences in their reproductive traits and male and female fitness using molecular markers. Using the results from this study, we will discuss how pollen size variation might be maintained in natural populations.

Female Labor Force Participation and Wages: What Has Changed in the Last 30 Years?

Anne Chen, CURO Summer Fellow, CURO Research Assistant
Dr. Christopher Cornwell, Economics, Terry College of Business

Goldin (2014) suggests that "the converging roles of men and women are among the grandest advances in society and in the economy in the last century." Indeed, women have made great strides in educational attainment, labor-market participation and wages over the last hundred years. They now earn almost 60 percent of bachelor's degrees and comprise a majority of the workforce. Understanding these changes is important for both future labor-market and marriage market implications. In this paper, I hope to study whether the factors contributing to the increase in female labor force participation and wages have changed significantly over time. The primary motive to understanding this topic is that women have come to dominate the U.S. college campus. There are many questions that arise given this fact: why male college enrollment has been stagnant, how that translates to the U.S. labor market, and how social norms may change in the future based on changing economic incentives. The project will have three components. First, I will compile a review of the literature on the advancement of women in the labor market, its effects on household formation, and opposing arguments against popular explanations as to which is the main contributor. Second, I will construct my analysis samples using NLSY data I have extracted and organized. Finally, I will construct my empirical models and apply the appropriate econometric methods to assess the relative importance of the factors in explaining gender disparities in wages and age at first marriage across the two cohorts.

Paper Art in Expanded Forms

Jiacheng Chen, CURO Summer Fellow, CURO Research Assistant
Prof. Eileen Wallace, Lamar Dodd School of Art

Traditionally, the art of papermaking was dedicated primarily to the arts of the book and calligraphy. Today, paper has been widely experimented with as a primary material for sculptural works and is considered an independent art as well. The polychotomous nature of paper to have multiple applications from the same basic material makes paper as an art form difficult to categorize. The first issue that I explored was paper formation. Paper formation occurs through the fibrillation of the fibers via beating and then reconstitution of the fibers through sheet formation. To investigate the correlation between the raw materials and procedural differences, I applied two variables to my experiment, cooking times of the raw plant fibers and beating times for the processed fiber. The results showed a distinct correlation between the variables and the resulting variations in paper qualities and characteristics. That information would help an artist with the knowledge to achieve a specific and ideal paper for artwork. It has also been my research interest to explore contemporary oriental aesthetics, particularly

in the idea of "dissolved imagery". Firstly, images are generated through photographic printing (cyanotype), screenprinting or pulp painting on wet paper. When the paper was air dried, natural forces of shrinkage and distortion moved the fibers and therefore the imagery, too. In this way, the imagery's original consistency is dissolved. The artist relinquishes a certain amount of control as the paper dries without restraint. Theoretically, this methodology aligns itself with the "blank-leaving" (*liu-bai*) aesthetics of ancient *shanshui* painting.

S. cerevisiae as a Model System for the Oligomerization and Aggregation of Aβ Peptides using Cup1p as a Reporter

Michael Cheng, CURO Research Assistant
Dr. Walter Schmidt, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Alzheimer's disease (AD) is a progressive neurodegenerative disorder. The accumulation of amyloid beta (Aβ) peptides observed with AD, combined with their toxicity, implicates them as a causative agent of the disease. Aβ peptides, particularly Aβ1-40 and -42, are prone to form oligomers and aggregate into amyloid plaques. It is the oligomer form that is widely accepted as the most cytotoxic form of Aβ. The purpose of this research is to build a useful tool for the expression and evaluation of Aβ peptides in a simple, cost-effective genetic system (*S. cerevisiae*). Because Aβ peptides are nontoxic to yeast and do not produce an easily assessable phenotype, an Aβ-Cup1p fusion will be used as a reporter. Cup1p is a small protein metallothionein that mediates resistance to high concentrations of copper. We predicted that aggregation of the Aβ-Cup1p fusion would result in the inhibition of Cup1p activity, thus increasing sensitivity to copper. Varying levels of sensitivity to copper were observed in yeast strains expressing Aβ1-19, -28, -40 and -42 fused with Cup1p. Using this system, various Aβ formation and degradation mechanisms are being investigated, such as the ability of Insulin Degrading Enzyme (IDE) to cleave Aβ peptides and disaggregate Aβ-Cup1p to restore Cup1p function.

Automated Stellar Classification

Zachary Chilton, CURO Research Assistant
Dr. Inseok Song, Physics & Astronomy, Franklin College of Arts & Sciences

Measuring stellar properties is a very time consuming process. Key properties — such as effective temperature, surface gravity, radial velocity, rotational velocity, and metallicity— are tediously calculated from the many absorption features in a star's approximately-blackbody spectrum. We worked to develop an autonomous method of calculating these properties using theoretical stellar spectra. High resolution theoretical spectra have been calculated for stars with many combinations of physical parameters. After creating a database of theoretical spectra, we implemented various computational methods to find the theoretical spectrum that best matches the input observed spectrum. We then assign the key properties that generated the theoretical spectrum to the observed star. We can identify these stellar parameters in a matter of minutes.

Assessing the Effects of Different Types of Parental Care on Nestling Survival in a Migratory Songbird

Ryan Chitwood
Joanna Hatt, Researcher
Mason Cline, Graduate Student
Dr. Robert Cooper, Warnell School of Forestry & Natural Resources

Nest predation has been shown to limit the productivity of forest-breeding migratory songbirds, with implications for both the conservation and evolution of life history strategies of these species. Skutch's hypothesis (1949) offers that nest predation should

increase with nest activity. Because provisioning of young dominates nest activity during the nestling stage, high provisioning rates should coincide with low nestling survival in spite of the direct benefits of provisioning. Many studies have tested Skutch's hypothesis by comparing predation risk between the incubation and nestling stages with little consensus. Here, we studied the effects of different strategies of parental care on Black-throated Blue Warbler *(Setophaga caerulescens)* nestling survival. We hypothesized that during the nestling stage male provisioning rates should correlate positively with nestling survival, allowing females to provision at lower rates. We measured provisioning rates for each parent in addition to other parental care types. Female provisioning rate was the top predictor of nestling survival for all models followed by male provisioning rate. Covariate predictions showed a relatively strong negative influence of female provisioning rate on survival and the opposite trend for male provisioning rate. Our results suggest that the optimal parental care strategy incorporates a shared provisioning burden that allows both parents to spend more time investing in other activities.

Mapping the Genetic Basis of Floral Traits in Cultivated Sunflowers

Erin Clark, CURO Research Assistant
Dr. Lisa Donovan, Plant Biology, Franklin College of Arts & Sciences

The goal of this study is to quantify the amount of genetic variation in floral architecture in cultivated sunflowers (*Helianthus annuus*), as well as identify the genetic basis of key floral traits. Despite their agricultural and horticultural importance, the genetic bases of most floral traits have yet to be determined in crop sunflowers. Recent efforts have established a 288-line association mapping panel for the purposes of determining the genetic basis of key phenotypic traits. This panel captures about 90% of the genetic variation across varieties of crop sunflowers, and each line has been heavily genotyped for over 5500 SNPs. With the use of this association mapping panel and its known genotype data, floral traits of interest can be mapped to the genome. It is hypothesized that the floral architecture of *Helianthus annuus* is most likely based on many genes of small effect, though there may be individual regions of very large effect present as well. Based on phenotypic variation in floral traits in wild *Helianthus*, it is also hypothesized that variation in floral architecture is independent of overall flower size, and that these traits map to distinct regions.

Introgression of a *Wolbachia* Infection into a Non-Native Host

Kathryn Clark, CURO Research Assistant
Dr. Kelly Dyer, Genetics, Franklin College of Arts & Sciences

Wolbachia are maternally inherited endosymbiotic bacteria that infect upwards of 60% of all insects. Their effect on the insect host varies depending on the strain of *Wolbachia* and the genetic composition of the insect host. In two closely related species of *Drosophila*, the same stain of *Wolbachia* causes different effects. In *D. recens*, the *Wolbachia* infection causes all the offspring to die. In *D. subquinaria*, however, this same *Wolbachia* strain causes only the males to die. The amount of male-killing varies within this species, potentially based on where the line is located geographically. In order to further analyze the effects of *Wolbachia* in non-native hosts and to ask how common the gene that suppresses male killing was, I attempted to move a *Wolbachia* infection into a *D. subquinaria* line that was not resistant to male-killing. This would enable further understanding of the evolutionary history of *Wolbachia* in these species and how the genetics of host and bacteria interact to drive

the evolution of this association. To do this, I established crosses between females from hybrid *D. subquinaria* lines (lines with mitochondrial DNA from *D. recens* and nuclear DNA from *D. subquinaria*) and males of either *D. subquinaria* or *D. transvera*. In each cross, I collected all the offspring and counted the number of males and females, looking to see if a female bias was present in the offspring sex ratio. After many generations of backcrossing, no male-killing was found among the various backgrounds of introgressed lines.

Potential Health Risks of Teen Online Behaviors

Jasmine Clayton, CURO Research Assistant
Dr. Maria Len-Rios, Grady College of Journalism & Mass Communication

With the rapidly changing technological structure of our society, many adolescents are growing up where smart phones and social media are a significant part of their lives. These media provide constant means for their social communication online, whether through direct or indirect interaction. The goal of our research is to explore how these online portals affect the psychological and physical well-being and health of adolescents. To begin our process, we will conduct a literature review. Our search will be guided by Festinger's social comparison theory. According to a previous study (Spurr, Shelley, Berry, Lois & Walker, 2013), teens often compare their bodies with media images, leading to unhealthy actions in an effort to attain an idealized image or persona. In another study (Wang, Jackson, Gaskin & Wang, 2014), there was positive relation between a user's well-being and the use of social networking sites for social communication. For this study, we plan to conduct six focus groups with adolescent boys (2) and girls (4) at middle schools in Henry County in order to learn how adolescents' use of social media impacts their views on body image and level of self-esteem. Then we will transcribe the interviews, engage in data analysis and write up the research results for publication. This research is significant because social media has a growing impact on adolescents. We can use our research to propose ways to combat any negative effects social media has on the health and well-being of adolescents.

Csmd1—a Novel Candidate Gene Related to Kidney Disease

Erica Coe, CURO Research Assistant
Dr. Robert Pazdro, Foods & Nutrition, College of Family & Consumer Sciences

Kidney disease is one of the top ten causes of death in the United States, affecting millions of people each year. The endogenous antioxidant glutathione (GSH) is a key regulator of renal oxidative stress and the ratio of GSH to its oxidized form (GSSG) is an informative indicator of oxidative stress. We quantified GSH concentrations and GSH:GSSG in kidneys isolated from 30 genetically-diverse inbred mouse strains. We performed genome-wide association mapping by efficient mixed model analysis (EMMA). We discovered that phenotypic variation of renal GSH concentrations and GSH:GSSG ratios were associated with 19 single nucleotide polymorphisms (SNPs) located within the Csmd1 gene on chromosome 8. We predict that Csmd1 is a regulator of renal oxidative stress and possibly renal disease. To validate our results, we used statistical analyses and EMMA to evaluate several renal function strain survey data sets in the Mouse Phenome Database (MPD), a community resource that facilitates the sharing of strain data. To experimentally validate Csmd1 and its role in renal oxidative stress and disease, we ordered a litter of Csmd1 knockout mice, which were successfully cryorecovered by the mutant Mouse Regional Resource Centers (MMRRC). In our next study, we will test whether Csmd1 knockout mice exhibit a higher incidence of

renal disease compared to wild-type and heterozygous littermate control mice.

The Relationship between Insulin Resistance and Distal Radius Cortical Bone Geometry

Derek Coger, CURO Research Assistant
Dr. Richard Lewis, Foods & Nutrition, College of Family & Consumer Sciences

Insulin is a pancreatic beta cell-derived hormone responsible for glucose regulation and activation of bone-forming osteoblasts. Insulin resistance has been associated with suboptimal cortical bone density and geometry of adolescent boys and girls, but these relationships have not yet been investigated at the distal radius, a common fracture site in children. The purpose of this cross-sectional analysis was to determine the relationships between insulin resistance and distal radius cortical bone measures in non-Hispanic white early-pubertal girls (breast development stage 2/3; mean age = 11.5 years; N=39) who participated in a zinc supplementation trial. Total body fat mass and fat-free soft tissue (FFST) mass were determined by dual-energy X-ray absorptiometry (Discovery A, Hologic Inc). Radius cortical bone geometry was assessed at the 20% site relative to the distal growth plate via peripheral quantitative computed tomography (Stratec XCT 2000). Fasting serum insulin and glucose concentrations were measured, and the homeostasis model assessment of insulin resistance (HOMA-IR) was calculated. Multiple linear regression controlling for FFST, fat mass, and breast development revealed HOMA-IR as a positive predictor of radial cortical bone area and thickness, but a negative predictor of volumetric bone mineral density. These findings suggest that insulin resistance differentially influences cortical bone size versus density. Bone strength depends on both size and density so future studies should investigate the clinical significance of these differential bone responses to insulin resistance.

Behavioral Testing for Cognitive Deficits in Traumatic Brain Injury Piglets

Caroline Coleman, Foundation Fellow
Dr. Franklin West, Animal & Dairy Science, College of Agricultural & Environmental Sciences

According to the CDC, traumatic brain injuries (TBI) are a contributing factor to over 30% of injury-related deaths in the United States every year, with children aged 0-4 at the highest risk. Currently, there are limited therapy options available for the treatment of TBI and the resulting cognitive and neurobehavioral deficits, but human induced pluripotent stem cell-derived neural stem cells (iNSCs) have recently become an option for injury treatment. Due to similarities in brain structure and early development, we are using a piglet model to 1) develop quantifiable and repeatable behavioral tests, 2) determine cognitive deficits following a TBI and 3) explore the effects of subsequent iNSC treatment on these deficits. Two behavioral tests that we will develop for use in the study are the open-field test and the social recognition test. In the open-field test, piglets will be placed in a 12 x 14 foot arena and observed to determine their exploratory interest, motor behaviors, and normal/abnormal behaviors. We expect that normal piglets will have high exploratory interest and will not exhibit any motor deficits or abnormal behaviors. The social recognition test will measure sociability and the ability to recognize familiar pigs from unfamiliar pigs, or social memory. We expect that normal pigs will be highly social and will be able to distinguish familiar pigs from unfamiliar pigs, demonstrating a high level of social memory. The successful development of these tests will satisfy the first objective of creating a quantifiable and reliable behavioral assessment of cognitive abilities in piglets.

Abstracts

The Politicization of Soccer in Brazil, and the Effect of the 2014 FIFA World Cup on Brazilian Politics

Aaron Conley, CURO Honors Scholar, CURO Summer Fellow
Dr. Barry Hollander, Grady College of Journalism & Mass Communication

The role of soccer has come to play a significant role in the culture of many nations. In Brazil, soccer is more culturally significant than in almost any other state. Soccer has even successfully affected Brazilian politics, especially in regards to the 2014 FIFA World Cup. The tension began in Brazil immediately following its successful bid for the tournament but increased to climax following Brazil's semi-final loss to Germany, the eventual champions. Through analyzing social media, especially Twitter, in Brazil throughout the tournament, the 2014 FIFA World Cup was shown to have a significant impact on the nation's presidential election in October 2014. Prior to the tournament, President Dilma Rousseff possessed a significant lead in the polls, but she only won re-election by approximately 4% of the vote in a runoff. Polling data, as well as sentiment analysis on social media, shows the gap between Rousseff and her main opponent, Aécio Neves, closing over the course of the tournament. Sentiment analysis is a method of analyzing social media that places individual posts on a 0-100 scale from negative to positive, determining the overall sentiment of a specific topic or individual over a specific period of time. This type of analysis was performed on Twitter in Brazil throughout the 2014 FIFA World Cup and showed that soccer could truly have a political effect on one of the fastest growing nations in the world.

Age Related Effects on Brain Activation during Cognitive Control Tasks in Subjects with Schizophrenia

Joseph Coppiano, CURO Research Assistant
Dr. Jennifer McDowell, Psychology, Franklin College of Arts & Sciences

Cognitive Control (CC) is vital to daily functioning. One aspect of CC is the ability to filter out irrelevant information in order to perform task-related responses. Functional magnetic resonance imaging (fMRI) research over CC circuitry has sought to better understand the effects of factors such as age or psychiatric disorders. A model of CC is antisaccade task performance. The task requires subjects to fixate on a central cue and instructs them to redirect their gaze towards the mirror image location (opposite direction, same distance) when it moves to the side. Despite well-documented findings that subjects with schizophrenia (SZ) (a psychiatric disorder) perform poorly on antisaccade tasks (more errors and longer reaction times) and display lower brain activations compared to healthy controls, studies of age effects on antisaccade performance are minimal. Through dividing diagnostic groups, SZ (N=24) and healthy controls with low cognitive control (LCC) (behaviorally comparable to SZ) (N=24), into age groups of younger (n=10) and older (n=14) adults, this study seeks to observe the effects age has upon antisaccade CC circuitry. We hypothesize that group and age will have no effect on behavioral measures, but that imaging measures will show higher activation in LCC than SZ and display negative age effects. As hypothesized, there were no differences in behavioral performance. Analyzing the effects of group and age using a 2x2 ANOVA, it was found that SZ had less activation than younger LCC but similar activation between older diagnostic groups. The results demonstrate that SZ does display brain-circuitry changes with age.

Abstracts

Factors Associated with HPV Diagnosis and Perceived Risk for Cervical Cancer among Unmarried, Sexually Active College Student Females

Clayton Cowart, CURO Research Assistant
Dr. Matthew Lee Smith, Health Promotion & Behavior, College of Public Health

Background: The human papillomavirus (HPV) has been identified as the leading cause of cervical cancer in the United States. While risk factors for contracting HPV have been well studied, less is known about the characteristics of those living with the virus and their perceptions about associated health ramifications. The purposes of this study were to examine factors associated with unmarried college student females': (1) HPV diagnosis and (2) perceived risk of getting cervical cancer in future years. *Methods:* Data were analyzed from 1,106 unmarried, sexually active college student females aged 18 to 26 using an internet-delivered questionnaire. Binary logistic regression was performed to compare HPV-related knowledge, HPV vaccination-related perceptions, HPV vaccination mandate support, healthcare utilization, sexual behaviors, and personal characteristics across participants' HPV status. Multinomial logistic regression was performed to assess the degree to which these factors were associated with participants' perceived risk of getting cervical cancer. *Results:* Relative to those who had not been diagnosed with HPV, participants who had more lifetime sex partners ($P<0.001$), had unprotected sex during last intercourse ($P=0.003$), had a Pap test in the past year ($P<0.001$), and perceived themselves to be at higher risk for cervical cancer ($P<0.001$) were significantly more likely to be diagnosed with HPV. Those with HPV were also significantly more likely to support HPV vaccination mandates for school-aged youth ($P=0.036$) and have fewer friends vaccinated against HPV ($P=0.002$). Participants who were uninsured ($P=0.011$), diagnosed with HPV ($P<0.001$), and had a family member ($P<0.001$) or friend ($P<0.001$) diagnosed with cervical cancer were more likely to perceive themselves to be at risk for developing cervical cancer in future years.

Quantitative Modeling of Circadian Rhythms

Sarah Cunningham, CURO Research Assistant
Dr. Jonathan Arnold, Genetics, Franklin College of Arts & Sciences

Many genes of *Neurospora crassa* are under the control of the biological clock in the cell. The clock consists of a closed network group involving the genes *white collar-1, white collar-2, frequency,* and *clock controlled genes* and their RNA and protein products. A model has been proposed that improves upon published models by differentiating between reactions in the cytoplasm and nucleus of the cell. Computer simulations and ensemble runs were used to test these models and refine them. The model created was found to fit experimental data collected from *Neurospora* better than previously published models. A better model could improve research done on all areas of the clock and further our understanding of circadian rhythms.

Energy Systems Module

Haley Daniel, CURO Research Assistant
Dr. Tim Foutz, College of Engineering

An energy system was analyzed based on the full supply chain from primary energy resource availability to consumer demand in order to develop an energy systems module for use in a freshman-sophomore engineering education setting. Each step in power generation and consumption was studied and analyzed in order to emphasize the importance of understanding the process from an engineering standpoint. Aspects of sustainability at each level were also considered. A flow chart of pertinent data and information in the power sector was compiled

and included transportation, power generation, emissions, transmission, distribution, and consumer demand. It is suggested here that this could supplement coursework in various engineering disciplines. From this analysis, data for each component in the system were compiled and detailed, with one being that the average household energy consumption in the state of Georgia was determined to be 13,176 kWh in 2012. This module can be used as a guideline for understanding the interconnectedness of the energy systems process and can serve as a basis for conceptualizing improvements to an existing system.

Spintronics in π-Conjugated Semiconductors: Investigating MEHPPV OLED Magneto-Property Temperature Dependence

Tyler Daugherty, CURO Research Assistant
Dr. Tho Nguyen, Physics & Astronomy, Franklin College of Arts & Sciences

We present findings from the investigation of the effects on magneto-properties of OLEDs when exposed to high-temperature environments. We fabricate organic light emitting diodes (OLEDs) using an organic polymer mixture of MEHPPV and PDOT and test under high thermal conditions in a cryostat with oscillating magnetic field application. The research is important for the development of OLEDs, specifically for integration into common technology which necessitates functionality at a wide birth of temperatures and fields.

Participatory Media: Self-Image and Perception in Women

Aashka Dave, CURO Research Assistant
Dr. Leara Rhodes, Grady College of Journalism & Mass Communication

Participatory media is a developing concept in today's media landscape. A form of media that combines the typically disparate fields of content creation and content consumption, participatory media is very nearly eponymous. Audience members submit content for publication and consumption by other audience members, making audiences both content creators and content consumers. This research investigates participatory media and how it influences body-image and self-perception in women and girls. The research also discusses audience receptivity to furthered media messaging as a result of image and perception influences. A content analysis examined content from three participatory media platforms: *Rookie Magazine*, *Interrupt Magazine*, and *BuzzFeed*. *Rookie Magazine*, founded in September 2011, has a large following among its audience of teenage girls and is continuing to grow. *Interrupt Magazine* has an audience of women in their twenties, but also caters to the LGBTQ community. *BuzzFeed*, as a more mainstream media platform, rounds out the research, providing an opportunity to examine participatory media on a larger scale. Content from these publications was examined through five different themes: body, personality, perception, image, beauty, and size. Content was labelled according to eleven negatively and positively perceived emotions in conjunction with these themes. This information formed the basis for a discussion on the positivity or negativity of participatory media platforms as they relate to image and perception, and resulting audience receptivity. The research consequently determines that participatory media platforms are a positive source of self-image and perception-based thought processes through the emotions that they induce.

Exploring Resistance to Change through Concern for Diversity

Amber Davidson, CURO Research Assistant, CURO Graduation Distinction
Dr. Karl Kuhnert, Psychology, Franklin College of Arts & Sciences

Resistance to change is a common challenge faced by organizations. There are more changes in the workplace today than ever before, especially as organizations strive to bring in innovation, creativity, and a more heterogeneous workforce, which ultimately creates a more diverse work environment. Resistance to change can be viewed in two ways. First, resistance can be interpreted negatively: as a problem, threat, or an enemy to be done away with through any means necessary. Second, resistance to change can be seen more positively: as a way to communicate or a way to interpret discomfort or hesitancy from employees. Colleges and universities also experience resistance to change as they keep up with changing rules and regulations, and which perspective of resistance they take can impact their success in the future. In order to explore resistance to change, the present study examines the importance of openness to new ideas at a university in the southeastern United States. This study found that employees at the university who were more open to new ideas saw a need for increased diversity. When accounting for length of time spent at the organization, this study further found that newer employees' resistance to change and diversity is not different than that of longer-tenured employees. Interestingly, this implies that longer-tenured employees, who are generally older too, are not more likely to resist attempts to increase diversity practices. Greater attention should be directed at gaining the support of all employees, not just new employees, when introducing new diversity programs.

The Role of Leader Experience on Employee Turnover

Amber Davidson, CURO Research Assistant, CURO Graduation Distinction
Kelsey Hamilton
Dr. Brian Hoffman, Psychology, Franklin College of Arts & Sciences

Recent research suggests that leader experience may be a catalyst for employee turnover (Hamori & Koyncu, 2015; Heavey, Holwerda, & Hausknecht, 2013). Given the importance of retaining top talent in the modern world of work (Ployhart, Weekley, & Baughman, 2006), organizations should examine leadership experience as a potential influence on employee turnover. In the current study, N = 155 CEOs from various Italian companies completed a survey. The average level of work experience for the CEOs was 18.24 years (SD = 9.25), while their followers had an average level of work experience of 11.79 years (SD = 8.80). Financial data came from the company Aida, software version 81.00, on 12/08/2014. Our study explores the impact of CEO work experience on staff turnover rates and turnover costs. Our results show a positive relationship between CEO work experience and staff turnover rates $r = 0.27$, $p = 0.04$. Additionally, the relationship between CEO work experience and turnover costs was positive $r = 0.34$, $p = 0.01$. In other words, the more experience a CEO had, the more frequently employees left their organizations. This indicates that a leader's experience on the job may have a negative impact on employees, and that leadership training may be necessary to help leaders maintain positive relationships with followers (Bond & Naughton, 2011). Leader experience is often seen as vital for a company, but if it negatively impacts employee outcomes, its role in leader selection efforts should be diminished.

Sponge Colonization across Varying Salinity Regimes

Kaleigh Davis
Dr. Jeb Byers, Odum School of Ecology

The boring sponge, *Cliona celata*, occupies oyster shells and other calcareous substrate in marine environments. *C. celata* colonization reduces bivalve shell strength, resulting in increased predation vulnerability and

potentially habitat exclusion. Low salinity has been suggested to limit *C. celata* populations. We tested the effect of mean and variable salinity on *C. celata* colonization and survival, first with an observational study of field patterns. Oysters were collected from reefs with episodic freshwater pulses (high salinity variability) and from reefs with more stable salinity regimes to examine the percent cover of *C. celata*. Next, in a manipulative lab mesocosm trial we collected *C. celata* samples in the field and exposed them to different experimentally controlled salinity regimes. We quantified survival time, both over a stable salinity gradient and over high salinity variability (freshet like). We predict *C. celata* will be less tolerant of consistently low salinity and even less tolerant of freshwater pulses. Determining sponge tolerance to different salinity regimes will improve our ability to predict where *C. celata* will have a significant impact on oyster reefs, informing oyster restoration project design. We hope to extend this research to look for relationships between historical oyster reef locations and changes in *C. celata* range as a result of decreased freshwater input in coastal Georgia.

The Associations between Visceral Fat and Appendicular Bone Geometry in Healthy Prepubertal Boys and Girls

Sarah Dawson, CURO Research Assistant
Dr. Richard Lewis, Foods & Nutrition, College of Family & Consumer Sciences

Visceral adipose tissue (VAT) is considered a pathogenic fat depot implicated in numerous metabolic and musculoskeletal conditions. In adults, VAT has been shown to negatively predict cortical bone area and strength at the midshaft of the femur, whereas these associations in adolescents have not been studied. This project aimed to determine the relationships between VAT and cortical bone parameters from data collected on a group of healthy children, participants from a previously conducted vitamin D trial. Participants were black and white boys and girls in the early stages of puberty (mean age=11.3 years; sexual maturation stage 2/3; N=159). Measures of VAT (g), total body (TB) fat mass (kg), fat-free soft tissue (FFST; kg), bone area (TBBA; cm2), and bone mineral content (TBBMC; g) were determined by dual-energy X-ray absorptiometry (Delphi-A, Hologic Inc). Mid-radius and tibia bone geometry were measured via peripheral quantitative computed tomography at the 66% site from the distal growth plate (Stratec XCT 2000). Partial correlations correcting for maturation, race, sex, and FFST revealed negative associations between VAT and both tibia ($r=-0.194$, $p=.037$) and radius ($r=-0.219$, $p=.018$) cortical volumetric BMD (vBMD). Additionally, VAT was negatively correlated with both TBBA ($r=-0.353$, $p<.001$) and height-adjusted TBBMC ($r=-0.338$, $p<.001$). Since vBMD is an important determinant of cortical bone strength, our results suggest that higher VAT may contribute to the increased risk for skeletal fractures in obese adolescents. Further studies should explore the mechanisms through which VAT affects cortical bone.

The Effects of Dietary Wheat Gluten on Swine and Poultry Growth Performance

Carson De Mille, CURO Research Assistant
Dr. Michael Azain, Animal & Dairy Science, College of Agricultural & Environmental Sciences

Wheat gluten is a high-protein ingredient that is commonly used in pet food and milk replacers, but not commonly in swine or poultry diets. Two studies were conducted to determine the effect of dietary wheat gluten on growth performance in weaned pigs and broiler chicks. The first study utilized 48 pigs that were weaned at approximately 21 days and blocked according to weight and gender (16 pens, 3 pigs/pen). There were 4 dietary treatments: 2 control diets and 2 experimental diets with 5 or 10% wheat gluten added at the

expense of corn and soybean meal. Dietary treatments were randomly assigned to pens. Test diets were fed for 2 weeks post weaning, followed by common diet an additional 2 weeks. The second study used 120 day-old broiler chicks that were randomly allotted to pens (20 pens, 6 birds/pen). Birds were assigned to one of 4 dietary treatments: 2 control diets and 2 experimental diets with 5 or 10% wheat gluten. The birds were weighed and feed intake was measured twice weekly for 2 weeks. In both pig and broiler studies, the animals fed diets with 5% wheat gluten grew significantly faster than the animals on other diets ($P<0.05$). Growth rate of pigs or chicks fed the 10% wheat gluten diets was similar to the control diets. These results suggest that the addition of 5% wheat gluten to swine or poultry diets results in a stimulation of growth. This response may be related to the unique amino acid profile of wheat gluten.

Analysis of the Physiological Role of a Bacterial RNA Repair System in *Salmonella*

Anquilla Deleveaux, CURO Research Assistant, CURO Graduation Distinction
Dr. Anna Karls, Microbiology, Franklin College of Arts & Sciences

Salmonella is a pathogen known to cause food poisoning. A specific strain of *Salmonella* known as *Salmonella enterica* subsp. *enterica* serovar Typhimurium is associated with gastrointestinal disease in humans. The pathogen is responsible for over a million illnesses, tens of thousands of hospitalization cases, and hundreds of deaths every year. In our lab, we are characterizing the components, regulation, and physiological role of an RNA repair system that is part of the RpoN regulon of *Salmonella*. RtcR is the transcriptional regulator of the operon that encodes the primary genes of this repair system. However, the environmental stimulus to activate RtcR is unknown. The RNA repair operon is not transcribed under most laboratory growth conditions, including in minimal or rich media; thus far, only the stress of treatment with Mitomycin C (MMC) has been found to induce expression of the RNA repair operon. MMC is an antibiotic that is known to cause RNA and DNA damage, but the mechanism of how MMC activates RtcR is unclear. Other components of the system include enzymes RtcA, RtcB, Rsr (Ro-sixty related protein) and noncoding Y RNAs, YrlA and YrlB. Although we know the enzymatic function of the components of the RNA repair system, their physiological importance is unknown. Therefore, the overall goal is to learn more about the system and how it functions. We want to know if there is an advantage to having the genes expressed from this operon under stressful conditions by stressing the cells with MMC and measuring viability.

Extracellular Vesicle Dependent Transfer of a Virulence Factor Confers Human Infectivity to *Trypanosoma brucei brucei*

Lauren Dennison, Foundation Fellow
Dr. Stephen Hajduk, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Trypanosoma brucei rhodesiense is the causative agent of human African sleeping sickness. The related subspecies *Trypanosoma brucei brucei* is able to establish infection in cattle, but is highly susceptible to lysis by a subclass of human high-density lipoproteins called trypanosome lytic factor (TLF) and therefore unable to cause human African trypanosomiasis. *T. b. rhodesiense* is resistant to TLF due to the serum resistance-associated (SRA) protein, a virulence factor localized to the parasite endosome that binds and inhibits TLF following endocytosis. Recently, our lab has shown that African trypanosomes produce nanotubes that arise from initial budding of the flagellar membrane and vesicularize into heterologous 100 nm

extracellular vesicles (EVs). Western blot analysis of EVs purified from trypanosomes expressing the virulence factor SRA showed that SRA was a component of EVs. We next investigated if transfer of SRA to non-human infectious *T. b. brucei*, via EVs, contributed to pathogenesis. We confirmed EV mediated SRA transfer to *T. b. brucei* by flow cytometry and showed that direct addition of SRA containing EVs to wild-type *T. b. brucei* cells leads to increased survival upon incubation with TLF. Additionally, co-cultivation of *T. b. brucei* and SRA expressing *T. b. rhodesiense* in a trans-well chamber which blocked direct cell-cell contact but allowed EV diffusion conferred TLF resistance to *T. b. brucei*. Our findings show that cell-cell communication, mediated by EVs, can alter the pathogenicity of African trypanosomes.

Stresses Induce Alternate Growth Phenotype in *K. lactis* Yeast Cells
Kaley Desher, CURO Research Assistant
Dr. Michael McEachern, Genetics, Franklin College of Arts & Sciences

When exposed to stresses, *Kluyveromyces lactis* yeast cells exhibit altered cell growth phenotype. It was shown that cells grown on medium containing 0.5 mM sodium arsenate were converted at 50-90% frequency to either of two growing alternate colony morphologies. These altered forms were able to switch back to the normal faster growing morphology at high frequency, indicating the possibility of an epigenetic switch in the growth behavior of *K. lactis* cells. Various strains of *K. lactis* were exposed to different stresses to evaluate which strains are capable of generating the slow growing phenotype at high frequency as well as whether these colonies are more resistant to stresses. Several *K. lactis* strains were plated on YPD plates as well as starvation, 1.2 M NaCl, and 1.5 M KCl stress plates. Dilutions of colonies from each condition were performed so that the presence of the different colony phenotypes could be quantified for comparison purposes.

The Importance of Personality and Emotion in Women's Support for Georgia's Secession, 1860-1861
Melissa DeVelvis, CURO Graduation Distinction
Dr. Stephen Berry, History, Franklin College of Arts & Sciences

Last semester, I completed my honors thesis titled "From 'great excitement' to 'gloomy and threatening:' White Women's Responses to Georgia's Secession, 1860-1861." Through studying letters, journals, and newspaper articles written and read by upper-class antebellum women, I argued that their opinions regarding secession were heavily influenced by personality and degree of contentment with their antebellum lives. Women who felt restricted by plantation life, for instance, often embraced secession as a sign of change and opportunity. Others, more prone to anxiety and worry, denounced secession and predicted the devastation of war. To best illustrate the importance of emotion and personality in deciding one's opinion on secession, I used the letters of sisters Florence and Georgia King of St. Simon's Island, Georgia. Both were raised wealthy on the same isolated plantation, and both were greatly burdened by their mother's death and their ensuing responsibilities. Florence, always a worrier, immediately sensed that secession would wreak havoc on the South and fretted over the ensuing changes. Her sister Georgia responded in the opposite manner, delighting in the escape from her dull life offered by the exciting debates in Milledgeville. These findings are significant in that they reveal mixed opinions surrounding secession in Georgia, rather than unanimous support. Using primary sources such as letters and journals has granted me greater insight into women's history during the time period, an area less explored. Finally,

a study in Civil War events as they occurred differs from the dominant "Lost Cause" memory discussed by historians.

Executive Function Moderates Relationship between Mobility and Functional Independence in Older Adults

Jonathan Dickens, CURO Research Assistant, CURO Graduation Distinction
Dr. L. Stephen Miller, Psychology, Franklin College of Arts & Sciences

Prior research has shown a positive relationship between executive function (EF) and mobility. Similarly, mobility is positively related to functional independence in older adults. This study examined EF as a moderator of the relationship between mobility and functional independence in 62 cognitively intact older adults (39 female) aged 64 to 99 (M = 72.02, SD = 7.46). Mobility was measured using the Short Physical Performance Battery (SPPB); balance, gait, and chair stand subtests were summed to obtain a total score. EF and functional independence were assessed via the CNS-Vital Signs cognitive battery and the Direct Assessment of Functional Status-Revised (DAFS-R), respectively. Hierarchical moderation analysis was conducted first with EF, SPPB total score, and EF x SPPB as predictors of DAFS-R, and then with each of the SPPB subtests independently. Significant interactions were further investigated via simple slopes analysis at ± 1 SD of EF. Age was controlled in all analyses. EF x SPPB predicted DAFS-R ($F = 5.099$, $p = .028$), and significant subtest interactions included gait x EF ($F = 6.470$, $p = .014$) and chair stand x EF ($F = 4.275$, $p = .043$). Simple slopes analyses indicated that SPPB ($t = 2.13$, $p = .038$) and gait ($t = 2.20$, $p = .031$) predicted DAFS-R only at lower levels of EF. Results confirm that EF and mobility interact to predict functional independence in healthy, older adults. In older adults with poor EF, slower gait and weaker lower extremity strength may indicate greater risk for functional decline.

The Refugee Health Care Process: Israel and Syria

Jacqueline DiStefano, CURO Research Assistant
Dr. Denise Clark Lewis, Child & Family Development, College of Family & Consumer Sciences

Since the civil unrest in Syria began in 2011, over four million Syrians have fled and another 6.5 million have become internally displaced. Despite the long and tense history between Israel and Syria, Israel has been providing healthcare to fleeing and injured Syrian children, civilians, and fighters since early 2013. This form of conflict and distance can cause a dehumanization of enemy nations by creating a negative stereotypical image of the individuals based on the greater geopolitical landscape. My research on this situation focuses on individual human relationships between Israeli healthcare providers and Syrian patients. I want to understand the dynamics of their interactions, specifically, how their relationships were influenced by the healthcare process. Participants were Israeli healthcare providers who came from a variety of different cultural, religious, and social backgrounds as well as different healthcare careers. Qualitative data were carefully analyzed by two researchers through Atlas TI in order to bring out a variety of themes showing if and how their relationships evolved over time and what types of barriers they overcame. Overall, the study is intended to show the experiences of the healthcare providers and their Syrian patients and how these experiences influence bidirectional humanization.

Abstracts

Hollywood's Risqué Years: Female Body Exposure in Pre-Code Film

Molly Dodd, CURO Research Assistant
Dr. Patricia Hunt-Hurst, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

Hollywood's allure has fascinated Americans since the industry's inception. To some dismay, the silver screen's molding influence surpassed that of traditional centers of influence, such as home, church, and school (Griffith & Mayer, p. 191, 1970). Hollywood's power to directly transmit messages to an impressionable population unsettled many over the fear of Hollywood's ability to perpetuate "immoral behavior." The classification "Pre-Code" describes movies produced prior to the 1934 implementation of Motion Picture Producers and Distributors' Code. The Code banned the portrayal of "immoral behaviors;" however, prior to 1934 "Hollywood made movies for adults who didn't want to be lied to about human nature…[it was] a complex, diverse, socially responsive American cinema" (Viera, p. 6, 1999). In this research, I analyzed female body exposure in fifteen Pre-Code films spanning from 1925 to 1934, including, *Hula* (1925), *Glorifying the American Girl* (1929), and *The Gold Diggers of 1933* (1933). Considered "Hollywood's risqué years," my research provides summary statistics on the portrayal of body exposure in its frequency, function, and degree in comparison with film criticism. My research hypothesizes the influence of female body exposure in Pre-Code film on the progression of female exposure found in socially acceptable fashion and dress. It is considered that "American morals and manners were sped up more by the screen than by any other agency except possibly the automobile" (Griffith & Mayer, p. 198, 1970). Thus, the portrayal of females in Pre-Code films can be considered a catalyzing factor in the social emancipation of women.

Understanding Elementary Reading Fluency and Reading Comprehension

Justin Dooly, CURO Research Assistant
Darrian Bailey
Dr. Paula Schwanenflugel, Educational Psychology, College of Education

The Physical Activity and Learning (PAL) program is a five-year federal grant program designed to study the effects that physical activity has on literacy and reading comprehension. This five day a week program took place at Fowler Drive Elementary School and Chase Street Elementary School in Athens, GA. The method in which this research was conducted was based on grade level. Students participated in one of two groups (2nd and 3rd graders; and 4th and 5th graders) so the students could read grade-level passages and receive grade-level instruction. Research was conducted in order to determine the effects of the PAL program and subsequent exposure to expository texts on students' fluency and comprehension. In the reading fluency enrichment, choral and echo reading strategies were employed in order to determine these practices' effectiveness in the classroom. These strategies were introduced to ensure that these students attained the knowledge for fluency as they progress in the education system. Reading comprehension was a secondary approach to the research. As a result, several strategies were implemented into daily practice. Such procedures included understanding the significance of bolded, highlighted, or otherwise simple queues for important vocabulary; providing experience with questions after reading the material; as well as subjecting students to various forms of questions they may encounter in the future. Ultimately, this research will not only help identify effective practices for improving reading fluency and reading comprehension, but it will also provide an academic jumpstart for those in the program.

Abstracts

Cutting Carbon in the Empire State of the South: A Policy Proposition for Putting Georgia ahead of the Curve

Jonah Driggers, Foundation Fellow
Dr. Jennifer Rice, Geography, Franklin College of Arts & Sciences

Climate change is already having, and will continue to have, profound implications around the world. These impacts include intensification of tropical storms and hurricanes, increased temperatures, rising sea levels, and drought-induced water shortages in both the residential and agricultural sectors. These physical changes will in turn impact social and economic systems. Response to the current and potential impacts of climate change is growing in the US and beyond: the Obama Administration has taken steps to address the role of the US as the largest cumulative emitter of greenhouse gases, thousands of protests have taken place worldwide, and billions of dollars have been divested from fossil-fuel companies. Despite these political and social responses, Georgia remains reluctant to address climate change. By failing to act early on this issue, Georgia is putting both its citizens and its reputation as a national leader at risk. This paper argues that the state should establish itself as a leader in energy innovation and sustainability for both economic and social benefits. To this end, a literature review and subsequent cost-benefit analysis were conducted to evaluate the status quo and three policy alternatives: a revenue-neutral carbon tax in Atlanta; introduction of net-metering technology statewide; and energy labeling and comparison of energy consumption. Based on this evaluation, this paper advocates the implementation of a revenue-neutral carbon tax in Atlanta as the most effective tool to mitigate carbon emissions and place Georgia in a strategic position in the years to come.

The Effect of Yopt2 and *Ssae* Proteins in Wasp Development of Aphids

Stephanie Duff
Dr. Vincent Starai, Microbiology, Franklin College of Arts & Sciences

Some *Acyrthosiphon pisum*, or the pea aphid, contain the endosymbiotic bacteria *Hamiltonella defensa* that is infected with the bacteriophage APSE, which prevents larval development of parasitic wasps such as *Aphidius ervi* from developing within the aphid. The pea aphid is unable to be eliminated by common pesticides, unlike other insects, which increases the chances for crop loss due to its massive population size. My objective is to use yeast as a simple eukaryotic model system and characterize the function of the *SsaE* and *YopT2* effectors from *H. Defensa*. Some include identifying the effects on yeast physiology and membrane trafficking pathways. The procedures include spot plating to test for toxicity and staining with FM4-64 (many of the effects are not known yet but further research progress will result in more findings). The effects will shed light on the mechanisms by which this protein disrupts wasp development. Plasmids with and without the *YopT2* effector protein proved to be nontoxic to the eukaryotic cells. Performing this study to better understand the host-symbiont-pathogen interactions in *A. pisum-H. defensa-A. ervi* system through a yeast model may help to prevent the massive population of pea aphids from killing agriculturally important crops.

Identification of CRISPR Adaptation Complexes and Associated Nucleic Acids in *Pyrococcus furiosus*

Justin Dumrongkulraksa, CURO Honors Scholar, CURO Research Assistant
Dr. Michael Terns, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

CRISPR (Clustered, Regularly Interspaced, Short Palindromic Repeats) loci and their

associated genes (Cas) comprise an adaptive defense system in bacteria and archaea. This immune system protects the organism against phages and other foreign genetic elements. Immunity is conferred via the acquisition and incorporation of invader DNA into the CRISPR locus. The locus is then transcribed to produce an RNA complement (crRNA), which guides Cas nucleases in targeted invader DNA or RNA destruction. In the archaeon *Pyrococcus furiosus*, our lab has recently obtained genetic evidence linking four Cas proteins (Cas 1, Cas 2, and Cas4-1 and 4-2) to the function of integration of new invader sequences in a process called CRISPR adaptation. However, the individual roles of each protein in the process are unknown, and will be an area of exploration in my research. To examine how each of these proteins functions in the cell, a number of experiments will be performed in order to test whether or not each protein is a member of a larger functional complex. Additionally, the ability of each protein to bind, recognize, or capture CRISPR and invader DNA will be tested. A CRISPR locus sequence called the leader is required for adaptation. As Cas 1, Cas 2, Cas 4-1, and Cas 4-2 are believed to have some role in adaptation, the leader along with invader DNA is expected to be found when these proteins are immunoprecipitated. This finding would provide substantial insight into this relatively new system.

Use of Pre-Pen Skin Testing as an Antimicrobial Stewardship Initiative in a Not-for-Profit Community Health System

Ian Dunne
Dr. Lindsey Welch, Division of Experience Programs, College of Pharmacy

Pre-Pen (benzylpenicilloyl polylysine) is a penicillin skin test antigen indicated for the assessment of penicillin hypersensitivity in patients with a history of penicillin allergy. Reported penicillin allergies increase both antibiotic costs and resistance by requiring use of alternatives such as carbapenems, vancomycin, and clindamycin. Pre-Pen offers potential to allow safe use of penicillin or related beta-lactam antibiotics resulting in cost savings while avoiding risks of increasing resistance from unnecessary overuse. The objective of this study is to determine clinical and financial impacts of Pre-Pen implementation in patients with a history of suspected IgE-mediated penicillin allergy. In 2014, Pre-Pen was added to the health-system formulary and restricted for use by infectious disease physicians or the antibiotic stewardship team. A pre-approved protocol for nurse administration of Pre-Pen was developed as well as a process for the team to contact physicians in the event of needed therapy changes based on test results. This retrospective chart review included adult inpatients admitted to the health system who received Pre-Pen between August 2014 and February 2015. Included patients had a suspected or confirmed infection that could be treated with beta-lactam antibiotics. Patients were excluded based on history of anaphylaxis, immunocompromised status, or any condition interfering with interpretation of test results. The primary outcomes of this study include antibiotic therapy before and after Pre-Pen and antibiotic acquisition cost data. Secondary outcomes include skin test results and the number of tests ordered secondary to stewardship team recommendations.

Atomic Hydrogen Sticking on Amorphous Water-Ice

John Dupuy
Dr. Phillip Stancil & Dr. Steven Lewis, Physics & Astronomy, Franklin College of Arts & Sciences

Gas-grain reactions have been invoked to explain the formation of many molecules in the interstellar medium (ISM). Molecular hydrogen is one such molecule. Utilizing

classical molecular dynamics, we are in the process of simulating the sticking and/or scattering process of a hydrogen atom on an amorphous water-ice slab (about 20 angstroms thick). Two temperatures of the slab (10 and 70 K) and a variety of kinetic temperatures (10 - 600 K) for the atom are used to model conditions of the ISM. We will determine the sticking probabilities and coefficients using one hundred simulations at each kinetic temperature of the atom for each temperature of the ice. The goal is to verify our results with previous simulations and experiments so that we can move forward with different molecular species (such as O_2) whose primary formation mechanism is through gas-grain reactions. As of now, we are in the process of determining interaction parameters to be utilized for the H-H_2O potential interaction. Once these parameters are calculated, the simulation will be run and analyzed to verify that these parameters describe the system in a physical way.

Evaluating the Climatic and Hydrologic Triggers for the Onset of Harmful Algal Blooms in Inland Water Bodies

Elizabeth Dyer
Dr. Adam Milewski, Geology, Franklin College of Arts & Sciences

Harmful algal blooms (HABs) are a serious environmental problem. They can form in both saltwater and freshwater and can cause serious health problems for wildlife, humans, and agriculture. The formation of saltwater harmful algal blooms has been studied more than freshwater blooms. Therefore, this study focused on looking at the factors that cause the development of HABs in freshwater, to see if they are similar to the factors that cause their presence in saltwater. It is important to ascertain these factors in order to find ways to avoid, prevent, or manage decreased water quality in public water supply. HABs are usually caused by an excess of nutrients being permitted to settle in one place by the timing of environmental factors; this excess of nutrients allows an algae bloom to grow very quickly. We investigated environmental factors (e.g., temperature and streamflow) in Lake Lanier, GA to evaluate the controls of two important parameters. It was hypothesized that we will find that harmful algal blooms are more likely to develop during warm weather and low streamflow, which allows the nutrients and algae to accumulate. The temperature of the water was gathered from field testing, and streamflow was obtained from the USGS. The presence or absence of harmful algal blooms in the lake was determined from Chlorophyll-A field testing and remote sensing algorithms. The results show a strong correlation between high streamflow during the seven days before sampling and lower Chlorophyll-A values; no correlation was found between water temperature and Chlorophyll-A values.

Freggie's Green Machine: The Development of an Entertainment Education Nutrition Intervention for Low-Income Preschool Children

Laura Eckhardt, CURO Research Assistant
Dr. Caree Cotwright, Foods & Nutrition, College of Family & Consumer Sciences

Childhood obesity is a major issue in America, with more than a third of children being overweight or obese. An ideal location to deliver nutrition education is in early childcare centers due to the amount of time spent in that environment and the development of children's food preferences at an early age. One way to promote healthy behavior is to encourage higher intakes of fruits and vegetables. The purpose of this study is to examine the effectiveness of an entertainment education nutrition intervention (i.e. interactive lessons, songs, puppet shows) on young children's fruit and vegetable preferences. The study will be conducted at two low-income childcare centers in Clarke County, Georgia and will include children

ages 3 to 5. One center will serve as the intervention and the other will be the control. The intervention will include nutrition lessons and tastings for three fruits (blueberries, peaches, kiwi) and three vegetables (beets, sweet potatoes, broccoli). The intervention will be conducted for 6 weeks with one new fruit or vegetable being introduced each week. All nutrition lessons will be introduced by Freggie (fruits + veggies), a fun character that will inspire healthy choices with his Green Machine (fruit and veggie cart). We hypothesize that an entertainment education nutrition intervention will improve young children's fruit and vegetable preferences, which will be measured via a previously validated taste and rate protocol, teacher survey, and parent survey. The results of this study will be used to make recommendations for future nutrition interventions targeting low-income preschool children.

How Can We Create a Sustainable Campus? An Assessment of Students' Awareness and Attitudes toward Food Waste and Sustainability in On-Campus Dining Halls

Emily Edwards, CURO Research Assistant
Dr. Juan Meng, Grady College of Journalism & Mass Communication

Roughly one-quarter of the University of Georgia student body is enrolled in the UGA Food Services' meal plan, which offers unlimited access to five on-campus dining halls. However, a substantial amount of food waste is generated in these facilities each day. Therefore, this study is designed to better understand UGA students' awareness, attitudes, and behaviors towards sustainability practices and food waste generation. Two research methods were employed in this study to investigate the topic. First, the researcher conducted an online survey to collect information from UGA undergraduate students who are currently or have been enrolled in the meal plan. Secondly, in-depth interviews with selected employees at UGA Food Services were carried out. The research findings indicated that while UGA students perceive sustainability as an important issue, they do not general act on these beliefs. Research also indicated that students are generally unaware of Food Services' sustainability practices and thus do not act in ways to engender the success of those practices. Lastly, research suggested increasing awareness of sustainability practices could change student behavior; thus, the findings of the study could point to messaging strategies that can be developed and implemented to change student attitudes and behaviors and ultimately reduce food waste generation on campus.

Purification of Endopolygalacturonase from *Aspergillus niger*

Linda Egbosiuba, CURO Research Assistant
Dr. Carl Bergmann, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

The enzymes produced by fungi that degrade plant cell wall pectin play crucial roles in both agriculture and industry. Crop loss due to phytopathogenic fungi is a worldwide problem. Dr. Bergmann's lab studies the biochemistry of cell wall degrading enzymes (CWDE). The goal is understanding the biochemical properties and specificity of these enzymes. Pathogenic fungi use cell wall degrading enzymes (CWDEs) as virulence factors to macerate host tissues both in the establishment and expansion phases of infection. Thus, knowing the mechanisms by which CWDEs function in the host plant cell wall and which proteins are secreted by the fungus during infection is key to understanding the interactions of this pathogen with plants. We focus on endopolygalacturonases (EPGs) from *Aspergilus niger*. EPGs are among the first enzymes produced by the pathogen to break down the plant cell wall. EPGs specifically

hydrolyze polygalacturonate, a major constituent of plant cell wall pectin. *A. niger* is a plant pathogen fungus that has been used as a model organism for studying the role of the pectin degrading enzymes (PDEs) for many years. Dr. Bergmann's lab has centered on the degradation of pectins by fungal enzymes during pathogenesis and plant mechanisms to alter the rate at which that degradation occurs. In order to do this, the lab has been expressing and purifying enzymes from *A. niger*, some of which are native and some of which are site directed mutants, and to characterize them in terms of purity and relative activity. Last spring I successfully worked out the methodology to purify *A. niger* EPG-I. I will be continuing the work on this enzyme and will characterize the pectin cleavage by this enzyme and identify the product of this enzyme.

Technique of Soil Fractionation for AMS Radiocarbon Analyses

Rachel Ehlinger
Dr. Alexander Cherkinsky, Geology, Franklin College of Arts & Sciences

On earth, soils hold more carbon than any other component of the carbon cycle, including the atmosphere. Fractionation and accelerator mass spectrometry are used to study the turnover of the organic matter in soil from its death in the biosphere to its decay into the atmosphere. In order to successfully radiocarbon date the matter in samples, the sediment must be converted to a form suitable for measuring carbon 14. Our study analyzes different carbon pools, including bulk composition, humic acid, and residue of the sediment. These pools are separated through different chemical processes in order to evaluate the mean residence time of the samples through mass spectrometry. The mean residence time allows us to calculate the age of the soil and measure its tendency to react to climate change.

Male Mate Choice between Sympatric and Allopatric Populations of *Drosophila subquinaria* and *Drosophila recens*

Randall English, CURO Graduation Distinction
Dr. Kelly Dyer, Genetics, Franklin College of Arts & Sciences

In a system of two species of fruit flies native to North America, *Drosophila subquinaria* and *Drosophila recens*, which have come into secondary contact since speciation, we examined the role that male mate choice plays in asymmetrical reproductive character displacement between *Drosophila* populations of the same species for both *D. subquinaria* and *D. recens*. For each species, we used males from sympatric and allopatric populations, which were individually placed in chambers with a choice of a manipulated fresh female corpse from either population to observe the patterns of their mating behaviors. We found that in *D. subquinaria*, both sympatric and allopatric males tended to pay more attention to their own population, but found that sympatric *D. subquinaria* males were choosier and less active than allopatric males. In *D. recens*, however, neither sympatric nor allopatric males tended to choose one female population over the other with significance.

Comparison of Spinal Motions Used during Running to Their Spinal Flexibility

Cristian Escalera, CURO Research Assistant
Dr. Kathy Simpson, Kinesiology, College of Education

Understanding the biomechanics of the spine that occur during running could be useful in developing rehabilitation plans for spinal-injured patients. The goal of this study was to compare the spinal motions used during running to individuals' spinal flexibility. For 20 participants, the spatial locations of the reflective markers placed on the spine and body were recorded by a motion capture system while the participant ran at maximum

speed and then performed maximum spinal flexion tasks. More spinal motion occurred in the lower compared to the upper half of the spine, with spinal twisting exceeding the corresponding static flexibility value. This implies that running at maximal speed could potentially be problematic for people with low-back problems.

Characterization of Leigh's Syndrome Patient Human Induced Pluripotent Stem Cells for Clinical Research

Christina Ethridge, CURO Research Assistant
Dr. Franklin West, Animal & Dairy Science, College of Agricultural & Environmental Sciences

Background: Leigh's Syndrome is an inherited disorder of mitochondrial energy metabolism that affects the central nervous system. Symptoms include muscular and neurological degradation leading to death within the first few years of life. No curative treatments are currently available. The reprogramming of mitochondrial diseased fibroblasts into induced pluripotent stem cells will allow for their differentiation into multiple cell types and tissues. If reprogramming is possible, this will function as an invaluable tool for studying disease pathophysiology *in vitro* with the intention of designing future gene therapies and pharmacological treatments for affected patients. *Objective:* Our goal in this study was to generate and characterize induced pluripotent stem cells (iPSCs) derived from skin fibroblasts of Leigh's Syndrome patients. *Methods:* Generated LS-iPSCs using a non-viral, non-integrating mRNA and microRNA system, then characterized iPSCs using immunofluorescence staining for pluripotency markers (Oct4, Sox2, Nanog, Tra-181, Tra-160, and SSEA4). iPSCs were differentiated and stained for endoderm (VIM, AFP), ectoderm (MAP2, TUBB3), and mesoderm (ACTA2, Desmin) germ layer markers. *Results:* The generated LS-iPSCs expressed markers of pluripotency as seen by immunofluorescence staining. Differentiated iPSCs staining showed expression of tissue markers from all three germ layers. *Conclusion:* Characterization of the iPSCs derived from Leigh's Syndrome patient fibroblasts demonstrated that the LS-iPSCs possess characteristics of true stem cells.

Effect of O-GlcNAc Expression on Cancer Stem Cells and the Role of LGR6

Sarah Evans, CURO Summer Fellow, CURO Research Assistant
Dr. Michael Pierce, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Studies have shown that colon cancer stem cells are subject to regulation by post-translational modification, such as by glycosylation. The addition of the monosaccharide O-linked ß-N-acetylglucosamine (O-GlcNAc) to serine or threonine residues on proteins by the enzyme OGT and its removal by OGA have been seen to cycle in response to cellular changes. It has been shown that changes in O-GlcNAc may regulate oncogenic signaling in cancer stem cells, and an elevated expression of O-GlcNAcylation has been found in some tumors, such as those of breast and colon cancer. O-GlcNAc has also been shown to play a role in the epigenetic regulation of some genes and has been implicated in the regulation of stem cells by modifying transcription factors. In particular, the gene LGR6 was found to be hypermethylated in colon cancer and may function as a tumor suppressor. The goal of this study is to determine if LGR6 levels are directly affected by a change in expression of O-GlcNAc in colon cancer stem cells. This objective will be carried out by performing a Western Blot to compare control samples to samples of colon cancer stem cells with OGT knocked out. Cancer stem cells are known to drive tumor formation, progression, and recurrence, and have also been shown to contribute to resistance to chemotherapy and radiation treatments. The results of this study will

provide a basis for studying the potential of OGT as a target for small molecule therapeutic development in colon cancer.

Escherichia coli Uses an IlvA/TrpD-Dependent Mechanism for Thiamine Synthesis

Kristen Farley, CURO Research Assistant, CURO Graduation Distinction
Dr. Diana Downs, Microbiology, Franklin College of Arts & Sciences

Phosphoribosylamine (PRA) is an intermediate in the biosynthesis of both thiamine and purines in *Escherichia coli* and *Salmonella enterica*. PRA is synthesized by the enzyme phosphoribosylpyrophosphate amidotransferase (PurF), and a null mutation in the gene encoding PurF leads to a purine auxotrophy in both organisms as expected. Despite the conservation of metabolic components between *S. enterica* and *E. coli*, *purF* mutants of *E. coli* are able to synthesize sufficient thiamine for growth, while *S. enterica purF* mutants are conditional thiamine auxotrophs. The conditional auxotrophy in *S. enterica* has been exploited to identify and characterize multiple alternative mechanisms of PRA formation that can be enhanced by mutation. This study was initiated to determine if PurF-independent mechanism(s) of PRA formation used by *E. coli* share characteristics with those identified in *Salmonella*. Nutritional studies with *E. coli* mutants lacking PurF showed that addition of isoleucine decreased the growth of these strains in the absence of thiamine (i.e. reduced PRA formation). This and other nutritional characteristics suggested that PRA was formed by a pathway of recruited enzymes that was defined in a *ridA* mutant strain of *S. enterica*. In this pathway, an enzyme from isoleucine biosynthesis and one from tryptophan biosynthesis are involved. Specifically, the 2-aminocrotonate intermediate formed by threonine dehydratase (IlvA) is used by the TrpD enzyme to generate PRA. Genetic studies described here revealed that the IlvA-, TrpD-dependent pathway defined in *Salmonella* is functional and highly integrated in the metabolic network of *E. coli* even when the RidA protein is present. These data indicate the metabolic makeup of *Salmonella* and *E. coli* are distinct enough to cause significant growth differences. Labeling studies following the incorporation of threonine into PRA will further probe the use of this mechanism for thiamine biosynthesis by *E. coli*. Studies like these emphasize the fact that different metabolic network configurations can be achieved while using the same components, which is important for evolutionarily related organisms that inhabit separate niches like *S. enterica* and *E. coli*.

The Effects of Ethinylestradiol and Levonorgestrel on the Central Nervous System and Behavior in Rats

Nathan Farr, Foundation Fellow
Jean Simone, Graduate Student
Dr. Philip Holmes, Psychology, Franklin College of Arts & Sciences

This represents the ideas and work of Jean Simone and Philip Holmes. My writing serves to consolidate and summarize the research for the express purpose of my own learning rather than to introduce new ideas or present those ideas as my own. Synthetic chemical contraceptives are the most commonly utilized form of reversible female contraception. Such drugs prevent pregnancy by modifying levels of gonadal steroids. Ample research details the somatic effects of such drugs, and a large body of work defends the benefits of restoring normal levels of circulating gonadal steroids, for example in post-menopausal women. Yet the literature fails to explain the effects that chronic use of chemical contraceptives may have on behavior and its underlying neurochemistry. To this aim, a single dose of ethinylestradiol, levonorgestrel, or saline vehicle was administered subcutaneously to

female Sprague Dawley rats daily. Rats were then tested in novel object (NOR), place (NOP), and context (NOC) recognition paradigms to assess learning and memory. Rats were also evaluated using the rotarod performance test to assess balance and coordination. Serum estradiol and ovarian weights were measured and brain tissue was preserved for analysis of tyrosine hydroxylase (TH) and gonadotropin-releasing hormone (GnRH) by ELISA method. No significant effects of drug treatment were found for NOP. Low dose (10 μg/day) ethinylestradiol impaired NOR while high dose (30 μg/day) improved performance. Low dose (20 μg/day) levonorgestrel improved NOC performance while high dose (60 μg/day) impaired it. All drug treatments lowered estradiol levels. Future studies anticipate the use of immunohistochemistry and other assays to inquire into a possible mechanism for the effects seen in the behavioral studies.

Insects in Shakespeare's Works

Giselle Fernandez
Dr. Fran Teague, Theatre & Film Studies, Franklin College of Arts & Sciences

My research explores the effects of insects on Shakespeare's life and works. When it comes to the past, bugs are usually the ones responsible for huge changes in populations—whether those changes are massive amounts of death, like the plague and famines caused by harvest failures (usually due to bugs), or large boosts in population brought on by bounteous harvests and surpluses of food. Just these few things are integral in several of Shakespeare's most popular plots and themes: the plague that prevents Friar Laurence from delivering a life-changing letter in *Romeo and Juliet*, along with the many feasts that are mentioned and hosted in many of Shakespeare's plays, for starters. People are captivated and repulsed by insects, and their enchanting nature as well as their ability to destroy has never ceased to affect us. In Shakespeare's *A Midsummer Night's Dream*, the fairies with insect-like features and abilities are creatures of intrigue and magic, and butterflies are mentioned as things of wonder and beauty, while in the very same play, other insects such as beetles are described as frightening and harmful things. Insects have all sorts of influence over our lives today, and they have shaped and molded history into the present. Insects are far more important than most people realize, and a small (but very powerful) part of that importance is in Shakespeare's works, which stand at the very base of Western theatre as we know it today.

Evaluating Pre-Medical Students' Experience with/Understanding of Autism Spectrum Disorders

Allison Fialkowski, CURO Honors Scholar, CURO Research Assistant
Dr. David Gast, Communication Sciences & Special Education, College of Education

One in 68 children is diagnosed by age eight as being on the autism spectrum according to the Centers for Disease Control and Prevention (Baio, 2014). Because autism spectrum disorders (ASD) and co-morbidities frequently associated with ASD result in more healthcare visits for those with ASD than for their neurotypical peers, those working in healthcare need to have a high comfort level and understanding of ASD to ensure this population receives adequate care (Gurney, McPheeters, & Davis, 2006; Liptak, Stuart, & Auinger, 2006). Research supports that the earlier in a medical student's education the student is introduced to psychological concepts, the more the student will integrate psychological concepts with clinical ones (Williams, Milton, Strickland, Ardagh-Walter, Knapp, Wilson, et al., 1997). In order to evaluate pre-medical students' comfort level and experience working with those with autism, I have developed a survey using Qualtrics software. Using the results of this

survey, I will analyze the data to see what resources pre-medical students may need and would use to obtain information about autism. In providing adequate, relevant information about autism, students will be able to integrate these psychological concepts into their learning prior to formal medical education.

The Role of Executive Functioning in Adherence for Pediatric Solid Organ Transplant Recipients

Kelsie Flanigan, Charlotte Goldman, Tyler Stollman
Graduate Students: Ana Gutierrez-Colina, Cyd Eaton, Julia LaMotte
Dr. Ronald Blount, Psychology, Franklin College of Arts & Sciences

Executive functioning (EF) involves higher-level cognitive skills, including those needed for planning and management of tasks. Pediatric transplant patients are responsible for maintaining a complex medical regimen, which often involves taking different medicines multiple times a day. As a result, those who have problems with EF may be at a higher risk for nonadherence. No prior research has considered EF in this population or how it might affect medication adherence. The purpose of this study was to measure EF in a sample of adolescent and young adult transplant recipients and explore possible relationships between EF, adherence, and barriers to adherence. Thirty-six participants (M age =16.64) with a solid organ transplant (heart, liver, or kidney) and their caregivers (M age= 54.64) were evaluated in this study. Participants completed both self- and caregiver proxy-report measures of EF, medication adherence, and barriers to adherence. T-test analyses indicated more difficulties with EF in adolescent and young adult transplant recipients than in members of a normative sample (M difference -14.61; $t(35)=5.9$; $p<.000$). Forty-seven percent of participants had clinically significant problems in EF. Further analyses demonstrated positive correlations between EF problems and barriers to adherence ($r= .39$, $p< .05$), and also between EF problems and nonadherence ($r= .43$, $p< .05$). Early detection of deficits in EF could pinpoint individuals at risk of nonadherence. Finally, future studies in EF could lead to early identification of patients at risk for nonadherence and to the creation of adherence interventions designed to improve medical outcomes in this population.

Metabolism and Blood Flow in 4 Regions of the Gastrocnemius

Alyssa Ford, CURO Research Assistant
Alia Church, CURO Research Assistant
Dr. Kevin McCully, Kinesiology, College of Education

Purpose: To measure blood flow, metabolism, and oxidative capacity in four locations (lateral, medial, proximal, distal) of the gastrocnemius muscle during progressive exercise. *Methods:* A four-channel near infrared spectroscopy device was used to simultaneously measure oxygen saturation of hemoglobin in four locations. Plantar flexion was performed for 280 seconds at three levels of resistance. After exercise, blood flow was measured using a venous (65 mmHg) occlusion and metabolic rate using an arterial (250+ mmHg) occlusion. Following a short bout of plantar flexion, muscle oxidative capacity was measured as the rate of recovery after muscle oxygen consumption (mVO2). Rapid inflation of a blood pressure cuff was utilized to measure mVO2 at least 20 times during recovery. *Results:* Blood flow and oxidative capacity remained constant in each region during rest and progressive exercise, while metabolic rate increased with increasing exercise intensity. The proximal portions of the gastrocnemius had higher metabolic rates than distal. The lateral portion had higher metabolic rates than the medial in their respective portions (proximal and distal). *Conclusion:* Simultaneous measurement of

metabolism and blood flow in four locations in the same muscle was successfully performed. The gastrocnemius showed a 5-6 fold increase in metabolism during progressive exercise. Based on preliminary analysis, proximal regions of the gastrocnemius do more work during progressive exercise than the distal portions. Blood flow is restricted in the medial region of the gastrocnemius when compared to the lateral during exercise. Future studies can use this approach when studying muscle or cardiovascular disease.

Image Effects on Young Women's Perceptions and Engagement in Healthful Behaviors

Sophie Frankham-Smith, CURO Research Assistant
Dr. Maria Len-Rios, Grady College of Journalism & Mass Communication

This paper will investigate whether images that depict healthfulness as sexy and alluring can actually have unintended effects on young women's motivations and feelings about engaging in healthful behaviors. Health communicators use visuals to increase audience understanding of health problems, assess health risks, and to make the information more personally relevant. Visuals may increase emotional response to the health message, increase satisfaction with the communication, and aid in information recall (Frish, Camerini, & Schulz, 2013). The purpose of this research is to use an experimental design to pick apart how these "typical images" that accompany text on health promotion fliers and emails aimed at young women may, in the short-term, affect participants' body image attitudes, information recall, message satisfaction, and perceived ability to self-regulate one's health behaviors. This research will manipulate images of females (beautiful/sexy, fit/muscular, average, and overweight) accompanying health information intended for late teens. This research is guided by Bandura's social cognitive theory and Festinger's social comparison theory. Exposure to less fit and attractive bodies should be more motivating to females with lower body image. Individual factors are expected to moderate the effect (e.g., body dissatisfaction, mood). The experiment will be conducted with college-age females ages 18-19. This research is significant because it will add to how public relations professionals should use images in health messaging to most effectively share their message and engage women in healthful behaviors.

Cutting Commercial Energy Costs in Atlanta – One LED Retrofit at a Time

Shreya Ganeshan, Ramsey Scholar
Dr. Meghan Skira, Economics, Terry College of Business

The city of Atlanta prioritizes energy efficiency and sustainability among office spaces, and, in 2012, adopted the DOE's Better Buildings Initiative to reduce energy and water consumption by 20% in 2020. Currently, lighting upgrades to efficient technologies target halogen, incandescent, and old T12-fluorescent fixtures, upgrading them to newer T8-fluorescent bulbs. However, even buildings that have undergone renovation do not operate at optimal efficiency. Because lighting is the lowest hanging fruit in terms of decreasing electrical energy demand, LED lighting, the most efficient commercial technology, should replace existing lighting to maximize efficiency. LED lights have longer lifetimes than other bulbs and emit brighter light, reducing the required number of bulbs per square-foot of office space. Cost-benefit analyses indicate that through four-year phase-ins (typical payback period for LED retrofits) commercial developers should benefit from returns on investments, even after the first year because LED bulbs annually cost less than alternatives. First

performing LED retrofits on participants in the Atlanta Better Buildings Challenge (BBC) will allow the 111 (out of 129) offices already approved for or undergoing renovation to reduce energy consumption by 20% before or by 2020. These offices will serve as leaders and case studies, allowing commercial developers to extend this proposal to their other properties requiring renovation. In the long run, implementation should attract more manufacturers of LED products into the market to reduce installation costs and drive down the price of energy efficient technologies to the point where higher efficiency standards can be enforced through future commercial building codes.

GATA Transcription Factors Substituting HANABA TARANU in *Arabidopsis* Embryo Development

Julian Gendreau, CURO Research Assistant
Dr. Wolfgang Lukowitz, Plant Biology, Franklin College of Arts & Sciences

The GATA transcription factor HANABA TARANU (HAN) is a known regulator of flower, shoot apical meristem, and more recently embryo development. Recent unpublished work has found that the GATA transcription factor HAN functions redundantly with two closely related GATA factors, HAN LIKE 1 (HANL1) and HAN LIKE 2 (HANL2), in embryo development. Knockouts for HAN, HANL1, and HANL2 together produce embryos with striking defects: they fail to form a shoot or root and accumulate abnormally enlarged cells around their periphery, eventually arresting. My research is aimed at understanding whether other members of the GATA family of transcription factors might also play a role in embryogenesis. I have conducted gene swap experiments in which the following eight factors – GATA29, GATA16, GATA17, GATA17-LIKE, GATA22, GATA21, GATA23, and GATA1 – were placed under the control of the HAN promoter and expressed in triple mutants. Preliminary results indicate that GATA29 rescues the triple mutant phenotype and is biochemically equivalent to other HAN genes. We are currently conducting experiments to identify whether this factor plays a role in embryogenesis.

Parenting Intervention Targeting Emotion Communication: Characteristics of Completers and Non-Completers

Jessica Giannotti, Elizabeth Tiarsmith
Dr. Anne Shaffer, Psychology, Franklin College of Arts & Sciences

This study aims to explore differences in parenting characteristics between mothers who completed a parenting intervention versus mothers who enrolled in the parenting course but dropped out early. The 6-session parenting intervention course (Shipman & Fitzgerald, 2005) aimed to improve emotion communication between the mother and child, with a goal of preventing emotional maltreatment. Consistent with past research, we expected that mothers reporting higher levels of stress and emotion dysregulation and more external locus of control, would experience less treatment engagement and thus be more likely to drop out of treatment. We also sought to compare baseline emotion communication skills between treatment completers and non-completers. Our hypotheses were tested using independent *t*-tests to compare treatment completers (n=20) and non-completers (n=10) from a sample of mothers and school-aged children. There were no group differences on mother or child age, mother education, or household income. Results indicated a marginally significant difference in emotional regulation ($t(28)$=-1.71, p=.09), with treatment completers reporting more problems regulating their emotions compared with non-completers. There were no group differences on locus of control or parenting stress. Mothers who completed the intervention reported higher

baseline levels of emotion coaching on all emotional scales, although the difference was only statistically significant ($t(28)=-2.79$, $p=.01$) regarding coaching of fearful emotions. Results suggest that mothers who stay engaged with the course report both strengths (i.e., greater emotion coaching) and vulnerabilities (i.e., higher emotion dysregulation). Further analyses will investigate potential group differences in observations of parent-child interactions completed at the baseline assessment.

Examining Perceptions and Expectations of African American Faculty and Students

Victoria Glover
Dr. Rosemary Phelps, Counseling & Human Development Services, College of Education

Researchers have documented the importance of African American faculty members and mentors in the retention and graduation of African American undergraduate students. Scholars have also identified mentoring as a positive factor in the retention and completion rates of students attending postsecondary institutions (Blackwell, 1989; Faison, 1996; Lee, 1999). Many higher education institutions, especially Predominantly White Institutions (PWIs), have focused on the recruitment and retention of faculty of color in order to diversify their institutions, provide different perspectives in the academy, and to provide a more welcoming and inclusive environment for students. Many PWIs have been successful in their efforts to recruit African American faculty and students, and the importance of having African American faculty involved in higher education continues to be evident. Yet, little research has been conducted examining the interactions and mentoring relationships between African American faculty and students. This is especially true when examining the perceptions and expectations that African American faculty and students have of each other in these interactions and relationships at PWIs. As the number of African American faculty and students increases, the lack of information in this area is problematic for several reasons: (a) little is known about the role of perceptions and expectations in the successful and effective outcomes of African American faculty and student interactions, (b) little is known about how these interactions facilitate growth and development for African American students, (c) little is known about best practices in this area, and (d) little is known about how African American faculty think through and frame these interactions. The current study aims to address the gap in the literature in the area of African American faculty and student interactions, especially as it relates to perceptions and expectations of each other in mentoring relationships at PWIs. By examining the views of African American students and faculty about their perceptions and expectations, we may gain new knowledge and insights into what factors may hinder or facilitate these relationships. This presentation will provide an overview of the theoretical underpinnings and research on African American mentoring relationships, discuss findings from the current study with African American faculty and undergraduate students at a Predominantly White Institution, and discuss future directions in this area of research.

Pre-Camp Characteristics Predicting Camp Outcomes for Children with Tourette Syndrome

Charlotte Goldman, Kelsie Flanigan, Tyler Stollman,
Graduate Students: Julia LaMotte, Ana Gutierrez-Colina, Cyd Eaton
Dr. Ronald Blount, Psychology, Franklin College of Arts & Sciences

Camps for children with Tourette Syndrome (TS) are a unique experience for campers to socialize with other children living with the same disorder. However, individual

differences may contribute to children having different camp experiences. The aim of this study was to determine which child characteristics predicted positive camp experiences for children with TS. Pre-camp attitudes towards having TS and self-competence were evaluated as predictors of post-camp outcomes for children who attended Camp Twitch and Shout. Thirty-one children (M age = 12.32 years) with TS participated. Prior to attending camp, children reported on their attitudes towards having TS and perceived social and general self-competence. After camp, children completed the Pediatric Camp Outcome Measure. A hierarchical regression analysis was conducted to identify predictors of post-camp outcomes, with attitude towards having TS entered in Step 1 and social and general self-competence entered in Step 2. The overall model accounted for 47.8% of the variance in children's camp experience. Attitude towards having TS was found to be a significant predictor of camp outcome, and the addition of social and general self-competence in Step 2 accounted for additional significant variance in predicting camp experiences. However, social self-competence was the only significant predictor at Step 2. These results indicate that children's attitudes towards TS and their perceived social-self competence are predictive of overall camp experience. Conversely, our conclusion indicates that children with lower social self-competence may benefit from extra attention at camp. Finally, additional factors associated with positive camp outcomes should be examined in future research.

Effect of Feeding Method (Breastfeeding vs. Formula) on Postpartum Weight Retention

Randi Goldstein
Dr. Leann Birch, Foods & Nutrition, College of Family & Consumer Sciences

Excessive gestational weight gain (GWG) and postpartum weight retention contribute to obesity among childbearing women. One factor that can affect postpartum weight loss is infant feeding method; the additional energy requirements of breastfeeding can promote postpartum weight loss, especially if infants are exclusively breastfed for several months. *Research Question:* Does the effect of feeding method (breast feeding vs. formula) affect postpartum weight retention? *Methods:* Body weight and body composition data (by BODPOD) were obtained from 12 women at 2, 8, and 16 weeks postpartum; height, initial pre-pregnancy weights, and delivery weights were recorded. The gestational weight gains were compared to Institute of Medicine guidelines. Weight, BMI, %Body Fat, and %Fat Free Mass were analyzed to compare postpartum weight retention loss between groups. *Results:* The sample included 8 participants who exclusively breastfed and 4 who exclusively formula fed. The mean GWG for breastfeeding mothers was 15.6kg, compared to 11.7kg for formula feeding mothers. By 16 weeks postpartum, breastfeeding mothers had lost 3.9 kg and weighed on average 1.4kg above their pre-pregnancy weight, while formula moms had gained 4.1 kg and weighed 7.1kg above their pre-pregnancy weight. *Conclusion:* Although both groups' GWG exceeded the IOM guidelines, by 16 weeks breastfeeding mothers were close to their pre-pregnancy weight, while formula-feeding moms gained even more weight postpartum.

Development of a Lightweight Weeding Robot

Delmaries Gonzalez, CURO Summer Fellow, CURO Research Assistant
Dr. Changying Li, College of Engineering

Nowadays, millions of US dollars are spent in the process of getting rid of weeds by the use of herbicides and manual labor in organic farms. The problem becomes more acute

when many weeds develop resistance to herbicides. To address this important issue, a lightweight robot was developed in this project. The robotic platform used was NI Robotic Starter Kit 2.0, along with a Kinect Sensor to sense depth and color, Arduino Uno microcontroller and a servo motor for the actuators, and a Mintbox 2 PC. Using the Kinect sensor, the robot can detect distance up to twelve feet to avoid any obstacles along its path, as well as detect the color green to differentiate weeds from dirt or plastic mulch. The actuators are made of a spinning brush mounted on a servo motor controlled by an Arduino Uno microcontroller. The navigation is autonomous, using a combination of time intervals and sensors to move along a predetermined path. With the help of the Kinect sensor, not only will navigation be more precise and efficient, but it will provide data on the environment being worked on, which can later be studied and quantified. This lightweight weeding robot provides an alternative to weed control in organic farming, contributing to a more sustainable food production system.

Policy Solutions to Cycles of Poverty and Food Insecurity in Athens, GA

Carver Goodhue, Foundation Fellow
Dr. Susan Tanner, Anthropology, Franklin College of Arts & Sciences

The rate of food insecurity in Athens, GA is significantly larger than both state and federal levels. Food insecurity in Athens can be largely attributed to the high prevalence of poverty, a condition which decreases food security by restricting the financial resources available for food purchases. Food security and poverty are linked in a self-perpetuating cycle; food insecurity can lead to cognitive impairment and poor academic performance in children, reducing income earning potential and reproducing conditions of poverty. There are already several organizations in Athens-Clarke County which address food insecurity. I suggested certain reforms or new uses of these established systems which could more effectively address food insecurity. I created three different policy proposals and examined their theoretical strengths and weaknesses as they related to sustainability, effectiveness, and cost. I chose a final policy which focused on providing nutritious food and nutrition education through school gardens. I judged this policy to be superior to others due to its low cost, high degree of sustainability, and its ability to address nutritional deficits at an early age before they affect educational and professional prospects.

Understanding the Mating Systems of the Fungi Causing Gummy Stem Blight of Cucurbits

Thomas Gottilla, CURO Research Assistant
Dr. Marin Talbot Brewer, Plant Pathology, College of Agricultural & Environmental Sciences

Gummy stem blight of cucurbits, an economically devastating disease, has recently been discovered to be caused by three fungal species: *Stagonosporopsis cucurbitacearum*, *Stagonosporopsis citrulli*, and *Stagonosporopsis caricae*. These species are genetically distinct but morphologically indistinguishable, and may have important biological differences including different mating systems. A critical aspect to understanding mating systems includes an investigation of the mating-type locus (*MAT1*). The *MAT1* locus is conserved among species within the phylum *Ascomycota*, with clear structural differences for self-compatible and self-incompatible species. The objectives to this study are to: (i) identify the *MAT1* locus in all three species, (ii) identify the mating-type genes at each locus, and (iii) compare the mating systems of the three species. Currently, there are draft genomes for three isolates from each of the three species causing gummy stem blight. By cross-referencing the genomes against known mating-type genes, we can identify the *MAT1*

locus. There are two genes in each species responsible for mating type, *MAT1-1-1* and *MAT1-2-1*. The presence of both genes in a single isolate would support self-compatibility; the presence of one gene would indicate self-incompatibility. The locus is likely flanked by the genes *APN2* and *SLA2,* as is the case with most *Ascomycota*. These genes will aid in the identification of the mating-type locus. The structure of the *MAT1* locus for each species is expected to be different, which would further confirm the distinction between these species. Genomic approaches are necessary because mating has not been successfully observed in the laboratory.

Field Test Significance in Adolescents with Chronic Ankle Instability

Morgan Green, CURO Honors Scholar
Dr. Cathleen Brown Crowell, Kinesiology, College of Education

Ankle sprains are the most common sport injuries among athletes and can lead to Chronic Ankle Instability (CAI). Easy to apply, field tests can screen athletes for CAI and assess performance; however, field tests were developed for adults and have not been applied to an adolescent population. The purpose of this study was to determine if functional performance ability is decreased in adolescents with CAI in the single-leg hop test (SLHT), using age as a covariate. We hypothesized that the CAI group would perform significantly slower than the control group, and that age would be a statistically significant covariate. Adolescent soccer players (30 male, 22 female, 15.7±1.4 yrs) completed standardized questionnaires to determine their perceived ankle instability status. Each subject performed two trials of the SLHT, jumping 10 times across a 30cm distance. An ANCOVA analysis was completed ($\alpha<0.05$). The 19 CAI subjects (17.5±4.1s) took significantly longer than the 33 control subjects (11.5±2.8s) ($p<0.001$). Age was identified as a significant covariate at $p=0.004$. Overall, subjects with CAI performed significantly worse in SLHT performance times; however, age appeared to influence performance times. These results demonstrate that SLHT can be used in an adolescent population, while accounting for age, and that CAI in adolescents decreases performance. Future research may assess the use of other field tests in adolescents and the effects of age on performance.

Natural Epigenetic Variation of SVP Results in Acceleration of the Floral Transition in *Arabidopsis thaliana*

Patrick Griffin, CURO Summer Fellow, CURO Research Assistant
Dr. Robert Schmitz, Genetics, Franklin College of Arts & Sciences

With the advent of high-throughput sequencing technologies, the identification of genetic variants and their association with phenotypic diversity is actively being pursued. Largely absent from these efforts is the identification of natural epigenetic alleles (epialleles). From previous experiments, a candidate epiallele was identified in the *SVP* (SHORT VEGETATIVE PHASE) gene of the accession Dja-1, which is a natural strain of *Arabidopsis thaliana* that displays an early-flowering phenotype. *SVP* influences the floral transition in *Arabidopsis*, and mutant alleles of this locus lead to an early-flowering phenotype. Interestingly, the *SVP* alleles are methylated in Dja-1 (hereafter referred to as *SVPepi*) compared to all other surveyed Arabidopsis strains, which leads to the following hypothesis: the methylated alleles of *SVP* in the Dja-1 strain are causative for the early flowering phenotype observed in nature. We have characterized the expression of *SVP* in Dja-1 using RNA-seq, which has revealed that it has the lowest expression in any accession. Furthermore, genetic complementation analysis revealed the Dja-1 allele fails to complement null T-DNA knockout alleles. Treatment with

demethylating agents demonstrates significant reduction of genomic methylation in seedlings; however, phenotypic data of treated adult tissue failed to show significant difference in *SVPepi* expression or flowering time.

Carbon Encapsulated and Magnesiothermically Reduced Diatoms as a Lithium-Ion Battery Anode

Bryan Grommersch, CURO Research Assistant
Dr. Ramaraja Ramasamy, College of Engineering

The chemical technology inherent in lithium-ion batteries has not kept pace with the portable electronics and automobiles that depend on them. Fossilized silica (SiO_2) frustules, or shells, of the fresh-water diatom Aulacoseira feature intricate pores and shapes which make them a promising template for a lithium battery anode. It is believed that retaining these intricacies after a magnesiothermic reduction to silicon and subsequently encapsulating the microparticles in carbon will yield batteries of superior capacity and cyclability.

Multi-Walled Carbon Nanotubes Alter the Acute Toxicity of Diclofenac to *Ceriodaphnia dubia* in Sediment: Water Exposures

Madison Hamilton, CURO Research Assistant
Dr. Marsha Black, Environmental Health Science, College of Public Health

Multi-walled carbon nanotubes (MWCNTs) are a new material with many industrial applications, strong binding properties to hydrophobic compounds, and no demonstrated acute toxicity to aquatic invertebrates at low concentrations. When MWCNTs enter aquatic environments as pollutants, they are predicted to precipitate and interact with sediment but also could bind to water-borne hydrophobic pollutants, reducing their bioavailability to aquatic organisms. Interactions between hydrophobic pollutants, MWCNTs, and sediment could lead to a greater reduction in pollutant toxicity than pollutant interactions with either CNTs or sediment alone. To test this hypothesis sediment elutriate tests were conducted, exposing *Ceriodaphnia dubia* to diclofenac, an anti-inflammatory pharmaceutical with known toxic effects, in the presence of different combinations of sediment, MWCNTs, and natural organic matter (NOM). The greatest reduction in *C. dubia* mortality occurred in the presence of MWCNTs and sediment, resulting in a 25% reduction in mortality compared to the diclofenac exposure. In contrast, the sediment and diclofenac treatment only reduced mortality by 10%. Unexpectedly, the combination of MWCNTs, NOM, and diclofenac increased mortality by 55%, and MWCNTs were clearly visible in the gut tracts of all *C. dubia* in these exposures. Increased toxicity is possibly due to NOM stabilizing CNTs in the water column, allowing for increased interactions between NOM, MWCNTs, and diclofenac followed by consumption of NOM-MWCNT-diclofenac complexes by *C. dubia*. However, sediment decreases the bioavailability of these hydrophobic toxic complexes. Therefore, MWCNT bioremediation efforts should take into account MWCNT stability in the water column and sediment interactions to avoid potential aquatic organism consumption.

Thomas Cole's Architectonic America

Connor Hamm, CURO Summer Fellow, CURO Research Assistant
Dr. Janice Simon, Lamar Dodd School of Art

This research project examines the representations of eclectic architectural forms in the paintings of the early 19th century American landscape painter Thomas Cole. Particular attention is given to *The Architect's Dream* (1840) and his five-part series *The*

Course of Empire (1833-36), which together lament what Cole believed was a faltering America. By examining these six seminal paintings and the representations of Egyptian, Classical, Gothic, and fantastical architectural idioms therein, I propose that Cole blurred the lines between painter and architect and, in turn, between landscape and built environment. I use the following research strategies: (1) formal visual analysis of the paintings themselves; (2) conventional art historical examination of primary/period sources as well as subsequent scholarship; and (3) face-to-face consultation with my mentor. Through such examination of Cole's architectonic paintings, this research project supplements and deepens Cole's artistic legacy as a landscape painter, putting into relief such issues as the relationship between Cole and his patrons, Cole's contribution to the developing American narrative and myth, and Cole's critique of Jacksonian politics. The rendering of architecture is therefore treated as the most apparent and compelling component of Cole's visual jeremiad for America, providing a focused and novel understanding of these paintings and of Cole's oeuvre.

Towards a Parametric Architecture?
Connor Hamm, CURO Summer Fellow, CURO Research Assistant
Dr. Amitabh Verma, College of Environment & Design

This research project examines the architectural philosophy and practice of Parametricism through comparative analysis of two buildings designed by Zaha Hadid Architects: the MAXXI Museum in Rome, Italy and the Heydar Aliyev Cultural Center in Baku, Azerbaijan. I posit that these two buildings allow me to critically examine the growing role of Parametricism as the preeminent architectural style. Comparative examination of these buildings elucidates not only the aesthetic development of Parametricism over the past twenty years (Parametricism-as-style), but also the concomitant structural changes to the built environments of Rome and Baku (Parametricism-as-practice). I use the following research strategies: (1) traditional examination of scholarly materials, including master plans, digital and physical models, architectural reviews, and critical essays; and (2) the design-based methodologies of the Architectural Association Design Research Laboratory, including computational and material analyses, face-to-face critique and feedback modules, and public presentations and critiques. Such robust methodological pluralism allows me to complicate the claim that Parametricism is the architectural style and practice *par excellence*, while also uncovering the ways in which the ubiquity of digital-based design practice has impacted the field of Architecture and the built environment writ large.

The Effects of Size on Development Time and Fecundity in *D. subquinaria*
Joan Han, CURO Research Assistant
Dr. Kelly Dyer, Genetics, Franklin College of Arts & Sciences

Organism body size affects evolutionary fitness by influencing maturation rate, reproductive potential, mating, and life expectancy. To better understand the causes and consequences of body size variation, I investigated the effect of body size on development time and fecundity using two populations of the mushroom-feeding fruit fly *Drosophila subquinaria*. Previous research has shown that flies from west of the Canadian Rockies are significantly larger than flies from the eastern side of these mountains. However, the other physiological characteristics connected to this size discrepancy remain unclear. Through observing the length of time required for flies to mature from time of oviposition to adult emergence out of pupa, I found that the larger population had a longer

development time compared to the smaller one. In addition, by measuring total viable offspring produced by single females, the results showed the larger population to have greater reproductive capacity. This study provides a foundation for further studies on the genetic and evolutionary basis behind body size control. Although larger flies have more offspring, their overall fitness may be hindered by their longer development time. This research may not only help provide insight into mammalian size control due to the similarities between *Drosophila* and vertebrate growth pathways, it may also aid in biodiversity conservation efforts by helping us better understand the mechanisms behind speciation.

Describing Scrambling in Japanese
Spencer Hanlin
Dr. Vera Lee-Schoenfeld, Germanic & Slavic Studies, Franklin College of Arts & Sciences

The syntax of the Japanese language has created controversy in the Japanese community for a number of years due to the rather flexible and somewhat unpredictable nature of its "scrambling" syntax, allowing speakers seemingly to be able to rearrange words and other elements freely. In order to shed some light on the exact nature of this syntactic process, I have conducted a pair of studies to establish a possible set of typologies for possible scrambling sentences and sought native speaker impressions to establish the efficacy of these typologies and what meanings these typologies convey. Based on the data collected and the information gathered from native speakers, I have concluded that there is a significant focus on the use for emphasis and a possible location-focused use that scrambling of sentence elements employs.

Correlation between Narcissism and Turnover within the Workplace
Dennis Hardigree, Alex Cole
Dr. Brian Hoffman, Psychology, Franklin College of Arts & Sciences

This study looks at the relationship between narcissism of chief executive officers (CEOs) and turnover within their companies. The significance of the study is to explore relationships with turnover in an organization in hopes of reducing turnover. We hypothesized that the narcissism scores of the CEOs would be positively correlated with employee turnover. The data were collected via an online survey of Italian company CEOs (N=155) and their followers (N=494). The Narcissism Personality Inventory (NPI-40) was used to measure narcissism of CEOs (Raskin and Hall, 1979), and turnover data was aggregated through AIDA, which records yearly financial records. Narcissism levels of CEOs correlated positively with turnover at 0.78. This finding could have practical implications for the selection process of CEOs.

Hurricane Forecasting and Healthcare Facility Evacuations
Elizabeth Hardister, CURO Honors Scholar
Dr. Curtis Harris, Institute for Disaster Management, College of Public Health

Hurricanes have the potential to produce mega mass casualty and mass fatality events in addition to catastrophic structural damage. The state of Georgia is located in an area vulnerable to hurricanes originating in both the Atlantic Ocean and the Gulf of Mexico; however, Georgia's response to a major hurricane has not yet been tested. The successful evacuation of healthcare facilities in response to an impending hurricane requires advanced notice, timely decision making, and an unprecedented coordination effort between coastal and inland facilities. As a starting point for determining whether

forecasts provide the advanced warning necessary to coordinate evacuations, we evaluated predictive models by comparing historical track data from hurricanes after 1990 to concurrent forecasts. Although emergency managers have benefited from developments in forecasting techniques, the limitations of individual predictive models necessitate special considerations for those that require greater notice for evacuations, specifically patients and residents of healthcare facilities and other individuals with functional medical needs.

Localization of Rv3351c Protein in *Mycobacterium smegmatis* and BCG

Jennifer Hardister, CURO Honors Scholar
Dr. Frederick Quinn, Infectious Diseases, College of Veterinary Medicine

Development of protective strategies against *Mycobacterium tuberculosis* (*Mtb*), a disease that kills nearly 2 million people annually and is the leading cause of death for individuals with HIV, requires an understanding of the mechanisms of host invasion employed by the pathogen. A component of the innate defense of the lung against inhaled infectious agents is the respiratory epithelium. Our laboratory previously showed that *Mtb* strains with mutations in genes *Rv3351c*, *esxBA,* or *hbhA* produce 30-70% less necrosis in human alveolar epithelial cell monolayers compared to the parent strains. Of the products encoded by these genes, only Rv3351c's function is unknown. The long-term goal of this project is to investigate this gene's regulation and its protein product's function. The aim of this current study is to identify the functional location of Rv3351c in the mycobacterial cell using faster-growing and nonpathogenic surrogate hosts, *Mycobacterium smegmatis* and *Mycobacterium bovis*, Bacillus Calmette–Guérin (BCG). To accomplish this task, plasmid vectors expressing *Mtb* Rv3351c will be transformed into these strains. The first vector, pET-19b, contains a polyhistidine tag, which allows for rapid identification by western immunoblots of successfully cloned genes. The second, pMV261, contains an Rv3351c-DsRed fusion that produces a fluorescent product allowing for microscopic analyses. Transformed cultures of the host strains will be separated into cytoplasmic, cell membrane, and secreted fractions and tested for the presence of Rv3351c. The location of the Rv3351c protein product in *M. smegmatis* and BCG provides information for subsequent studies and has implications for the protein's function.

Necessity of Universal Pre-Operative Blood Work in Otherwise Healthy Canines

Kayla Hargrove
Dr. Erik Hofmeister, Small Animal Medicine & Surgery, College of Veterinary Medicine

The objective of this retrospective research study was to determine if performing pre-operative blood work in otherwise healthy dogs influences anesthetic decision making. These decisions include fluid rates, additional procedures, cancellation of surgery, management and monitoring techniques, avoidance of NSAIDs, change in current risk status, changes to client communication, and repetition of blood work. It was hypothesized that few surgeries would be cancelled based on abnormalities, but their effect on other anesthetic decisions would be greater. Cases were identified by the anesthesia records of 100 dogs that underwent elective orthopedic surgeries. Data collected from each case includes: name, age, weight, breed, diagnosis/problem, ASA status, reason for anesthesia, date of procedure, and abnormalities found in blood work. All cases were reviewed by 5 board certified veterinary anesthesiologists. Out of 100 dogs, 0% would have additional surgeries or procedures, 6% would have their procedure cancelled or postponed, 38% would have fluid therapy altered, 31% would have blood work

repeated, 9% would have changes made to monitoring while anesthetized, 50% would have management techniques altered, 12% would have further tests conducted, 10% would have their risk status changed, 42% would have changes in client communication, and 59% would have NSAIDs eliminated from treatment. Results were congruent with the hypothesis. A large number of patients had anesthetic decisions altered on the basis of pre-operative blood work. It is recommended that current blood work requirements remain in place in order to ensure best patient care.

Genetic Determination of Serum Growth Differentiation Factor 15 throughout Lifespan

Elizabeth Harris, CURO Research Assistant
Dr. Robert Pazdro, Foods & Nutrition, College of Family & Consumer Sciences

The Centers for Disease Control and Prevention estimates that 117 million Americans have at least one chronic disease. Cardiovascular disease is the most prevalent chronic condition, especially among people ages 65 and older, causing 1 in every 4 deaths in the United States per year. As the American population steadily ages, it is critical to elucidate the mechanisms by which aging promotes cardiovascular disease. Serum concentrations of growth differentiation factor-15 (GDF15) increases with age and serves as a predictor of cardiovascular disease and all-cause mortality in humans. However, the effect of genetic background on GDF15 levels is undefined. Our hypothesis predicts that genetic background regulates the age-associated increase in circulating GDF15. To test this hypothesis, serum GDF15 levels will be measured in young, middle-aged, and old cohorts of two classical inbred strains: C57BL6/J (B6) and BALB/cByJ (BALB). If our hypothesis is correct, it will demonstrate that GDF15 concentrations and their changes due to aging are genetically-regulated. Success in this study will inform future studies to identify genes and alleles that regulate GDF15 concentrations and, therefore, cardiovascular disease risk in older populations.

Chief Executive Officers' Personality Characteristics and How These Characteristics Affect Marketing in Their Company

Samantha Harris, CURO Research Assistant
Dr. Sundar Bharadwaj, Marketing, Terry College of Business

Our study focuses on the relationship between Chief Executive Officers' (CEOs) narcissistic tendencies and marketing spending (advertising and promotions) undertaken by the companies they are part of. We start with analyzing how narcissistic the CEOs are based on prior scales developed in managerial research. This is done through two studies. The first one entails analyzing each CEO's picture in the annual report based on a number of characteristics, such as the size and positioning of the picture within the report and the presence or absence of other executives in it. The second study is an in-depth analysis of each CEO's "Letter to the Shareholders," investigating the ratio of single to plural personal pronouns. In terms of statistical analysis, we use a multivariate regression approach in order to study whether narcissism exhibited by the CEO is associated with an increased marketing spending, as our hypotheses suggest. We control for a number of different variables, such as firm size, CEO compensation orientation, CEO stock ownership, and CEO tenure at the firm. Overall, we aim to contribute towards a deeper understanding of the impact of chief executive officers' personality characteristics on marketing. Our predication is that if the CEOs are more narcissistic, then they tend to spend more on marketing, even if this is not in the best interest of the firm.

Investigating Resting State Oscillatory Dynamics Associated with Schizophrenia and High and Low Cognitive Control

Rachael Hart
Graduate Students: Anastasia Bobilev, William Oliver, Matthew Hudgens-Haney, Lauren Hayrynen, David Parker
Peter Buckley, MD, Dean, Medical College of Georgia, Georgia Regents University
Dr. Brett Clementz & Dr. Jennifer McDowell, Psychology, Franklin College of Arts & Sciences

Individuals with schizophrenia (SZ) have cognitive deficits that manifest in poor performance on tests of executive function compared to healthy persons. Levels of executive function are associated with performance on working memory capacity (WMC) tasks. Performance on these tasks varies greatly within healthy populations and, similarly to persons with schizophrenia, those with low WMC perform poorly compared to high WMC individuals. This study examines differences in resting state neural activity between persons with schizophrenia and healthy subjects with high and low WMC. In the current study, WMC was determined by a conglomerate score based on performance on computerized operation-, symmetry-, and reading tasks. Persons with schizophrenia, as well as healthy individuals with high and low WMC scores, completed a five-minute eyes-open resting state paradigm while 142 Sensor magnetoencephalography (MEG) data were collected. Time-frequency analysis of resting state activity demonstrated differences in activation between all groups (SZ, High WMC, and Low WMC) across frequency bands. The Low WMC group exhibited commonalities with both the High WMC and SZ groups. Notably, High WMC demonstrated regionalized power differences in the alpha frequency band (8-12 Hz) compared to both Low WMC and SZ groups. Future analyses will employ additional statistical tools to further elucidate differences in oscillatory dynamics across groups. Results from this study suggest that frequency-specific intrinsic activity may markedly contribute to differences in working memory capacity in both healthy persons and those with schizophrenia, while other features of intrinsic activity may be distinctly characteristic of schizophrenia.

***The Motion Picture Story Magazine*: Early Niche Markets, "Fan Communities," and Multi-Platform Transmedia Storytelling in the 20th Century**

Chelsea Harvey, CURO Research Assistant
Dr. James Hamilton, Grady College of Journalism & Mass Communication

This exploratory study seeks to explore how advertisers construct and encourage the creation of "fan communities" for particular products and industries, taking advantage of niche markets and consumer enthusiasm. It also examines the extent to which consumer communities were involved in professional content creation prior to the emergence of the Internet. My research mentor and I analyzed a random sample of nine issues from the 1911 and 1912 publications of one such film industry fan magazine entitled *The Motion Picture Story Magazine*, and placed relevant content, editorials, and advertisements into different categories of reader (or "user") involvement. Results identify "supplier" and "contributor" as the most frequent forms of user involvement by far. The study suggests that the early cinema fan communities organized and aggregated by fan magazines engaged in a form of multi-platform storytelling and the movie industry that went far beyond simply viewing movies. This study lends credence to the claim that convergent storytelling is a long-standing phenomenon, and not only a recent one made possible only via online or digital innovations in technology and media platforms. Furthermore, this study suggests how filmmakers and advertisers used early film fan magazines like *The Motion Picture Story Magazine* to create the consumer

communities that would best benefit them, introducing ways for audiences to interact with films across multiple platforms and in creative ways more than a century before the emergence of digital transmedia.

Effectiveness in Curing Existing Intramammary Infections and Preventing New Cases in Bred Holstein Heifers

Courtney Haviland, CURO Research Assistant
Dr. Stephen Nickerson, Animal & Dairy Science, College of Agricultural & Environmental Sciences

Bacterial infections in the cow's udder result in mastitis, the chronic inflammation of developing milk-producing tissues. Protecting these tissues during the greatest development of the mammary gland (1st gestation) from pathogenic bacteria will guarantee maximum milk production. Nonlactating cow antibiotics are effective in curing infected mammary quarters and preventing new cases of mastitis in uninfected quarters. In addition, teat sealant products have proven effective in preventing new infections and in reducing the chances of contracting clinical mastitis at the time of calving. For this study, mammary secretions were collected from bred heifers prior to treatment and processed for bacteriology, differential leukocyte counts, and total white blood cell counts (WBC) to determine initial infection status. Four treatments (untreated control, nonlactating cow antibiotic, teat seal, and nonlactating cow antibiotic + teat seal) were administered to each of 23 heifers 30-60 days prior to expected calving date. Responses to treatment were monitored at 3 and 10 days postpartum. Significant treatment differences for cure rate, new intramammary infection rate, and WBC were determined with PROC GLM (SAS 9.3). Compared to the control, use of antibiotic and antibiotic + teat seal resulted in higher cure rates ($P<0.05$); no differences were observed among treatments for new intramammary infection rate. Compared to the control, use of antibiotics, teat seal, and antibiotic + teat seal resulted in lower WBC on day 3 postpartum ($P<0.05$). Results demonstrated that treatment with antibiotic, teat seal, or antibiotic + teat seal resulted in less mastitis and lower WBC after calving.

An Overexpression Screen to Determine How *Legionella pneumophila* Effector Protein LegC7 Disrupts Class C Tethering Complex Formation

Chetan Hebbale, CURO Research Assistant
Dr. Vincent Starai, Microbiology, Franklin College of Arts & Sciences

Legionella pneumophila is a Gram-negative bacterial species that causes a severe pneumonia known as Legionnaires' disease. During infection, *L. pneumophila* secretes nearly 300 effector proteins into host cells in order to evade lysosomal degradation by remodeling the host's membrane trafficking pathways. One of these effector proteins, LegC7, has been shown to be lethal upon expression in the budding yeast *Saccharomyces cerevisiae* by disrupting normal vesicle trafficking and vacuole morphology. It is hypothesized that LegC7's toxicity is dependent on an interaction with one or more endosomal genes due to its disruption of cargo localization that transits through endosomes to the vacuole. I examine the relationship between LegC7 and the Class C Tethering Complexes – CORVET (class C Core vacuole/endosome tethering) and HOPS (homotypic fusion and vacuole protein sorting). The CORVET and HOPS complexes have been identified as a set of universally conserved proteins which are essential for early-to-late endosome transition and endo-lysosomal trafficking pathways by tethering membranes, proof-reading SNARE assembly to drive membrane fusion, and interacting with Rab GTPases. Using homologous recombination, 4 different genes will be overexpressed in yeast: *vps8, vps16, vps21* and *vps41*. By assaying whether

overexpression of CORVET/HOPS subunits can suppress LegC7 toxicity, we can determine which specific subunit(s) LegC7 may have binding interactions with.

Superparasitism as a Strategy to Overcome Resistance in an Aphid-Parasitoid Interaction

Alexander Hedaya, CURO Research Assistant
Dr. Kerry Oliver, Entomology, College of Agricultural & Environmental Sciences

Insects are attacked by many natural enemies, promoting selection for resistant phenotypes in natural populations. Pea aphids, *Acyrthosiphon pisum*, for example, maintain significant variation in resistance to a common parasitoid wasp, *Aphidius ervi*, which may be achieved through intrinsic, aphid-encoded means or infection with the protective bacterial endosymbiont *Hamiltonella defensa*. Both resistance types are found in populations of alfalfa-infesting pea aphids, but it remains unclear whether there are conditional differences between aphid-encoded or symbiont-encoded resistance. It was demonstrated that *A. ervi* can detect and selectively superparasitize (two or more oviposition events) aphids with *Hamiltonella*-based protection to overcome their resistance, but is not known if wasps can overcome aphid-encoded resistance via superparasitism. Recently, we found that another pea aphid parasitoid, *Praon pequodorum*, was not susceptible to either aphid- or symbiont-encoded resistance. Aphids maintaining both types of resistance may, however, benefit when facing this parasitoid. In this study we aim to answer: (1) can *A. ervi* overcome aphid-encoded resistance by superparasitizing aphid hosts? (2) are aphids harboring both aphid-encoded and symbiont-based resistance protected against *P. pequodorum*? The answers to these questions will aid our understanding of the basic biology of aphid-symbiont-parasitoid interactions, which is important for the successful implementation of biological control.

Women's Participation in Non-State Militaries Founded on a Secular or Religious Ideology: The Case of Chechnya and Dagestan, Hamas, The PKK

Sarah Hedges
Dr. Lihi Ben Shitrit, International Affairs, School of Public & International Affairs

Women's involvement in militaries has traditionally been limited to positions of support, not engaging in combat or participating in combat-oriented roles. Over time, especially within the last two decades, external pressures and internal demands have led different militaries to incorporate women more heavily. The purpose of this research paper is to examine the roles of women in non-state militaries or armed groups operating from a primarily secular or religious ideology. Three groups will be studied in depth; this includes the major Islamist militant groups in Chechnya and Dagestan, Hamas, and the Kurdistan Workers Party (PKK) fighting in Turkish Kurdistan. The primary question addressed is whether women's participation is greater in armed groups with a secular ideology or armed groups of a religions ideology. This paper reviews multiple sources that offer extensive research on specific militant groups and their involvement in regional conflicts, recruitment measures, the involvement of women in these organizations, and the response of media and the public to these groups' activities. These sources include academic journals, interviews with family members of female militants, and regional newspapers. The results indicate that non-state militaries with a secular foundation provide more opportunities for women in combat-oriented positions; direct military engagement is often limited, but when women do participate in combat it is primarily through conventional means. Conversely,

religious non-state militaries largely use women in unconventional warfare, meaning suicide bombings. While these non-state militaries varied in the positions available to female members, the motivations that women had for participating in these groups were often similar.

Something Old, Something New? A Postfeminist Analysis of the Myth of the "Big Day"

Kristin Henry
Dr. Belinda Stillion Southard, Communication Studies, Franklin College of Arts & Sciences

In this essay, I perform an analysis of the rhetoric that idealizes the wedding as "the big day" for women, rooted in a history of many traditions of marriage and gender roles that now emerge as sources of feminine empowerment. This analysis focuses on two of the most prominent wedding planning websites in the United States, TheKnot.com and WeddingWire.com. The rhetoric of wedding advertising reinforces standards of successful upper-class, white women and continues to treat femininity as the emblem of female competence, inhibiting diverse images of women through false empowerment. Broadly, this study aims to contribute to studies of the tensions between feminism and femininity in postfeminist media outlets.

The Role of Kinesins in Meiotic Spindle Development in Zea Mays

Amy Hodges, CURO Research Assistant
Dr. Kelly Dawe, Genetics, Franklin College of Arts & Sciences

Cell division is a process in which chromosomes are equally divided amongst two daughter cells. A key component of the cell division process is a family of proteins called kinesins. These molecular motors are responsible for pulling chromosomes apart and collecting them in the newly formed cells. Maize (*Zea mays*) has been used for nearly a century as a model for cytogenetic studies. Two specific kinesins of the maize genome, Kinesin6 (ZM-Kin6) and Kinesin11 (ZM-Kin11), are very similar in structure, though they are expressed in different tissues of the plant. ZM-Kin6 is responsible for properly collecting chromosomes during cell division leading to meiocyte (pollen) formation; mutations in ZM-Kin6 cause errors in cell division leading to multi-nucleate daughter cells. Due to the high homology between the two proteins, we predict that the deleterious effects caused by mutations in ZM-Kin6 can be overcome by the over-expression of ZM-Kin11. A maize line in which ZM-Kin11 is highly expressed was crossed with a ZM-Kin6 mutant line. qRT-PCR will be used to confirm the over-expression of ZM-Kin11 in maize meiocytes, and the spindle morphology of these mutant meiocytes will be visualized using immunolocalization. Because kinesins play such a vital role in cell division, learning more about them will provide more information about this complex process at the core of biology.

Investigating Heat Treatment of Serum and Plasma Samples as a Means to Improve the Detection Sensitivity of Heartworm Diagnosis in Dogs

Katherine Hogan
Dr. Ray Kaplan, Infectious Diseases, College of Veterinary Medicine

Dirofilaria immitis, the canine heartworm, can cause serious and sometimes life-threatening pulmonary and vascular disease in dogs. Diagnosis of heartworm is performed by detecting the presence of antigens secreted by female heartworms' reproductive tracts in the blood of dogs, using either Enzyme Linked Immunosorbent Assay (ELISA) or immunochromatography. False negative results may sometimes occur, resulting in heartworm positive dogs being untreated. False negatives may arise when the antigen is bound in an antibody complex, rendering it

unable to bind to the capture antibody in the test. Recently it was discovered that heat treatment can break up the antibody-antigen complex, thus freeing the antigen and allowing its detection. Heat treatment might therefore be able to eliminate false negative results, thereby improving the accuracy of heartworm diagnosis. In currently published work, serum and plasma were used interchangeably without considering impact on results. To test whether use of serum vs. plasma might impact results following heat treatment, serum and plasma from five dogs of infected, uninfected, and unknown *D. immitis* status were collected and tested. Serum, serum-heated, plasma, and plasma-heated samples from each dog were tested using ELISA. Four dogs yielded results consistent with their known infection status for all sample types. However, the fifth dog yielded positive results for plasma and plasma-heated, but negative results for serum and serum-heated. These results are particularly interesting since this dog had been experimentally infected with heartworms but had not been positive on previous tests. Further research is ongoing to examine this discrepancy in results.

3D Printing the Trefoil Knot and its Pages

Frederick Hohman, CURO Research Assistant, CURO Graduation Distinction
Dr. David Gay, Mathematics, Franklin College of Arts & Sciences

Observing the physical geometry of shapes that are particularly tough to visualize in topology has been made easier by visualization techniques such as 3D printing. The work presented here describes the creation of a 3D printed puzzle of the open-book decomposition of the trefoil knot. The open-book decomposition of the trefoil knot describes an object where the trefoil knot is equivalent to the spine of the book. Typical pages of an ordinary book are rectangular and are joined from one edge to the spine; when the equivalent pages of a book are added to the trefoil knot they become surfaces winding inside and outside of the knot. After working through the mathematical theory behind the creation of the puzzle, imploring various concepts such as stereographic projection, we created and printed primitive models, such as the trefoil knot alone, the trefoil knot plus one page, and the trefoil knot plus three pages spaced equiradially. Using Mathematica, a symbolic mathematics computer programming environment, high resolution 3D models of the knot and pages were created. With the aid of other modeling software, namely Blender, the inclusion of twelve pages was made possible by digitally cutting each page in half. From here, holes were removed from the 3D mesh of each half-page to provide space for small magnets. Once printed, magnets are glued into the holes to allow each page and piece of the knot to join together to construct the desired puzzle. The puzzle can be taken apart and rebuilt in various ways that demonstrate properties of the trefoil knot and the accompanying surfaces. The primitive models have been published on Thingiverse.com: the official website dedicated to sharing user-created digital design files for 3D printing, and have been viewed and downloaded thousands of times. Current results have also been posted on the well-known 3D printing blog MakerHome.com, and Wolfram Community, and were written about by 3DPrint.com and other maker websites.

Cas Protein Function in Adaptation of *Streptococcus thermophilus* Type II-A CRISPR-Cas System

Erin Hollander, Foundation Fellow, CURO Research Assistant
Dr. Michael Terns, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

For bacteria and archaea, constant attack by invading genetic elements requires the evolution of novel defense systems. The

recently discovered CRISPR-Cas system mediates phage resistance through a three-step process of (1) adaptation, involving integration of DNA sequences known as spacers from nucleic acid invaders into CRISPR loci; (2) expression, the transcription of small crRNAs from the loci; and (3) interference, in which crRNAs guide effector complexes to recognize and cleave invaders. Cas genes in the CRISPR locus encode proteins involved in the three stages. The Type II-A CRISPR system in *Streptococcus thermophilus*, a key bacterium used in the dairy industry, has one of the simplest systems with only four proteins. This project focused on delineating the function of these four Cas proteins through the functional testing of mutant strains of *S. thermophilus* with deletions of Cas1, Cas2, Csn2, or Cas9. Phage infection of Cas1 and Cas9 deletion strains resulted in loss of function in spacer incorporation, whereas transformation with and without matching spacers retained function in the Cas1 deletion strain but lost function in the Cas9 deletion. These results indicate Cas1 is involved primarily in adaptation, while Cas9 is involved in defense and possibly adaptation. Additionally, functional testing of a Cas1, Cas2, and Csn2 deletion mutant determined all three proteins were necessary for successful adaptation in *S. thermophilus*. Greater understanding of the Cas genes will give insight into the underlying processes of the CRISPR-Cas system as a whole.

Fighting Pain with Pills: Overprescribing and the Opioid Addiction Epidemic

Erin Hollander, Foundation Fellow, CURO Research Assistant
Dr. Amanda Abraham, Health Policy & Management, College of Public Health

Drug overdose deaths increased 117% between 1999 and 2012. Almost three-fourths of all deaths caused by prescription drug overdoses are caused by prescription painkillers, or opioids (CDC.gov, 2014). Increased opioid overdoses are paralleled by a 450% increase in prescriptions from 2007 to 1991 (HHS.gov, 2008). Overprescribing by physicians enables non-medical use of opioids, either by the prescription holder or more commonly by a friend or family member. Current policy centers on the Controlled Substances Act of 1970, which created a framework of "Schedules" for increased regulation of more abusable substances along with the Drug Enforcement Administration for enforcement ("State-by-State Opioid Prescribing Policies," n.d.). However, the rapidly increasing overdose rate and high societal cost indicate these policies are failing. To combat overprescribing, three policy alternatives were proposed and analyzed along with the status quo: (1) mandate usage of Prescription Drug Monitoring Programs (PDMPs), (2) place a hard time limit on opioid prescription, and (3) crack down on pill mills. After extensive analysis, the first alternative was chosen as the most effective, feasible, and cost-beneficial. All but one state currently has the legislation for or a working PDMP, making implementation smooth. Success stories from states which have independently mandated usage will aid in convincing states as well as doctors that PDMPs are worth the cost and effort. A date would be set by which all prescribers must be enrolled in the program, then after a trial learning period weekly logs of patient and prescription information would be required.

Abundancy and Multiply Perfect Numbers

Jackson Hopper, CURO Research Assistant
Dr. Paul Pollack, Mathematics, Franklin College of Arts & Sciences

Two of the oldest questions left in mathematics are related to perfect numbers: whether there is a finite number of them, and whether any of them are odd. We approach these questions by studying arithmetical

property of integers called *abundancy*, which is the sum of an integer's divisors divided by the integer. A perfect number is a number whose abundancy is two. The abundancy of an integer can be found with a simple formula, given its prime factors, but finding all of the integers with a given abundancy is more difficult. An algorithm called solveBA, available on OEIS, quickly returns all integers less than an upper bound whose abundancies are equal to a given rational number, but the algorithm requires a complete list of multiply perfect numbers up to that bound. It is widely believed that all multiply perfect numbers up to 10^{100} are known, but to our knowledge there is no systematic proof any such list is complete. We begin by generating a complete list up to 10^{100} using a modification of solveBA, then use this list to determine which rational number are the abundancy of integers in that range. Additionally, we use recursive criteria to determine many rational numbers, known as abundancy outlaws, which cannot be the abundancy of any integer. We find that available lists of multiply perfect numbers are complete, but determine the abundancy status of more rational numbers than previously known.

Measuring Willingness to Pay for Sea Level Rise in Coastal Communities of Georgia

Kirstie Hostetter, Foundation Fellow, CURO Research Assistant
Dr. Craig Landry, Agricultural & Applied Economics, College of Agricultural & Environmental Sciences

Forces associated with climate change have caused sea levels to rise at an unprecedented rate with much uncertainty about what the exact magnitude of the rising oceans will be. This makes low-lying coastal areas increasingly vulnerable to flooding and infrastructure damages that put both property and people at risk. Currently, FEMA has a program in place called the Community Rating System that offers reductions on flood insurance premiums in proportion to the amount of mitigation and resiliency measures a community enacts to protect themselves against rising sea levels. Our research uses a survey distributed throughout different coastal counties in Georgia to determine whether or not people are more willing to pay for sea level rise adaptation measures if they receive a message of empowerment as opposed to simply facts about how sea level rise affects coastal communities. We do this by sending people to one of two websites with the same formatting but different uses of rhetoric, and then asking similar questions about their willingness to pay for various levels of adaptation measures. This research question comes from psychology literature that indicates people are more likely to take action against a large threat if they believe that their efforts will actually influence the outcome. We hope that our results will contribute to the effort to enroll more communities in the Community Rating System and encourage a larger demand for sea level rise adaptation measures.

Apicoplast Function in *Plasmodium falciparum*

Nathan Howell, CURO Research Assistant
Dr. Vasant Muralidharan, Cellular Biology, Franklin College of Arts & Sciences

Malaria causes nearly 600,000 deaths each year, and it is a mosquito-borne disease caused by *Plasmodium* parasites. Ongoing development of new anti-malarial drugs is very important because of wide spread drug resistance. In fact, the parasite is already resistant to the frontline drug artemisinin. A key characteristic to look for in potential drug targeting is specificity, particularly when treating humans. The deadly malaria parasite, *P. falciparum,* has a unique organelle known as the apicoplast. The apicoplast is required for the synthesis of isopentyl pyrophosphate (IPP), an essential metabolite that is required for parasite survival, and parasites grown in

the presence of IPP can lose their apicoplast. IPP is the metabolic precursor required for synthesis of ubiquinones, polyprenols, and dolichols. We set out to identify which of these metabolic pathways utilizing IPP are important to the survival of the parasite. It was previously known that the downstream synthesis of ubiquinone is essential, and its requirement for parasite survival can be bypassed through the expression of a yeast enzyme. We discovered that exogenous supplementation with dolichols and polyprenols was unable to rescue parasite growth. We are further testing new drugs that can inhibit the IPP synthesis pathway. These results will eventually lead to the development of new anti-malarial drugs through the identification of ideal drug targets.

Ankle Joint Laxity in Those with Chronic Ankle Instability

Katherine Hsieh, CURO Research Assistant, CURO Graduation Distinction
Dr. Cathleen Brown Crowell, Kinesiology, College of Education

Ankle sprains are the most prevalent sports-related injury, with approximately thirty percent of those injured developing Chronic Ankle Instability (CAI). Ankle ligamentous laxity has been demonstrated in those with CAI. Mechanical laxity may be used to help evaluate effectiveness of treatments and outcomes in those with CAI. The purpose of this study was to determine if differences exist in anterior talofibular ligament displacement between individuals with and without CAI. Twenty-one participants (6 CAI, 15 controls, age=22.5 ± 2.2 yrs, height=169.6 ± 9.6 cm, mass=68.5 ± 13.5 kg) completed the Cumberland Ankle Instability Tool (CAIT) and were classified as CAI if they scored ≤24 and as controls if they scored ≥28. Anterior displacement was measured via an instrumented ankle arthrometer. A 150 Newton force was applied to the ankle joint and the amount of anterior displacement was obtained. Three trials were performed on each limb and the last two trials were averaged. Independent samples t-tests were performed to assess for group differences. No statistically significant differences were found between the CAI (16.7 ± 3.2 mm) and control groups (16.2 ± 2.3 mm, p=0.384). Anterior talofibular laxity does not appear in those with CAI. Calcaneofibular laxity and functional deficits may need to be examined in conjunction with anterior talofibular laxity to diagnose CAI. Understanding ankle ligamentous laxity may help provide clinicians with better rehabilitation strategies for those with CAI.

Design of Novel Reporters for Monitoring CaaX Proteolysis

Jesse Hu, CURO Research Assistant
Dr. Walter Schmidt, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

The CaaX motif is a crucial C-terminal protein motif consisting of a cysteine residue, two aliphatic residues, and one variable residue. The clinical applications of CaaX biology are well documented in the literature. Members of the Ras family of GTPases all contain a CaaX motif and help mediate signal transduction events pertaining to cell growth, differentiation, and survival. Mutations leading to permanent activation of human Ras are found in 25% of all types of cancer, 60% of solid tumors, and up to 90% of pancreatic cancers. The CaaX motif directs addition of an isoprenyl group to the cysteine residue. Canonically, this event is followed by proteolysis between the Cysteine and first aliphatic residue by the Ste24p or Rce1p CaaX protease, and carboxylmethylation by Ste14p. These modifications yield the mature isoprenylated protein. This research seeks to better understand the modifications associated with CaaX motifs. We propose a new "shunt" pathway that forgoes the steps of proteolysis and carboxylmethylation for certain proteins such as Ydj1p. Using the yeast *Saccharomyces*

cerevisiae as a model, we have designed approaches and are building plasmid to be used for monitoring the CaaX proteolysis of Ydj1p, Chs4p, and Nap1p. These plasmids will be used for genetic, biochemical, and biophysical studies. For example, we will evaluate the impact of changing the Ydj1p CaaX motif on the Ydj1p-related phenotypes of temperature sensitivity and mitochondrial function. Similar studies will investigate the impact of changing the Chs4p CaaX motif on chitin deposition through calcofluor binding studies. We will also describe efforts toward purifying the aforementioned proteins for use in mass-spectroscopy studies aimed at identifying the specific modifications occurring to the CaaX motif.

Increasing Adoption of an Internet Standard: Internet Protocol Version 6

Heather Huynh, Ramsey Scholar
Dr. Brad Barnes, Computer Science, Franklin College of Arts & Sciences

Internet Protocol version 6, or IPv6, determines how information is sent over the Internet. Even with the benefits of migrating to Internet Protocol version 6, or IPv6, the United States is still lacking in public adoption of IPv6 as a standard for internet protocols due to the public's reliance on IPv6's predecessor: IPv4. The U.S. government has acknowledged the issue, but their course of action is to promote IPv6 as a standard internally, which means only adopting it within the federal government agencies. This policy isn't detrimental, but it doesn't focus on public adoption of IPv6, which is the most important aspect of IPv6 adoption. Three policy alternatives were evaluated in addition to the status quo: incentives for ISPs to adopt IPv6, incentives for content creators to adopt IPv6, and an extension of the status quo to a small group of businesses. The best way to solve this issue is to get the government to incentivize ISPs to adopt IPv6. This is both the cheapest policy to implement and the policy that will result in the greatest number of people gaining access to IPv6 in the shortest time possible. While the policy has a good chance of accelerating IPv6 adoption, there are still issues like where to get the money to fund this policy as well as how cooperative ISPs will be when implementing this policy; however, the first step to implementing this policy is getting the money to incentivize the ISPs.

Upregulation of Transferrin Receptor in *Trypanosoma brucei*

Stacey Ikebudu, CURO Research Assistant
Dr. Kojo Mensa-Wilmot, Cellular Biology, Franklin College of Arts & Sciences

The bloodstream form of *Trypanosoma brucei*, causative agent of human sleeping sickness, internalizes host transferrin as its primary source for iron through receptor-mediated endocytosis. Uptake of host transferrin is dependent on a heterodimeric transferrin receptor encoded by two genes, ESAG6 and ESAG7, which has no sequence similarity to the mammalian transferrin receptor. Iron is needed by *T. brucei* for viability, making transferrin a crucial growth factor. Levels in both transferrin receptor and transferrin uptake can be regulated in the trypanosome by the iron chelator deferoxamine, thus suggesting that the expression of transferrin receptor may perhaps be regulated by iron availability. This hypothesis was tested by first incubating trypanosomes over a 48-hour period with several concentrations of deferoxamine in order to arrest cell proliferation. Flow cytometry and Western blot were used to quantify transferrin binding to trypanosome transferrin receptors. The ability for *T. brucei* to overexpress its transferrin receptor in iron-limiting conditions may contribute to the ability of the parasite to thrive in different mammalian hosts. Transferrin uptake, due to its importance, may be targeted in anti-trypanosome drug discovery efforts.

Abstracts

The Strategy of the Early British Feminist Movement: Emily Davies and Feminist Networks, 1865-1905

Caroline Jackson, CURO Research Assistant
Dr. Steven Soper, History, Franklin College of Arts & Sciences

The significance of networks among participants in the women's movement of the latter half of the nineteenth century has been largely unexplored. This paper will argue that networks were widespread between women active in a variety of different feminist campaigns, and that they were of vital importance in their successes. Networks were important because they enabled the leaders of feminist operations to acquire powerful contacts and large bases of support. Though there was a considerable variety of views on the appropriate goals of the women's movement, networks helped to create a galvanized generation of women pushing for a more important role in society. Consequently, issues pursued by different organizations – such as greater education and professional opportunity – became linked. There was strategic purpose to the creation of networks: credentialist tactics – appeals to equal rights for the sexes – were often unsuccessful in breaking down male power structures, but they helped to accrue a web of interested parties. The power of combination then aided in legalistic struggles over the creation of female-oriented or female-only institutions. This paper will use the efforts of Emily Davies and her circle in the field of higher education as a case study in feminist networks; it will then gesture towards the importance of these networks in the women's movement as a whole.

Embedded Bi-Directional FBG Curvature Sensor

Aneek James, CURO Research Assistant
Dr. Mable Fok, College of Engineering

The research involves designing and investigating the properties of a Fiber Bragg Grating (FBG) sensor embedded in a silicone material for bi-directional curvature sensing. An FBG optical cable spectral response is affected by the FBG's environment, and thus can be used to sense its surroundings. Unfortunately, FBG sensors are fragile, and existing techniques usually involve the use of a bulky non-flexible fixture, making the FBG based curvature less attractive. Our research involves developing an FBG sensor that is embedded in a silicone material, making the sensor flexible and robust. To investigate this, we will compare the responses of five identical FBG sensors embedded in the material, all at different positions. We then will record the sensors' responses to bending by placing them on seven substrates of varying curvatures (30° to 360°). Through plotting the wavelength shifts versus the curvatures, we can examine the slopes of the curves and see how the experimental sensitivity trend compares to the theoretical model we constructed using the concepts of pure bending and the Bragg wavelength condition. The Bragg wavelength's relationship to curvature is highly linear over a large range of values, and its sensitivity seems related to the sensor's position in the silicone material as well as the bending direction. Our preliminary study shows a very promising breakthrough in bi-directional curvature sensing and this novel FBG sensor has potential uses in civil engineering for structural health monitoring, shape sensing, and biomedical engineering.

The Genetic Basis of Leaf Phenolic Content in Cultivated Sunflowers

Amna Jamshad
Dr. Lisa Donovan, Plant Biology, Franklin College of Arts & Sciences

This research works to understand the genetic basis of variation in leaf phenolics in cultivated sunflower (*Helianthus annuus*).

Phenolics are a diverse group of secondary metabolites, many of which act as effective chemical defenses against herbivores and pathogens. From an agricultural perspective, understanding the genetic basis of leaf phenolics will provide plant breeders with resources to develop more pest and disease resistant crop varieties. This research employed a 288-line association mapping panel of cultivated sunflowers that captures ~90% of the genetic diversity across all crop sunflower varieties. After extracting and preparing the samples, the Folin-Ciocalteu assay was used to quantify total leaf phenolic content, and variation in total phenolics was mapped to the sunflower genome using published genotype data for the sunflower association mapping population. This data was used to evaluate hypotheses about the genetic structure underlying the variation in these traits, including (1) that phenolic content will be associated with many genomic regions of small effect, rather than a few regions of large effect, and (2) that regions associated with total phenolic content will cluster due to shared biosynthetic pathways.

The Predictive Power of Self-Reported Computer Usage on Processing Speed and Reasoning Scores

Kharine Jean
Dr. L. Stephen Miller, Psychology, Franklin College of Arts & Sciences

This study examined computer usage experience in older adults toward predicting processing speed and reasoning scores measured by computerized neuropsychological testing, the CNS-Vital Signs (CNSVS). The participants' ages ranged from 64 to 99 with 28 males and 42 females. Participants were grouped based on their self-reported computer usage: frequent and non-frequent computer users. Processing speed was determined by a Symbol Digit Coding task requiring participants to pair symbols with a corresponding number. Reasoning was determined by a Non-Verbal Reasoning test requiring identification of missing objects based on a pattern within a time frame. Both tasks required participants to use a keypad. An independent samples t-test found no significant difference in reasoning scores between frequent (M=2.19, SD=4.08) and non-frequent self-reported computer experience (M=1.22, SD=4.54; t(68)=.845, p=.401). There was a significant difference in processing speed scores between those with frequent (M=40.73, SD=9.74) and non-frequent computer experience (M=32.39, SD=12.17; t(68) = 2.93, p=.005). Hierarchical multiple regression revealed a near-significant effect of previous computer experience relating to processing speed (2.5% variance accounted, p=.069) when controlling for age and clinical dementia rating. Although findings found no difference in reasoning score means between frequent and non-frequent computer users, it suggests that prior computer familiarity may have some power in predicting processing scores. Findings suggest a need to control for previous experience when giving computer-based tasks to older adults that require more than a basic level of computer-participant interaction.

Tissue Factor-Altered Mice Show Upregulated Pro-Inflammatory Cytokine Gene Expression in Experimental Cerebral Malaria

Tiffany Jenkinson
Dr. Julie Moore, Infectious Diseases, College of Veterinary Medicine

Cerebral malaria (CM) is a devastating neurological condition caused by sequestration of *Plasmodium falciparum*-infected erythrocytes in the brain microvasculature. The disease has a high mortality rate and mainly affects children under 5 years of age. Previous studies have shown a pro-coagulant and pro-inflammatory state in patients with CM. As inflammation and coagulation are known to interact, the effect of altered TF

expression on the production of pro-inflammatory cytokines was investigated in a murine model of CM. Tissue factor (TF), a principle initiator of the coagulation cascade, is dramatically upregulated in areas of excessive fibrin deposition, a hallmark of CM brain pathology. 6-8 week old transgenic female mice were infected with 10^6 *P. berghei* ANKA, a CM-inducing murine malaria species. Mice with a null mutation (1% expression), those heterozygous (50% expression) for mouse TF, and a TNF knockout strain were used for these experiments. Weight, hematocrit, and parasitemia were taken daily, and the mice were serially sacrificed between days 4 and 6 post-infection. Brains were harvested and homogenized, and mRNA expression of several critical pro-inflammatory cytokines was assessed by qPCR, including TNF-a, IL-6, IL-1b, and MCP-1. We suspect that in response to the localized sequestration of infected erythrocytes in the microvascular region of the brain, levels of these inflammatory mediators will be significantly increased. The pro-inflammatory response may elicit a chain of events that lead to increased coagulation and fibrin deposition in the brains of these mice, which would contribute to the breakdown of the blood-brain barrier.

Biosynthesis of Base J

Melissa Jennings, CURO Honors Scholar
Dr. Robert Sabatini, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Trypanasoma brucei (*T. brucei*) is a parasitic protozoa that causes African Trypanasomiasis, aka Sleeping Sickness, in humans. *T. brucei* is part of a larger class called kinetoplastids, which are responsible for other deadly human diseases, such as Leishmaniasis and Chagas' disease, that are found all over the world. These kinetoplastids contain a modified T nucleotide, called base J, which regulates RNA polymerase II transcription and gene expression. Base J is not synthesized in the host, but it is essential to the parasite. By understanding base J synthesis and function, researchers may one day be able to develop a specific treatment that will manipulate base J and kill these protozoa. The initial step of J synthesis is catalyzed by two thymidine hydroxylases, JBP1 and JBP2, which add a hydroxyl group to thymine. The second step of base J biosynthesis involves the addition of a glucose to the hydroxylated thymidine by a glucosyl transferase (JGT). What is unknown about this mechanism is how the enzymes recognize specific regions of the parasite genome and modify the thymidine base. The hypothesis is that J biosynthetic enzymes are part of a larger complex that regulate recruitment to specific chromatin regions of the genome. To address this we will identify proteins that interact with each of the enzymes *in vivo* using two approaches: tandem affinity purification and BioID. We will present current data resulting from recombinant parasite cell lines and the search for JBP associated proteins involved in J biosynthesis.

Social Dynamics Affect Learning of a Technical Skill in Infant Capuchins

Thomas Johnston, Ramsey Scholar, CURO Summer Fellow
Dr. Dorothy Fragaszy, Psychology, Franklin College of Arts & Sciences

In the wild there are instances of nonhuman animals learning skills socially and passing these skills on as traditions. I am interested in the factors that promote or inhibit social learning in young capuchins. In a previous study, captive capuchin monkeys, *Sapajus* spp. developed a technical skill (solving a mechanical apparatus for juice reward) and passed it on as a tradition. The data were collected in twelve 30-minute sessions of video with each of four groups of tufted capuchin monkeys. Because proximity to the

device increases the chances of an infant observing a solution, I examined several factors predicted to affect proximity and in turn affect the time (t1) of an infant's 2nd solution (criterion for mastery). The monkeys' presence near the apparatus and interactions with the vending device were coded using one-zero sampling in ten-second intervals. I first created social network matrices to visualize relationships among members of the group. Second, I examined the factors (age, sex, presence of mother, and/or social status) that affect the frequencies of proximity and other factors related to solving. Third, I fitted a linear model for solutions over nine sessions of one group. Infants appear to interact with the apparatus more often than adults, and nearly all infants achieved mastery. Maternal presence increased infant interaction with the device. Higher status males had higher proximity counts but not more solutions. Infants' solutions increased linearly with time. These findings reveal how social dynamics could affect the learning of a technical skill in infant capuchins.

PCR Detection of SRY Gene of Male Dog Mesenchymal Stem Cells in Female Dog Brains with Acute Ischemic Stroke

Susan Jones, Foundation Fellow
Dr. Elizabeth Howerth, Pathology, College of Veterinary Medicine

Intra-carotid-delivered mesenchymal stem cells (MSCs) may improve functional neurological outcomes after acute ischemic stroke (AIS). However, a large animal model is essential before beginning human clinical trials for patients with AIS. This study uses a dog stroke model in which female dogs with experimentally induced AIS receive male-derived MSCs via intra-carotid injection. It is hypothesized that the MSCs will successfully move to the site of infarction and participate in repair of damaged tissue. The objective of the present study is to target the Y chromosome in order to track the migration of the male-dog derived MSCs to various locations by using PCR. To detect the MSCs, techniques were developed or modified from those in the literature to amplify the SRY gene on the Y chromosome by PCR. These techniques were tested and optimized using male dog bone marrow. Two PCR techniques, an original semi-nested technique and one modified from a previously described technique, were then tested using fresh brain samples from female dogs with experimentally induced AIS that were subsequently injected with male MSCs on the side of the stroke. Both techniques were effective at detecting the Y chromosome in the brain samples and are suitable for tracking male-derived MSCs in this dog model of stroke. The next step of this study will be to modify these techniques for use in paraffin embedded samples using a laser capture technique to specifically identify cells containing the Y chromosome in the area of the stroke.

Regional Sourcing of Obsidian Artifacts through Chemical Analysis (pXRF): A Case Study in Western Canada

Travis Jones
Dr. Jeff Speakman, Director, Center for Applied Isotope Studies

In January of 2015, researchers from the Royal Alberta Museum, Canada, and the University of Georgia's Center for Applied Isotope Studies collaborated on what is arguably the largest chemical analysis of archaeological obsidian via portable X-Ray Fluorescence (pXRF) to date in Western Canada. This technique has been successfully implemented in places such as the Mediterranean, Alaska, and the American Southwest. One region of the world, however, rich with prehistoric artifacts made from obsidian, which has lacked any large scale analysis is Western Canada.
The analyzed sample set consisted of approximately 750 artifacts found in various archaeological contexts throughout Alberta.

Comparing trace element concentrations generated through this analysis with those of known geologic sources provides insight into obsidian procurement and use by prehistoric humans in the region. Preliminary data demonstrate that most of the samples' geologic origins are from known sources in the northwestern United States (primarily Idaho), British Columbia, and Alaska. This study is a first step toward expanding our understanding of human utilization of this historically important natural resource in Western Canada.

Who Saved Thad Cochran?: Racial Politics and Voter Mobilization in a Deep South Runoff

Zachary Jones, CURO Research Assistant, CURO Graduation Distinction
Dr. Charles Bullock, Political Science, School of Public & International Affairs

The June 3, 2014 Mississippi Republican Senate Primary saw State Senator Chris McDaniel defeat 40-year incumbent Senator Thad Cochran with 49.5% of the vote to Cochran's 49.0%. Because neither candidate received a majority, the two were forced into a runoff election three weeks later on June 24. Defying expectations, Cochran defeated the Tea Party-backed McDaniel to secure the Republican nomination. Many claimed that Cochran's unlikely victory was the result of his campaign's appeals to traditionally Democratic African-American voters to "cross over" and vote for Cochran in the Republican runoff. This research investigates those claims, as well as the potential impact of African-American voters on the outcome of the runoff election. Simple linear regression and Pearson-R correlation statistics suggest the possibility of African-American influence on the runoff. A closer analysis using ecological inference provides conclusive evidence that black voters in Hinds County were essential to Cochran's victory. This research also draws upon relevant literature, news articles, and historical data to provide perspective on runoff elections, turnout, and racial voting patterns in the Deep South.

Structural and Cultural Factors Influencing HIV Testing and Risky Sexual Behaviors in Young Liberian Women

Taylor Jordan, CURO Research Assistant
Dr. Tamora Callands, Health Promotion & Behavior, College of Public Health

The civil war in Liberia from 1999-2003 destroyed the nation's political and social infrastructure. The purpose of this study was to examine the structural and cultural factors that influence HIV testing and sexual health outcomes among young Liberian women in order to develop effective and culturally sensitive interventions. Five focus groups with 49 women and 16 key informant interviews were conducted. This qualitative data provided insight into the contexts surrounding gender-based violence, mental health, adolescent pregnancy, and HIV risk sexual behaviors among young Liberian women. The interviews reveal poor education, poverty, and mistrust of the Liberian healthcare system influence HIV testing and sexual health outcomes. Findings also suggest that women's increasing role as the primary breadwinners for their families serves as a major driver of lack of HIV testing and sexual health outcomes.

Role of RGS10 in Regulating Neuroinflammation in Microglia

Mugdha Joshi, CURO Summer Fellow, CURO Research Assistant
Dr. Shelley Hooks, Pharmaceutical & Biomedical Sciences, College of Pharmacy

Microglia are the resident immune cells of the central nervous system. Dysregulation of their inflammatory pathways causes chronic neuroinflammation, which is implicated as a cause for neurodegenerative diseases such as

Multiple Sclerosis, Parkinson's, and Alzheimer's, as well as neuropathic pain. Regulator of G-Protein Signaling (RGS) 10 has emerged as an important suppressor of the microglial inflammatory response. Studies have shown that RGS10 exerts a neuroprotective effect by regulating the NF-κB signaling pathway. The NF- κB signaling pathway is also activated by lipopolysaccharide (LPS), a component of bacterial cell walls and a potent activator of the microglial inflammatory response. LPS binds to Toll-like Receptor 4 (TLR4), which is not a G-protein coupled receptor. Even so, its effect seems to be suppressed by the presence of RGS10. To explain this paradox, we hypothesize that a secondary G-protein coupled receptor (GPCR) regulated by RGS10 intersects with the TLR4 pathway and facilitates LPS induced production of inflammatory cytokines. Through methods of cell culture, transient transfection with siRNA, nuclear fractionation, western blotting, and qualitative real time PCR, this study aims to demonstrate the existence of such a facilitative GPCR and investigates GPR84 as a candidate for this receptor. While results do support the existence of a facilitative GPCR regulated by RGS10, they suggest that GPR84 is not the identity of this receptor.

Integrating of Human Neural Progenitor Cells into a Developing Chicken Embryo for a Toxicology Model

Piyush Joshi, CURO Research Assistant, CURO Graduation Distinction
Dr. Steven Stice, Animal & Dairy Science, College of Agricultural & Environmental Sciences

The goal of this project is to establish a developmental toxicology model system, which can be used in the field of toxicology and regenerative medicine. Human neural progenitor stem cells (hNPs) will be injected into the developing chicken embryo and multimodally tracked with MRI and fluorescence microscopy. To accomplish this, hNPs will be labeled with iron nanoparticle MRI contrast agents and injected into the chicken embryo at stage 15. The cell will then instigate into the central nervous system (CNS) of the chicken. At specific endpoints, the chicken embryo will be imaged to assess cellular integration. When successful, this will provide a novel developmental toxicology model for further studies aimed at assessing the impact of endocrine active compounds (EACs) and other toxins on neural development.

Mechanism of Developmental Regulation of Base J Synthesis in *Trypanosoma brucei*

Megha Kalia, CURO Honors Scholar
Dr. Robert Sabatini, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Kinetoplastids are a group of unicellular flagellate protozoa, some of which cause serious diseases in humans. *Trypanosoma brucei*, causive agent of African sleeping sickness, is spread by the tsetse fly and affects more than 60 million people. A unique feature of kinetoplastids is a DNA modification known as base J. Base J is a hypermodified thymidine that is synthesized in two steps. First, a thymidine residue is hydroxylated into HOMedU by a thymidine hydroxylase (JBP1 and JBP2). Second, a glucose moiety is added by a glucosyl transferase (JGT) to form base J. The life cycle of *T. brucei* can be divided into two main stages: mammalian (bloodstream form) and insect (procyclic form). The mammalian life stage produces base J, but procyclic does not. It is known that the enzymes that synthesize base J are down regulated in the procyclic stage. However, it is unclear if this explains the complete lack of the modified base in the PC life-stage. To address this, we will re-express the enzymes in the parasite and follow the production of base J. An epitope tagged version of JGT was

eptopically expressed in procyclic *T. brucei*. A Western blot analysis showed expression of the tagged enzyme. Our next step is to quantify the levels of base J by doing an anti-base J dot blot. However, while the same construct leads to high levels of the enzyme in BS cells, very little of JGT is produced in PC cells. This suggests an additional level of regulated gene expression in this life stage. Understanding the biosynthesis of base J will help broaden our understanding of this DNA modification in trypanosomes.

A New Analysis Strategy for Designs with Complex Aliasing

Andrew Kane, Samantha Cao
Dr. Abhyuday Mandal, Statistics, Franklin College of Arts & Sciences

In this project we propose a new data analysis strategy for designs with complex aliasing. In many non-regular designs, factorial effects are often partially aliased with each other. Identifying the correct underlying model from the experimental data is a challenge. Both frequentist and Bayesian solutions to this problem are subjective in nature. Here we propose the Lasso (least absolute shrinkage and selection operator) variable selection method to identify the correct model in the presence of complex aliasing. Given a particular dataset generated from a non-regular design, regression methods are commonly used to select the model with the most significant predictor variables. The standard approach for fitting a linear regression is the ordinary least-squares (OLS) method, which minimizes the error sum of squares between the observed and predicted response values. However, OLS does not perform well on high dimensional data, where the number of variables is large compared to the number of observations. On the other hand, Lasso and adaptive Lasso perform variable selection to reduce the number of variables by adding a penalty to the coefficients, shrinking certain predictor coefficients to zero and thereby eliminating extraneous variables. We demonstrate the use of adaptive Lasso techniques on real and simulated datasets to establish the superiority of the proposed technique over standard methods available in the literature.

Republicanism in the American South: From Strom Thurmond to Lindsey Graham

Daniel Kanso, CURO Summer Fellow, CURO Research Assistant, CURO Graduation Distinction
Dr. Charles Bullock, Political Science, School of Public & International Affairs

In order to understand the complex dynamics within the modern Republican Party, its ideological core, and the platform on which its base of voters is built, it is necessary to evaluate the full scope of its development. Throughout American history, South Carolina's national profile has outsized its geographic territory, its significance consistently overshadowing the state's long median-sized population. From 1878 to 1980, more than 85% of the 46 senators and 124 members of the South Carolina House of Representatives caucused with the Democratic Party. Measured Republican electoral growth began in the 1960's, driven by a multitude of factors that parallel South Carolina's development as a state. In the past 115 years, Republicans in South Carolina have accounted for five governors, four U.S. Senators, nineteen members of the U.S. House of Representatives, two majority leaders of the state senate, and two speakers of the house. Although seemingly dominant, the Republican Party is relatively new in establishment in South Carolina and projects a growing identity of republicanism that is visible across the nation. My thesis is focused on the election and governorship of Mark Sanford, who currently represents South Carolina's 1st District in the United States House of Representatives. The GOP

gained control of the South Carolina House of Representatives in 1994, and under Democratic Governor Jim Hodges the South Carolina Senate transitioned to Republican control in 2001. Mark Sanford is the first governor in modern history to oversee a Republican majority in both chambers of the state legislature. I have conducted personal interviews with Mark Sanford, his former Chiefs of Staff Fred Carter, Scott English, and Senator Tom Davis, Sanford's Chairman of the Board of Economic Advisors John Rainey, and his Legislative Liaison Senator Chip Campsen. Additionally, I have interviewed more than 70 individuals involved in South Carolina politics, ranging from Assistant Democratic Leader James Clyburn to Senator Jim DeMint.

Characterizing the Novel 1,2-Propanediol Dehydratase and its Activating Enzyme from *Roseburia inulinivorans*

Suraj Kapoor, CURO Research Assistant
Dr. William Lanzilotta, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Glycyl radical enzymes (GREs) represent a diverse superfamily of enzymes that utilize radical mechanisms to catalyze difficult, but often essential, chemical reactions. In this work, we present biochemical and structural data for the GRE-dependent diol dehydratase from *Roseburia inulinivorans* (RiDD) and the glycerol dehydratase from *Clostridium butyricum* (CbGD). We demonstrate that these enzymes have very different substrate and enantiomer selectivity despite high sequence identity (48%). Specifically, the CbGD catalyzes the dehydration of glycerol and *(S)*-1,2-propanediol but not *(R)*-1,2-propanediol. In contrast, the RiDD does not utilize glycerol but will utilize both *(S)*-1,2-propanediol and *(R)*-1,2-propanediol as a substrate. Interestingly, the RiDD also produces some acetone with either enantiomer of 1,2-propanediol. We also report the crystal structure of the RiDD that, when considered in light of the biochemical data, provides an explanation for the observed substrate and enantiomer selectivity as well as new insight into the radical-catalyzed dehydration reaction of both enzymes. These observations provide a framework for rational enzyme engineering towards the application of GREs in commodity chemical production from renewable resources.

The Effects of Prior Knowledge of Trial Type on Saccade Task Behavior

Megan Kelley
Dr. Jennifer McDowell, Psychology, Franklin College of Arts & Sciences

Rapid eye movements (saccades) are commonly used for studying top-down cognitive control. Following presentation of a peripheral stimulus, two saccadic responses are possible: simple, stimulus-directed prosaccades and more complex antisaccades directed toward the mirror location of the stimulus, which require inhibition of the impulse to look toward the stimulus. This study explored how explicit knowledge of task conditions affected behavior by manipulating the probability (10, 30, 50, 70, or 90%) of antisaccades versus prosaccades in a run, with one group of participants (explicit, n=32) being informed of the probability prior to a run, and a second group (implicit, n=33) remaining uninformed. Thus, the current study examined how cognitive preparation affected latency and proportion of incorrect responses. It was hypothesized that participants would perform better (shorter latencies, fewer errors) on saccade trials when their respective trial type was highly probable compared to runs when each type was improbable. The explicit group was expected to perform better than implicit on high probability trials (e.g. antisaccades in 90% AS run) and the same or worse than implicit on low probability trials (prosaccades in 90% AS run). The preliminary results show that groups

do not significantly differ, implying that knowing the likelihood of a desired response type does not improve performance. This could be because individuals who are unaware of the probability may still be able to determine that the stimuli are occurring in different probabilities and thus may still be cognitively preparing for the appropriate tasks.

Highly Mobile Kenyan Runners: Transnationalism through Sport

Jacob Kennedy, Foundation Fellow
Dr. Jepkorir Rose Chepyator-Thomson, Kinesiology, College of Education

Since the mid-1960s, Kenyans have dominated long distance running. Presently, over 2000 Kenyan runners live, train, and race abroad using various migratory patterns. In recent years academic and public efforts have sought to explain Kenyan running, usually in biological terms. Yet, few studies have examined the athlete experience as it relates to how mobility influences ties to home, how transnational relationships have been constructed and negotiated, and extent of impact on the athlete and his or her home community. The purpose of this study is to examine Kenyan runners' lived experiences and connections with their home communities, specifically focusing on Kenyan athletes training in the United States. The entirety of the Kenyan running phenomenon involves three small towns in the Rift Valley—Iten, Eldoret, and Kapsabet. Those who decide to become athletes move from their home seeking to join a training camp, acquire a manager, and make money racing internationally. Throughout this process athletes and their communities exchange remittances and support, and negotiate identity. Data collection methods will include qualitative surveys, interviews, and utilization of GIS mapping techniques. Data analysis will involve triangulation of data derived from interviews and qualitative surveys. The insights from this research will contribute to the literature on athlete migration, broaden understanding of the East African running phenomenon, and generate new ways to build theory using anthropological lenses.

Nano Formulation of Platin-A and Associated Inflammation

Samuel Kennedy, CURO Research Assistant
Dr. Shanta Dhar, Chemistry, Franklin College of Arts & Sciences

Prostate cancer is the most common cancer found in the male population in the United States. In the late stages, metastasis and chemo-resistance induces tumor recurrence, and that significantly affects the morbidity and mortality of a huge group of prostate cancer patients. Moreover, chronic inflammation associated with tumor tissues plays a key role in the metastasis of prostate cancer. In our continuing efforts to provide therapeutic options for metastatic prostate cancer, we recently constructed a Pt(IV) prodrug, Platin-A, with the ability to release cisplatin, a widely used chemotherapeutic, and aspirin, an anti-inflammatory agent. However, clinical translation of small-molecule based therapeutics requires a suitable delivery system to achieve pharmacokinetics parameters and appropriate biodistribution. Activation of various proteins causes mitochondrial dysfunction, resulting in mitochondrial reactive oxygen species production and downstream signaling that promote inflammation-associated cancer. Using a mitochondria-targeted polymeric-nanoparticle as a delivery vehicle, we anticipated that Platin-A could be rerouted to the mitochondria of cancer cells and attack the mitochondrial DNA, thereby designing a targeted pathway for the well-established drug cisplatin. Platin-A exhibited anticancer and anti-inflammatory properties which were better than a combination of cisplatin and aspirin. This result highlights the advantages of co-delivering an anti-inflammatory agent

with a chemotherapeutic agent in a single prodrug. The enormous potential of Platin-A encouraged the design of additional Pt(IV) prodrugs to co-deliver cisplatin and aspirin. A promising design will be discussed here.

O-Linked Glycosylation Patterns at the Interface of Cervical Mucins and HIV Infection

Hammad Khalid, Foundation Fellow, CURO Research Assistant
Dr. Michael Tiemeyer, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Mucosal surfaces, well known for their role in sensing their environment (nose, mouth), nutrient absorption (gut), gas exchange (lungs), and reproduction (vagina and uterus), also function as a complex immunological barrier at these common sites of entry for pathogens and viruses. However, surprisingly little is known about the complex post-translational modifications of the mucin proteins expressed at these surfaces and about how these modifications provide protection. This project focuses on an in-depth characterization and comparison of the glycans found on cervical mucins from HIV and non-HIV patients aimed at identifying unique modifications that may play a role in mucosal immunity. Samples were collected and prepared to analyze by direct injection nanospray ionization mass spectrometry (NSI-MS). Glycan structures were probed using collision induced disassociation (CID) and assigned using software developed in-house for high-throughput analysis. Preliminary data suggest an increase in sialylated and fucosylated structures in HIV patients, indicating a possible defect in terminal processing of glycans. Interestingly, preliminary data from lectin blots indicate an increase in the abundance of anti-inflammatory mucins in non-HIV patients. The analysis of more patient samples is ongoing. By understanding the fine structural features of the mucosal interface, new approaches for eliciting mucus-tethering antibodies can be considered. Additionally, this research has the potential to develop a more efficient, standardized platform for evaluating the mucus barrier, which could enhance future research on natural and vaccine-induced defenses against other sexually transmitted infections.

The Impact of Sugar during Larval Development on Growth Rate, Energy Stores, and Behavior

Maha Khan, CURO Research Assistant
Dr. Patricia Moore, Entomology, College of Agricultural & Environmental Sciences

The recent invasive pest species, *Drosophila suzukii*, differs from other drosophilids in that its larvae develop in ripening fruit, which is low in protein compared to the rotting fruit and its associated microbes utilized by other drosophilids such as the well-studied *D. melanogaster*. However, ripening fruit may also differ in terms of sugars and thus we are interested in examining how sugar amount and composition of the larval diet affects performance. My previous work on the effects of varying types and amounts of sugars on the development time, survival rate, and body size of the *D. suzukii* demonstrated that *D. suzukii* growth is optimum with moderate to high levels of sugars. However, the type of sugar is also important. I found that a high level of fructose not balanced by high glucose is lethal for *D. suzukii* larvae. My current research project extends these findings by examining development, fat storage, and behavior of both *D. suzukii* and *D. melanogaster* under varying carbohydrate diets. I will first examine development and fat stores upon adult emergence of *D. suzukii* and *D. melanogaster* under four different sugar treatments: fructose, glucose, sucrose, and high fructose corn sugar. I will also undertake a larval choice experiment to determine if larvae are able to adaptively choose the diet

that optimizes development and fat stores. Results from this experiment will help us to understand the nutritional ecology of *D. suzukii* and the role larval diet, particularly related to its unique host, plays in the biology of this invasive pest species.

Alleviating Inequities in Georgia's Public School Funding

Christine Kil
Dr. Jack Parish, Lifelong Education, Administration & Policy, College of Education

Although education is primarily the responsibility of state governments, states entrust a significant portion of education funding responsibility to local governments, who derive revenue for education primarily from property and sales taxes. This shared responsibility of education funding perpetuates a disparity, as raising local revenue and funding varies widely between districts. Any immediate and impacting solution to inequitable funding systems in US states will require full funding of the states' existing education funding formulas. Providing more state funds for education can come from increasing tax revenue or reform of other state social services to provide more money for education. This paper critically examines the impacts of the existing status quo of public school funding in Georgia and proposes three policy alternatives. I consulted primary sources of Georgia's education funding mechanism and spoke with education experts on the current state of public school finance and recommendations for creating a more equitable system. For Georgia specifically, a student-based budgeting (SBB) formula is a transparent alternative to the current Quality Basic Education (QBE) formula that will ensure greater equity in funding students. Traditional funding methods such as the QBE formula allocate funds based primarily on staff positions of different program segments; SBB allocates money based on student characteristics, such as socioeconomic status, limited English proficiency, and disability. Supplements to local revenue, robust funding, and transparent funding formulas will help ensure that investments in education pay back the community and break the cycle of low tax revenues and persistent income inequality.

Identifying Virulence Genes Associated with Emergent *Avibacterium paragallinarum* Isolates Associated with Acute Endocarditis in Chickens Using a Bioinformatic Approach

Christian Kim
Dr. John Maurer, Population Health, College of Veterinary Medicine

Avibacterium paragallinarum is a Gram-negative bacterium known to be the primary etiological agent of infectious coryza, an upper respiratory tract infection with significant detrimental effects on the poultry industry. However, *A. paragallinarum* strains have recently been isolated that instead cause endocarditis in affected birds. In order to characterize the unique pathogenicity of these strains, a bioinformatic approach using a variety of common web-based tools such as RAST and NCBI BLAST was utilized to analyze the genomes of the strains in question, primarily focusing on the identification of potential virulence factors. Once isolated, these factors were compared to those possessed by *A. paragallinarum* reference strains, as well as those of closely related bacterial species, in order to better comprehend the pathogenicity of the endocarditis-causing strains. In our analysis of the genomes of the *A. paragallinarum* strains, several virulence factors characteristic of *A. paragallinarum* were identified, including a three-region capsule locus and a three-gene cytolethal-distending toxin operon. A Type VI secretion system unique to the endocarditis-causing strains was also discovered. In addition, genes coding for RTX toxin, which

is believed to play a major role in *A. paragallinarum* virulence, were found to be absent in the genomes of the endocarditis-causing strains. Further identification and analysis of potential virulence factors will be performed in order to obtain a more complete understanding of *A. paragallinarum* pathogenicity.

A Synthetic Lethal Mutant Screen in *Salmonella* Typhimurium to Identify Genes whose Products Cooperate with RNA Ligase, RtcB, in RNA Repair

Justin Kimsey
Dr. Anna Karls, Microbiology, Franklin College of Arts & Sciences

Many stress conditions are known to damage nucleic acid. The pathways for DNA repair are well characterized in bacteria, but no RNA repair pathways have been defined. In *Salmonella* Typhimurium, a sigma 54-dependent operon, *rsr-rtcBA*, encodes proteins that are homologues of known RNA repair enzymes from metazoans and archaea. RtcB is an RNA ligase that seals broken RNA molecules containing 2'3'-cyclic phosphate and 5'-OH ends, and RtcA converts 3'-P to 2'3'cyclic phosphate. The physiological role of these RNA repair proteins in bacteria is not known. The goal of this project is to use a synthetic lethal mutant screen in *Salmonella* to identify genes encoding proteins/RNA that cooperate with RtcB in RNA repair. A strain with *rtcB* deleted has been transformed with an unstable plasmid that has *rtcB* transcriptionally fused with *lacZ* under the control of the *lac* promoter, and will be mutagenized with a transposable element. To screen for mutants that require the maintenance of *rtcB* for viability, the transposon-mutant library will be grown on LB agar plates in the presence of mitomycin C (MMC), which induces the RNA repair operon, and X-Gal IPTG, which indicates expression of *rtcB-lacZ*. The current focus of the project is to define the concentration of MMC to be used in the selection agar that provides enough stress to induce the operon, as measured by qRT-PCR, and affect cell growth in the absence of RNA repair, as measured by viable cell counts. Transposon insertions in synthetic lethal mutants will be mapped by arbitrary primed PCR.

Inefficiencies of Water Use in Animal Agriculture

Catherine Klein, CURO Research Assistant
Dr. Jeffrey Mullen, Agricultural & Applied Economics, College of Agricultural & Environmental Sciences

In 1977, the United Nations Water Conference resolved that access to fresh drinking water to meet basic needs is a fundamental human right. Since that time, population growth, economic development, and environmental degradation have put increasing pressure on our water resources, raising demand and shrinking supply. In effect, fresh water is an increasingly scarce resource. This scarcity has and will continue to vary around the world depending on environmental factors (eg., precipitation and evapotranspiration rates) and economic factors (eg., income levels and prices), as reflected by the spatial variation in water scarcity indices. A major concern for the future is the dietary shift away from plant-based proteins toward animal-based proteins that often accompanies increases in household incomes. This research study focuses on the cascading effects of rising incomes on the demand for animal-based protein – meat, dairy, and eggs – and the implications for water scarcity. Using country-specific estimates of the income elasticity of demand for meat, dairy, and eggs, and projections of income growth, projected changes in water use for animal agricultural production are developed on a nationwide scale. The effect of projected changes in water demand on a country's water scarcity index are then examined. In addition, expected water quality

impacts of expanding animal agriculture are identified. The study concludes with a discussion of a variety of policy options for mitigating the water scarcity and water quality effects of expanding animal agricultural production.

Oklahoma!: The Building of the Dream Ballet in Two Different Mediums

Hannah Klevesahl
Dr. Marla Carlson, Theatre & Film Studies, Franklin College of Arts & Sciences

In 1943, Richard Rodgers and Oscar Hammerstein II wrote a musical that opened on Broadway and stayed in continuous production in the USA for the next 16 years. This musical was called *Oklahoma!*, and today it remains a staple of many international theatre companies, as well as an example of the first modern musical. It is for this reason that I choose to focus on two specific versions of *Oklahoma!*. The first production I will be examining is the 1955 film, and the second version is the filmed stage production of the 1998 London revival by the National Theatre. The 1998 London revival of *Oklahoma!* as well as the 1955 film both include dream ballets that take place in an alternate dream world, but their methods of building and maintaining those worlds differ. The London revival relies heavily on its ensemble to create the dream, and maintain it, during the fight with Curly and Jud. Since that version is a filmed copy of a live performance, it makes sense that the stage production would utilize their ensemble in order to establish the convention of a dream world. In contrast, the film uses special visual effects for its dream sequence and fight. These effects are utilized to show the audience that the dream sequence does, in fact, take place in a dream. Both productions' methods achieve their goal of establishing the convention of a dream world, but are altered slightly to fit their medium.

Size Labeling for Infant Clothing: Cultural Perspectives on Childhood Growth

Allison Koch, Foundation Fellow, CURO Research Assistant
Dr. Susan Tanner, Anthropology, Franklin College of Arts & Sciences

Previous research has suggested that childhood nutrition and growth patterns are strongly associated with current and future health outcomes, but little is known about how parents understand and evaluate the size and growth of their children. A literature review found that pediatric growth charts are not widely understood or implemented by parents. Instead, research suggests that parents use characteristics of their child and sociocultural norms about appropriate size to evaluate growth. This study explores if clothing size is an additional way through which parents evaluate the size and growth of their infants. Because Latino populations in the U.S. are more than twice as likely as the average consumer to purchase clothing in the birth-to-preschool market, this research will focus on Latino parents in Southeast Georgia. Semi-structured interviews will determine what growth assessment mechanisms, including clothing sizes, are most useful and important to parents. The qualitative and quantitative data will be evaluated to assess *to what extent* Latino parents use clothing size labels to assess the growth of their infants. It is expected that clothing labels are frequently used by parents in gauging infant growth, but parents may not be overly concerned if they must purchase clothing outside of their child's age or weight designation. This research has implications for understanding how the social environment could shape parents' understanding and evaluation of child growth and health.

Abstracts

Clearing Natural Forest Lowers Decomposition Rates and Results in Less Diverse Macrofauna and Mesofauna Communities

Allison Koch, Foundation Fellow, CURO Research Assistant
Dr. Scott Connelly, Odum School of Ecology

Global climate change and increasing demands on world resources continue to lead to concomitant transformations of land use and the widespread loss of biodiversity. These global factors may be threatening local ecosystem functions—the various ways in which biotic and abiotic components interact to maintain the health of the system. This study explored the effects of anthropogenic change on the essential process of decomposition. Mesh leaf litter bags were placed at two sites near San Luis, Costa Rica: in natural forest and in an area that had been converted to pasture. Some mesh bags were filled with homogenous leaf clusters, which contained the plant taxa *Cecropia*, *Rubiaceae*, or *Solanaceae*. Others were categorized as heterogeneous and contained all three plant taxa mixed. This was done to simulate diversity loss. Bags were collected at four intervals over 37 days, re-weighed, and emptied of decomposers—the macrofauna and mesofauna community—for further analysis. Leaves in the forest decomposed faster than their counterparts in the open pasture, and on all collection days, leaves placed in the forest hosted a more diverse fauna community than leaves placed in the pasture. Heterogeneous leaf groups did not show significantly greater levels of fauna diversity than homogenous leaf groups, suggesting that biodiversity loss may not affect decomposition. Clearing the natural forest, however, does impact ecosystem function by leading to slower decomposition rates and less diverse macrofauna and mesofauna communities.

Child Neglect, Depressive Symptoms, and Substance Use among Children and Adolescents Reported to Child Protective Services

Stephanie Kors, CURO Research Assistant
Dr. Assaf Oshri, Child & Family Development, College of Family & Consumer Sciences

Children who have experienced parental neglect are at significant risk for the development of depressive symptoms and substance use behaviors in adolescence. Using the self-medication hypothesis, we aim to test whether increased adolescent drug abuse is a result of a maladaptive coping strategy neglected youth use in an effort to reduce stress-associated with depressive symptoms. In addition, gender differences in this hypothesis were examined. A longitudinal sample of 796 children from the National Survey of Child and Adolescent Well-Being was examined at three time points (aged 11-13 at wave 1, 12-15 at wave 2, and 14-16 at wave 3). Structural equation modeling was used to test a mediation model in which child neglect is associated with adolescent substance use through increased levels of depressive symptoms. Statistical model fit was satisfactory ($\chi 2$ (20) = 75.55, p = .01 CFI =.91; RMSEA = .03; SRMR = .05). Multiple group analyses revealed significant moderation by gender. For males, supervision neglect at time 1 significantly predicted depressive symptoms at time 2 (β = .22; p < .05) and depressive symptoms at time 2 significantly predicted cannabis use at time 3 (β = .26; p < .05). Mediation analyses confirmed an indirect effect from supervision neglect to increased substance use via depressive symptoms among males (β = .08; p < .01). These results suggest the need for interventions for neglected children via preventive programs that address depressive symptomatology during early adolescence in order to modify risk for subsequent

involvement in substance use behaviors during adolescence.

Studying the Kinetics of N-glycan Release by PNGase F with MRM Quantitation of the Glycopeptides from Human Serum Glycoproteins

Adam Kramer
Dr. Ron Orlando, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Peptide-N-Glycosidase F, PNGase F, is an endoglycosidase that cleaves the linkage between the asparagines residue and innermost GlcNAc of N-linked glycans. Because this enzyme releases all mammalian N-linked glycans, it is widely used in the analysis of glycoproteins. While performing glycomic studies, we determined that the PNGase F release introduces the largest source of quantitative variation, which led us to conduct a more detailed study of this enzyme system. Here we investigated the kinetics of glycan release, to determine the effect of glycan structure and amino acid sequence on the rate of glycan release as this would be a reasonable explanation for the observed quantitative variations. Human serum was subjected to a standard trypsin digestion protocol, followed by PNGase F digestions. Aliquots of the digestion mixture were taken at various time points and were analyzed by LC-MS using a Penta-HILIC column on Shimadzu Nexera LC system interfaced to a Q-trap 4000 MS analyzer (ABSciex). Selected reaction monitoring methods were utilized to quantitate every known glycoform of each tryptic peptide from the major serum glycoproteins, for example 20 glycoforms for each of the human serum IgG subclasses (i.e., IgG1, IgG2/3, and IgG4). We have utilized this method to determine the changes of glycopeptide residues after various PNGase F digestion times. We are currently developing SRM methods to investigate the glycoforms of the other major serum glycoproteins to determine if larger changes in the amino acid sequence flanking the glycosylation site alter the rate of glycan release.

The Potential Protective Effects of Anthocyanins on Liver Insulin Signaling

Madison Krieger
Dr. Claire de La Serre, Foods & Nutrition, College of Family & Consumer Sciences

Obesity is a rising epidemic in the United States, effecting up to one third of its population. Obesity and its comorbidities, such as diabetes and cardiovascular diseases, are associated with low-grade inflammation. Recent work has notably found that inflammation is causally linked with insulin resistance or pre-diabetes, especially affecting liver insulin sensitivity. The use of bioactive foods, namely ones with anti-inflammatory properties, could produce beneficial effects. In this study we examine the potential protective effect of blueberries, a food rich in anti-inflammatory anthocyanins, on insulin sensitivity and liver functions. Rats were fed three different diets for 8 weeks: low-fat(LF), high-fat(HF), and high-fat supplemented with 10% blueberry(HF-BB). The HF and HF-BB diets were matched for fiber and calories while all three were matched for sucrose content and amount of food. After 7 weeks on the diets, animals underwent on oral glucose tolerance test and at the end of the study livers were harvested. Insulin signaling was investigated by western- blotting. H & E staining and Oil-Red O staining were completed and evaluated to determine fat infiltration in the liver. Additionally, immunohistochemistry will be performed using an F4-80 antibody to determine the amount of macrophage presence in the liver, signifying inflammation. The hypothesis is that the rats fed an HF-BB diet will have significantly less macrophage infiltration and fat infiltration than those fed an HF diet. If this is the case, then we can conclude that anthocyanin-enriched diets can reduce the

impacts of inflammation and therefore improve insulin signaling.

Changes in Neural Activation Following Daily Practice of Saccade Tasks

Mitra Kumareswaran
Dr. Jennifer McDowell, Psychology, Franklin College of Arts & Sciences

Cognitive control relies on contextual cues and existing perceptions to enable neural mechanisms to respond to parameters of a cognitive task and produce the appropriate behaviors. The ocular motor system, the neural circuit that guides eye movements, serves as a model of cognitive control with two opposing tasks: prosaccades are directed gazes toward a peripheral cue while antisaccades are gazes toward the mirror image location of the cue. Since antisaccades involve suppressing the instinct to view the stimulus in order to generate a saccade in the opposite direction, they require higher levels of cognitive control and greater neural activation in saccade circuitry than stimulus-driven prosaccades. In the current study, the probability of antisaccades presented within a given trial was varied to observe changes in neural activation in saccade circuitry as a result of context. Thirty-five subjects performed five saccade tasks in the functional MRI environment where the percent of antisaccades to prosaccades was 0%, 25%, 50%, 75%, or 100%. Brain scans were collected at baseline and after four days of saccade practice to compare changes in activation over time. With practice, the subjects were faster, made fewer errors, and decreased neural activation, notably in the cuneus, supplementary eye fields, and prefrontal cortex. Correlations between behavioral measures and brain activation suggest that participants increased task efficiency by utilizing cognitive control cues following practice. A better understanding of the relationship between cognitive control and the ocular motor system can be utilized to detect deviations from normal functioning that may occur in neurological disorders.

Addressing the Lack of Access to Public Assistance for Adults with Autism

Mitra Kumareswaran
Dr. Jay Rojewski, Career & Information Studies, College of Education

Under the status quo, individuals with autism who have an IQ score below 70 and display severe cognitive disabilities are eligible to receive state and federal services such as group homes, job training, and case management upon aging out of the school system. Individuals with autism who have mild to moderate cognitive impairments may also need such services but are very unlikely to receive the services or may not even be eligible to receive the services. Within the past twelve years, the rate of children diagnosed with autism has increased by 228%, and the nation is ill-equipped to take care of the current population of autistic adults let alone the future population of these individuals. To improve upon the status quo, alternativ policies were analyzed based on political feasibility, cost-effectiveness, and equity. The policies evaluated were the status quo, a policy to change the method used to determine service eligibility and provision, a policy to allow autistic students to attend public school until age 25 instead of age 21, and a policy to pass a federal autism health insurance mandate. Of the four policies, the policy that entailed providing needed services based on the needs and cognitive impairments of the adult with autism was the most effective to implement. To implement the selected policy, Congress and state governments must pass legislation to change how adults with autism are provided public assistance and additional funding must be allocated toward providing increased public services to a larger population of beneficiaries with autism.

Abstracts

Speed Effects on Angular Displacement of Back during Gait

Eric Kure, CURO Research Assistant
Dr. Kathy Simpson, Kinesiology, College of Education

According to the American Chiropractic Association, as many as 80% of the population will experience a back problem at some point in their lives. Therefore, understanding the mechanical demands on the back of various physical activities is important. The purpose of this study was to determine which back region (upper, middle, and lower) demonstrates greater angular motions as running speed increases. Twenty healthy, physically active volunteers (age = 22.4 ± 3.0 yr, mass = 67.4 ± 12.9 kg, height = 1.7 ± 0.1 m) ran at 3 different speeds (natural, 110% of natural, and maximum). Reflective markers on the back region were used to capture spinal movements by seven infrared cameras. From ANOVA results, (p <.05), it was determined that the amount of rotation in all regions of the back increased (p<.01), with the exception of the upper back during flexion and extension (p=.26). The lower back twisting motion showed the greatest increased motion at faster speeds, suggesting that lower back tissues may have greater strains placed on them. These findings could be beneficial for individuals with low back problems.

Factors Influencing Gut Microbial Community Structure in Mosquitoes

Kip Lacy
Dr. Michael Strand, Entomology, College of Agricultural & Environmental Sciences

It is well established that microbes are integral to insect biology. Mosquitoes are important insects because many species are vectors which transmit disease-causing pathogens in humans and other vertebrates. Recent studies indicate that mosquitoes host a community of bacteria (microbiota) in their digestive system that influences their development, reproduction, and vector competency. This community is acquired by larvae from their aquatic environment and persists to the adult stage. However, the factors determining community composition and the relative abundance of community members are not well understood. In this study, we examined the influence of the aquatic microbiota on gut community structure and mosquito development using *Aedes aegypti* mosquitoes reared under sterile conditions in a controlled bacterial environment. Our results support a strong role for the aquatic environment in determining mosquito gut community composition and identify specific community members as key factors influencing bacterial abundance and diversity in the gut. These results have important implications for ongoing studies to describe microbial communities in populations of vector mosquito species in the field.

Financial Literacy in College Students

Benjamin Landes
Dr. Brenda Cude, Financial Planning, Housing & Consumer Economics, College of Family & Consumer Sciences

It is commonly conceived that college students have poor financial competency, yet little is known about the severity, cause, or ramifications of this issue. Therefore, the purpose of Dr. Cude's study is to determine how well college students understand financial vocabulary and concepts, where this knowledge or lack thereof derives from, and the impact of this level of knowledge on their debt, financial self-perception, social comparison, delay of gratification, and more. To answer this question, Dr. Cude administered a 30-item pre-test and Likert scales, which previous research has proven to test financial literacy and other items of interest, to 1,000 college seniors in her classes. I then assisted Dr. Cude in importing and analyzing this data through Microsoft Excel and IBM SPSS, creating frequency tables,

regression analyzes, chi squared values, and other relevant statistics. While research is still in progress, we have determined that among Dr. Cude's students, the mean grade on a finance pre-test is a failing 50%, only half own credit cards (while previous research suggests this number is as high as 75%), and only 7% report having financial education in high school. Further research will be done with the ultimate goal being to acquire a greater understanding of college students' financial matters in order to determine the necessary actions to improve students' financial well-being.

Drug Discovery and Structural Studies of an Essential Transcriptional Regulator, ACIAD0746

Paige Lane
Dr. Cory Momany, Pharmaceutical & Biomedical Sciences, College of Pharmacy

The LysR-type transcriptional regulator ACIAD746 is an essential regulator in *Acinetobacter baylyi* that is not functionally well-characterized. The goal of this project is to discover compounds that will interact with this protein and to characterize the structural changes associated with the binding of regulatory ligands using X-ray crystallography. Crystals of ACIAD746 protein were prepared from protein incubated with the potential ligands (cysteine, methionine, and sulfite), and the crystals revealed different habits that were analyzed using X-ray diffraction. Several atomic structures with cysteine were obtained, but the bound ligand was not identified and the results appear inconclusive. Similar studies with sulfite are in progress. The purpose of this research is to understand whether bound ligands to ACIAD746 will alter the DNA conformation of the protein and consequently alter transcription. The essentiality of this protein suggests that it is a potential drug target. Studies are in progress to identify small molecules from natural plant extracts that may prevent the activation process where the protein recruits RNA polymerase to the promoter of genes controlled by the protein. Such small molecules would represent a new class of antibiotics. Because ACIAD746 has homologs in numerous pathogenic bacteria, compounds identified in these studies could have broad spectrum activities as therapeutics.

Syrian Civil War Victims Receiving Medical Care in Israel: Humanity in a War Torn Region

Sarah Lane
Dr. Richard Schuster, Health Policy & Management, College of Public Health

The Syrian Civil War began in the spring of 2011, and the availability of healthcare in the country has been declining rapidly ever since. Due to the lack of healthcare and general stability, more than 1.5 million Syrians have fled to refugee camps in nearby countries. Although Syria shares a border with Israel, civil war victims aren't able to seek refugee status in Israel due to a policy that refuses asylum to "subjects of enemy or hostile states." However, this has not kept Israel from providing medical care to injured Syrians. Since March of 2013, Syrians with traumatic war injuries who are found near the Syrian-Israeli border are brought into the country by the Israel Defense Forces and taken to various hospitals in the Galilee region. This study examines the demographics, diagnoses, procedures, and resource utilization of Syrian patients that have been admitted through the emergency department to the Galilee Medical Center, a large general hospital in Nahariya, Israel. These findings were then compared to a random sample of Israeli trauma cases. We found that the Syrian patients were younger and more predominately male than Israeli trauma patients, and they had longer lengths of stay, underwent more procedures, and had a higher mortality rate. As a result, the Syrians'

medical bills were on average 350% more than Israeli patients'. These findings can be used to help Israeli hospitals prepare both clinically and financially for Syrian Civil War victims who will continue to be brought into the country with traumatic injuries.

Identification of the Mechanism for Ciliary Gliding in Heterotrophic Euglenids

Jeffery Lanier, CURO Research Assistant
Dr. Mark Farmer, Biological Sciences, Franklin College of Arts & Sciences

In this study, the gliding motility of unicellular eukaryotic organisms was studied to determine the mechanism by which the organisms attach themselves to a substrate and propel themselves along it. Despite its widespread occurrence among protists, ciliary gliding is the least well-characterized form of flagellar-associated cell motility. The euglenid flagellate *Paranema trichophorum* is an ideal study organism due to the fact that gliding is its primary form of locomotion. Lectins are plant-derived carbohydrate-binding proteins, usually with preferred sugar specificities. By utilizing lectins and observing their effect on cell velocity, we can identify possible sugars present on ciliary membranes that may facilitate substrate adherence and gliding motility. If lectins attach to sugars of the flagellar hairs that extend from the cilium and thus interfere with gliding, the velocity of lectin-treated cells should decrease. Observing cell velocity without lectins provides a control. After incubating *Peranema* with increasing concentrations of the lectin Concanavalin A, the lectin-treated cells showed significantly decreased gliding velocity. Fluorescently tagged lectins were observed with confocal microscopy to confirm the lectin binding to the ciliary surface. Our study suggests that flagellar hairs play a role in ciliary gliding, and expanding upon this research may finally reveal the mechanism of ciliary gliding.

Worried, Concerned, and Untroubled: Patterns of Adolescent Worry

Rebecca Lanier
Dr. Jay Mancini, Child & Family Development, College of Family & Consumer Sciences

During adolescence, many situational and cognitive changes occur that enable youth to anticipate and conceptualize future events and outcomes, which may increase susceptibility to worry development and maintenance. Although the majority of adolescents seem to worry infrequently, or only have typical adolescent worries, roughly 25% experience frequent worry. Worry becomes particularly problematic when it co-occurs with other internalizing/externalizing symptoms, such as low self-efficacy and delinquent behaviors. This suggests a need to study adolescent worry and differentiate the levels of worry youth experience. Our research is expected to indicate youth groupings by differing levels and topics of worry. We hypothesize that specific individual, environmental context, and relational characteristics will create distinct groupings of worry and that group designation is associated with other well-being aspects. We investigated worry patterns among an adolescent sample using a latent profile analysis (n=273). Youth responded to eight items from the Generalized Anxiety Subscale of the Revised Version of the Screen for Child Anxiety Related Emotional Disorders (SCARED-R; Muris et al., 1999), which created profiles describing the intensity and focus of adolescents' worry. The results indicated the existence of three distinct groups varying in intensity, probable causation, probable association, and worry topics. Three groups were identified: *worried* (23.8%), *concerned* (37.7%), and *untroubled* (38.5%), respectively. *Worried* youth were comparatively more nervous, more worried about the future, and more worried about previous occurrences; *concerned* youth reported moderate levels of worry about personal

ability and about others liking them; *untroubled* youth reported relatively little concern about typical sources of adolescent worry.

Storytelling for Social Justice: Fostering Activism through Collective Memory Work

Jose Leandro, CURO Research Assistant
Dr. Corey Johnson, Lifelong Education, Administration & Policy, College of Education

Storytelling has been central to social justice movements, with stories becoming a method of potential and actual transformation of oppression and injustice. With the acknowledgement of the need for advocacy for the LGBTQ community in bridging the gaps in equality, self-identified LGBTQ activists will be introduced to Collective Memory Work. This study intends to introduce Collective Memory Work to investigate and answer the questions: 1) what motivates LGBTQ activists to resist internalizing anti-LGBTQ oppression? and 2) how do memories keep activists engaged and energized to do the work of social justice? Collective memory work encourages participants to recall, examine, and analyze earlier memories and experiences in a broader cultural context to see how individual experiences link to collective, shared experiences of similar and/or different groups in society (Haug, 1992). Two focus groups will be conducted with each involving 4-8 participants. The researchers anticipate that participants will increase their knowledge about leisure, LGBTQ activism, self-identity, culture, the diversity among fellow participants, and the influence that they have on others as activists. By engaging in collective memory work, participants will also learn about a new tool for building a sense of understanding, unity, and collectivism in moving their causes forward and in sustaining activism for a more socially just society.

Change the Channel: Can Firms Influence Consumer Channel Choice through Marketing Contacts?

Lyndon Lee, CURO Research Assistant
Dr. Sue Chang, Marketing, Terry College of Business

With the recent proliferation of various channels, such as the Internet, many companies have adopted a multichannel strategy. Today, consumers can purchase a product through more than one channel and will often switch channels based on their channel preference at a specific time. Consumers' fluidity between channels makes it difficult for a firm to determine which channel a consumer prefers at a certain moment and how to contact its individual customers most effectively. Emails and catalogs, currently two of the most common methods of contacting consumers, may increase brand awareness and purchase intention. However, depending on marketing contact strategy (e.g. method used (catalog versus email), frequency of contact), the marketing contacts may result in different purchase and channel choice decisions of consumers. While previous research exists studying various relationships between the channels in a multichannel environment, few papers separate the effects of discrete marketing contact methods (e.g. email versus catalog). Using a dataset from an undisclosed retailer, we built a model to analyze the different impacts of email contacts and catalog contacts on the performance of each channel in a multichannel environment. We also examine other critical factors influencing the channel decisions of consumers such as the convenience of product return and the consumer's distance from a physical store.

The Impact of Foreign Aid on Democracy in Africa

Benjamin Leigh
Dr. Laura Zimmermann, International Affairs, School of Public & International Affairs

This paper seeks to address the impact of foreign aid on the democratization of recipient countries in the African context. There is some evidence in the academic literature that governments are less responsive to the people, and the people care less about government actions, when government income comes from sources other than direct taxation. With most foreign aid tied to the goal of promoting democracy, there are serious implications for policy if foreign aid reduces the likelihood of a recipient country democratizing. Using a variety of sources on foreign aid receipts and democracy scores over time for different countries, this paper seeks to analyze the impact of foreign aid on democracy. The paper begins with a review of literature, followed by a discussion of the relevant questions. Methods are discussed and followed by data, which is then interpreted. A conclusion follows to tie all parts of the paper together.

Design of a 1,5-Substituted Triazolyl-Bridged Peptide to Inhibit EGFR Activation

Peter Liaw, CURO Research Assistant
Dr. Eileen Kennedy, Pharmaceutical & Biomedical Sciences, College of Pharmacy

The Epidermal Growth Factor Receptor (EGFR) signaling is tightly controlled and involved in many cell activities such as growth, differentiation, and migration; however, overexpression of EGFR has been linked to many carcinomas such as breast, prostate, and colorectal. A significant step in the activation of EGFR involves a region termed the "dimerization arm" within domain II. Dimerization arm interactions between two EGFR monomers lead to trans-autophosphorylation of the intracellular domains and subsequent downstream signaling events. Our lab aims to inhibit EGFR by disrupting important protein-protein interactions for receptor activation. In this project, I have synthesized a dimerization arm mimic using 1,4- and 1,5-substituted 1,2,3-triazolyl bridges to lock the peptide into a beta-loop conformation. A medicinal chemistry approach will be used to compare the 1,5-substituted peptide with the 1,4-substituted peptide. The peptides were synthesized using conventional Fmoc solid phase peptide synthesis with a ruthenium-catalyzed azide-alkyne cycloaddition to form the triazolyl-bridge. Two ruthenium catalysts were tested under different reaction conditions. The structure of the peptide will be characterized and cellular activity will be tested. This research offers a medicinal chemistry approach to inhibit EGFR by synthetically blocking the dimerization interface. Furthermore, this approach can be applied towards other peptide-peptide interactions, especially ones that utilize a beta-loop conformation.

How Did Female Candidates Fare in the 2014 Election?

Alexandra Lilly
Dr. Charles Bullock, Political Science, School of Public & International Affairs

Females are still vastly underrepresented in governments around the world, and specifically in the United States. While women make up about 50% of the population, they make up 19.4% of our national legislature. This paper researches how successful women were in gaining seats in both the House of Representatives and Senate in the 2014 midterm elections and which factors affected their success. I will be comparing the data from the most recent election to traditional national trends pertaining to the success of women in these elections. A variety of factors will be analyzed. First, I will identify the percentage of women elected to each house of Congress, which parties elected them, and their success in primaries as well as in runoffs. I will also further study the freshman female legislators: how many there were and which factors

contributed to their success. Next, I will find where women obtained funding for their campaigns. Lastly, I will examine trends in the original careers of female legislators. This information can all be found in online databases. The midterm election is significant, as it is the last national election before a major Presidential election year. This election is unique because traditionally, more women are elected from the Democratic Party, but with the strong Republican climate in the nation, more female Republicans found success in the 2014 midterms. There are 100 women for the first time ever, and this data can give a clearer insight of the factors contributing to this trend.

Disruption of Signaling at Oocyte MTOCs Leads to Meiotic Division Errors and Embryonic Loss

Mallory Little, CURO Graduation Distinction
Dr. Maria Viveiros, Physiology & Pharmacology, College of Veterinary Medicine

Aneuploidy (an abnormal chromosome number) in oocytes before fertilization can lead to pregnancy loss and birth defects such as Down syndrome. Aneuploidy can result from meiotic chromosome segregation errors owing to spindle defects and inaccurate chromosome-microtubule attachments. Potential underlying causes of spindle defects include disrupted microtubule-organizing center (MTOC) associated proteins. This study tested the function of a key MTOC-associated protein, pericentrin. Using a unique transgenic RNAi oocyte-conditional knockdown mouse model, we tested the impact of pericentrin loss on meiotic division and female fertility. Q-PCR confirmed lack of *Pcnt* transcripts in oocytes from transgenic females, and fertility was determined by mating with control males for 6 months. Moreover, metaphase-II oocytes were collected to evaluate spindle and chromatin configurations by immunofluorescence. The mean number (± SE) of viable pups/litter was significantly lower in transgenic females (4.89 ± 0.78 *vs.* 11.62 ± 0.93), and timed mating analysis on day16 (E16) of gestation revealed that embryonic loss occurs post-implantation in utero. Immunofluorescence confirmed pericentrin expression at MTOCs in oocytes from control, but not transgenic, females. The *Pcnt*-depleted oocytes showed increased spindle disruption and chromosome misalignment as well as a higher incidence (18.8 ± 4.6 *vs* 8.3 ± 2.7) of attachment errors, as indicated by chromosome lagging. These defects potentially contribute to chromosome segregation errors that lead to aneuploidy. This study confirms effective depletion of pericentrin in oocytes from *Pcnt* RNAi transgenic female mice. Notably, pericentrin loss in oocytes is associated with increased meiotic errors and significant embryonic loss. Funding: NIH (HD 0713330)

Electronic and Photonic Modeling of GaN/InGaN Multiple Quantum Well Light Emitting Diodes

Bhaskar Lokanathan, CURO Research Assistant
Dr. Lawrence Hornak, College of Engineering

LEDs (Light Emitting Diodes) play a vital role in most optoelectronic devices, and recently there has been great interest in the development of efficient Group III Nitride Light Emitting Diodes, as they allow a wide range of wavelengths. Much research has gone into quantum wells, as they increase efficiency and allow tuning in emission wavelength. The time and cost of fabricating these devices hinders further research in optimization of these devices, so Technology Computer Aided Design (TCAD) simulation tools have been crucial in aiding engineers in the early design phase. These tools may be used to model the materials, device physics, and quantum effects of multiple quantum well LEDs. In this research project, TiberCAD and Optiwave FDTD will be used to design

and analyze device components of multiple quantum well (MQW) LEDs. The effects of electronic and photonic device characteristics including: variations of mole fraction and well width on MQW energy levels and optical emission wavelength, impact of device layout on light extraction, and current-voltage (I-V) characteristics will be examined. The results will be compared to fully grown and fabricated GaN/InGaN MQW LEDs in order to optimize their performance.

The Presentation of Victimhood and Virtue in the Holocaust-Focused Works of George Tabori

Kelsey Lowrey, Foundation Fellow
Dr. Martin Kagel, Germanic & Slavic Studies, Franklin College of Arts & Sciences

I studied the works of the Hungarian-German Jewish playwright George Tabori and their relationship to the late feminist concept of oppression as a social position, specifically through the lens of the Holocaust, as well as their value as works for confronting and making sense of loss under the Nazi regime and continuing injustices in the world today. To do this I compared two of Tabori's best-known works with a play by his contemporary and known inspiration Bertolt Brecht, whose unique style of critiquing oppression is already well-studied. I also applied theories from second-wave feminist essays to Tabori's works and to his literary portrayal of victimhood. I ultimately found Tabori's works to propagate an oppressive idea of victimhood and virtue being necessarily indistinguishable, with strongly misogynistic undertones, making his works at best useful for coping with the realities of the Holocaust in the late 20th-century Germany for which he wrote them, and at worst not useful and potentially harmful to apply to instances of oppression in the modern world. Tabori is a celebrated author in Germany and his works hold great cultural significance there, but few critiques of the modern social implications of his writing have been made – critiques which are necessary when dealing with works that influence national opinion over topics as significant as the Holocaust and the social position of the victim.

Use of a Breath-Hold Paradigm to Remove FMRI Variability due to Vascular Factors in Older Adults

Joshua Lukemire, CURO Summer Fellow
Dr. Lawrence Sweet, Psychology, Franklin College of Arts & Sciences

Functional Magnetic Resonance Imaging (FMRI) is one of the principle methods used to investigate cognition. FMRI analyses are based on the blood-oxygen-level-dependent (BOLD) signal, which depends on blood flow and volume and is considered a proxy for neural activity. For inference based on FMRI to be reliable, it is important that BOLD differences between subjects be due to neural activity and not physiological factors. If a condition such as cardiovascular disease causes participants to have compromised neurovasculature, their BOLD responses could show systematic differences from healthy adults. Methods correcting for differences in neurovasculature are needed to overcome this. One such method is breath-hold scaling, which uses a breath-hold task to elicit a robust increase in blood flow. Due to the cognitive ease of the task, most of the BOLD change induced should reflect physiology. The response to another task is scaled using the response from the breath-hold task, and the resulting data is less confounded by physiological differences. In this study we investigate the effects of breath-hold scaling in 18 older adults. We scaled the response to a working memory task and examined regions of interest (ROIs) in 15 task-related areas, as well as 3 control areas. All but 2 of the task-related ROIs showed a significant reduction after scaling; however, no significant changes were observed in the control ROIs. These findings suggest that

scaling is having the intended effect of producing a signal that more accurately represents the neural component of the BOLD response by removing physiological confounds.

Type of Infant Feeding, Weight, and Body Composition Changes in Early Infancy

Joy Maduka
Dr. Alex Kojo Anderson, Foods & Nutrition, College of Family & Consumer Sciences

Childhood obesity and rapid weight gain has been linked to feeding practices during the formative stages of life. The purpose of this study is to examine the influence of types of infant feeding (breastfeeding, mixed feeding, and formula) on infant weight gain and body composition changes in early infancy. This is part of a pilot study that enrolled pregnant women and followed them through 16 weeks postpartum. Infants born at full-term and normal birth weight were scheduled for weight and body composition measurements via the PEA POD at 2, 8, and 16 weeks postpartum. Mothers were required to keep a bi-weekly 24-hour feeding log. At birth, breastfed newborns weighed slightly higher than formula fed infants (3.64 kg vs 3.04 kg, $p=0.029$) and the rate of weight gain was slower among breastfed compared to formula fed infants, although not statistically significant ($p>0.05$). There was a statistically significant difference in percent body fat (adiposity) between breastfed and formula fed infants at 8 weeks postpartum (19.36% vs 12.98%, $p=0.03$) but not at 2 weeks (13.27% vs 12.60%, $p=0.10$) and 16 weeks (22.56% vs 16.63%, $p=0.14$) postpartum. Our preliminary results show that the rate of change in adiposity is faster for breastfed infants compared to formula fed infants, though not statistically significant. Initial observation suggests that early infant body composition is associated with infant feeding type. A further examination of the influence of feeding mode is likely to improve our understanding of the differences in changes in adiposity between breastfed and formula fed infants.

Mammary Gland Specific Deletion of Rac1 on MMTV-PyVT

Eric Malaney, CURO Research Assistant
Dr. Tamas Nagy, Pathology, College of Veterinary Medicine

Rho family G proteins have been found to be integral for regulation of a myriad of functions in the cell. One such function is a role in gene expression. Through lamellipodia extension, the regulation of Rac protein of the Rho family GTPases allows these proteins to be found in the body in both active and inactive states; in the GTP-bound state, these GTPases are active, and in a GDP-bound state, they are inactive. Initially, Rac1 was identified as an essential player in β1-integrin signaling in cultured mammary epithelial cells. More recently, Rac1 was found to be indispensable for prolactin signaling during secretory maturation of the mammary epithelium. Overexpressing Rac1 has been found to promote tumor development of the mammary gland in mice. Our current work in the laboratory focuses on further delineating the precise role of Rac1 in mammary carcinogenesis using mutant mice with mammary gland-specific deletion of Rac1 and mammary gland-specific expression of the polyoma middle T antigen (PyVT), a known oncogene. We found that mice having both PyVT expression and Rac1 deletion in the mammary epithelium develop mammary tumors significantly later than mice that only have PyVT expression in the mammary epithelium. The research was performed by purposefully breeding different mouse lines to generate offspring with desired genotypes, PCR genotyping of offspring, and immunoblotting. The goal of the research is to further characterize the role of Rac1 in mammary carcinogenesis in order to explore possible new avenues in anticancer therapy.

The Relationship between Adverse Child Experiences, Family Needs, and Child Outcomes

Emily Maloney, Foundation Fellow
Dr. Stacey Neuharth-Pritchett, Educational Psychology, College of Education

Children living in poverty are exposed to a number of adverse childhood experiences (ACEs), placing them at-risk for prolonged negative cognitive, emotional, physical, and mental health issues (Sacks, Murphey, & Moore, 2014). Research from neuroscience suggests children living in toxic stress conditions resulting from ACEs demonstrate decreased executive functioning skills – the higher cognitive functions responsible for memory, inhibitory control, and mental flexibility (Center on the Developing Child, 2011). The Head Start program serves as a stabilizing preschool environment for children with ACEs to attenuate these harmful side effects of living in poverty. When applying for Head Start, families supply background information on the number of ACEs in relation to identified family needs. Head Start then theoretically uses the family needs assessment to help the family set attainable goals realized by program exit. The research question for this causal-comparative study was: What is the relationship between number of ACEs, family needs and goals, and child developmental outcomes? Results indicated the number of ACEs experienced by families was statistically and significantly related to needs expressed by parents including employment, finances, mental health resources, parent/child bonding, and education. Children with more ACEs had parents who specified goals consistent with addressing such needs, but not in all cases. Children in families experiencing more ACEs had poorer cognitive development scores at the beginning of the intervention year. This study illuminates the complex relationship between ACEs, family goal setting, and child outcomes in designing intervention for children and families living in poverty.

Reducing Teen Pregnancy: The Case for Comprehensive Sex Education in Georgia

Emily Maloney, Foundation Fellow
Nneka Ewulonu
Mallory Harris, Foundation Fellow
Dr. Stacey Neuharth-Pritchett, Educational Psychology, College of Education

Georgia's current policy on middle school sex education stresses abstinence and focuses on the negative effects of premarital sex, requiring coverage on sex and HIV but not contraceptives or sexual coercion (Georgia Parents for Responsible Health Education). Although abstinence-only education has some short-term effectiveness in pregnancy and disease prevention, this approach has been shown to have little to no impact on future sexual attitudes (Devaney, Fortson, Quay, Wheeler & Clark, 2007). The state of sex education standards in Georgia is significant because of the negative consequences it has for both teenagers and taxpayers. Teenagers clearly suffer physical, social, and economic consequences of inadequate sex education. Costs associated with Georgia's teen birth rate totaled over $395 million in 2010, accounting for 19,029 teen pregnancies (Georgia Campaign for Adolescent Power and Potential). This research is intended to explore implementable comprehensive sex education policy alternatives to the current standards for sexual education in Georgia. The primary method in this research was analyzing the effectiveness of different types of sex education and basing the policy on previous comprehensive programs in other states and countries. Based on our findings, we believe the Georgia Department of Education should revise and improve the Quality Core Curriculum Standards and Resources to require comprehensive sex education and institute a system of 30 certified educators, each teaching sex

education in 16 or 17 geographically clustered schools, covering all 485 Georgia public middle schools.

Perception of Student-Athletes on UGA's Campus

Jillian Maloney, Cara Smith, Mackin D'Amico
Dr. Billy Hawkins, Kinesiology, College of Education

When student-athletes are being recruited, coaches convey the idea that they will be universally admired as student-athletes on campus. In our personal experience, most non-student-athletes perceive student-athletes as arrogant, receiving special treatment, and as being at a lower academic level than the average UGA student. So, are student-athletes admired or detested, and what is the cause of this perception? To measure the true perceptions of student-athletes, we surveyed non-student-athletes, student-athletes, and instructors, asking questions about their experiences with student-athletes and the amount of benefits that student-athletes receive. The implications of this study are that student-athletes may be conditioned, through the recruiting and athlete orientation process, to have an inflated sense of importance on campus, especially revenue-generating student-athletes. We believe that non-student-athletes and even instructors sometimes hold student-athletes in a negative light. Even student-athletes sometimes have negative perceptions of their fellow athletes, finding them more arrogant than the average student. We also explored the difference in observations for revenue-generating student-athletes and non-revenue-generating student-athletes. The student-athletes in revenue-generating sport are subject to the most polarized perceptions and seemed to experience the admiration of non-student-athletes, while also being judged for their attitudes and academic levels by student-athletes and non-student-athletes alike. We believe that student-athletes are often held in a negative light because non-student-athletes exaggerate the amount of benefits student-athletes received while underestimating the amount of sacrifices student-athletes must make.

Impact of Intermittent Glucose Oscillations on Vascular Endothelial Cell Inflammation

Meagan Marshburn, CURO Research Assistant
Dr. Nathan Jenkins, Kinesiology, College of Education

People with type 2 diabetes are at elevated risk for cardiovascular diseases, in part due to intermittent extreme high and low oscillations in blood glucose levels. Exercise has been shown to improve glycemic control, yet the implications of this effect for cardiovascular health are not known. The aim of this study is to determine the effect of intermittent high and low glucose oscillations on vascular endothelial cell inflammation using an in vitro model system. Cultured endothelial cells will be exposed to a variety of glucose solutions based on research-supported postprandial glycemic fluctuations over two and a half hours to mimic the blood glucose response to a high carbohydrate meal in humans. Experimental conditions include conditions mirroring the typical responses observed in people with (i) normal glucose metabolism, (ii) mild type 2 diabetes, (iii) severe type 2 diabetes, and (iv) when people with diabetes perform a light walk 30 minutes after a meal. The endothelial response will be quantified by examining the expression of inflammatory markers (vascular adhesion molecule 1, intercellular adhesion molecule 1, E-selectin, and tumor necrosis factor-alpha). Expression of these markers will be assessed at the mRNA level by PCR and the protein level via flow cytometry. We hypothesize that there will be a significant reduction in endothelial cell inflammation under exercising postprandial glucose conditions compared to

the type 2 diabetic condition. The results of this study could contribute to the understanding of mechanisms underlying the beneficial effects of exercise on cardiovascular health among individuals with type 2 diabetes.

Expanding Polymer Usage for 3D Printing in Tissue Engineering

Andrew Martin, CURO Research Assistant
Paul Cray
Dr. Jason Locklin, Chemistry, Franklin College of Arts & Sciences

Tissue engineering has incorporated the use of 3D printing, most commonly Fused Deposition Modeling, to direct and develop cells and tissues both *in vitro* and *in vivo*. The current number of choices for polymers to be used in medical device implants remains small, especially in load bearing cases. Several new and previously uninvestigated polyesters and blends – Polyhydroxybutyrate Acid, Polylactic Acid/Polycapralactone, and Polyhydroxybutyrate Acid/Polycapralactone – have been provided in pellet form from Meridian Holdings Group, MHG, for investigation. Optimal printing and extrusion conditions were investigated for the construction of high quality 3D printed constructs. Variables such as extrusion temperature, cooling rate, and tension were investigated to generate 3D printed filament 1.70 ± 0.05 mm. Once the filament generated, 3D print temperatures and extrusion rates become variables for optimization Young's Modulus. Trials investigating filament extrusion temperatures began at 190 degrees C. Extrusion temperature displayed a direct relationship with ductility, exemplifying the need for constant tension with filament development. Measurements are taken of cooled filament once steady state has been reached. Cell viability testing of these polymers will be completed in future work.

Effects of Tempol, a Superoxide Dismutase Mimetic, in Alleviating *Plasmodium chabaudi* Oxidative Stress during Pregnancy

Omar Martinez-Uribe, CURO Research Assistant
Dr. Julie Moore, Infectious Diseases, College of Veterinary Medicine

Plasmodium chabaudi AS-infection in pregnant C57BL/6J mice results in mid-gestational pregnancy loss associated with increased systemic pro-inflammatory response and oxidative stress. It is well known that oxidative damage is one of the most important pathological consequences of malaria infections. This study aims to assess the effects of Tempol, a superoxide dismutase mimetic and pleiotropic intracellular antioxidant, in alleviating *Plasmodium chabaudi* AS-induced oxidative stress and its associated complications during pregnancy. Gestational Day 0-infected and -uninfected pregnant C57BL/6J mice were treated with Tempol (100mg/kg) or vehicle from Gestational Day 6 to 12 via drinking water. The drug was safe, evidenced by the absence of significant differences of clinical parameters in Tempol-treated mice versus vehicle-treated mice. More importantly, 4-hydroxynonenal, an α,β-unsaturated hydroxyalkenal that is produced by lipid peroxidation in cells, was significantly reduced in conceptuses of infected pregnant Tempol-treated mice. However, Tempol treatment did not rescue pregnancy loss in this model, suggesting that oxidative stress may not be the only pathological mechanism by which *P. chabaudi* AS-infected mice abort at mid-gestation. Experiments are underway to further elucidate the mechanisms of antioxidant therapy in malaria during pregnancy.

Elucidating the Functional Role of Chondroitin Sulfate Proteoglycans in the Extracellular Matrix for Use in Rationally Designed Glycomaterials

Hannah Mason, CURO Research Assistant
Dr. Lohitash Karumbaiah, Animal & Dairy Science, College of Agricultural & Environmental Sciences

Chondroitin sulfate proteoglycans (CSPGs) are a family of extracellular matrix proteins that play a variety of roles in growth and development. CSPGs are also thought to be potent inhibitors of neuronal regrowth after injury. However, contrasting evidence also suggests that they are key components of the neural stem cell (NSC) niche, where they are thought to be responsible for the maintenance and self-renewal of neural stem cells. We hypothesize that the seemingly paradoxical roles played by CSPGs are largely due to the diversity of their sulfated glycosaminoglycan (GAG) side chains. In order to uncover the diversity and functional attributes of CSPG associated CS-GAGs, we purified CSPGs from mice brains and analyzed CS-GAG content via SAX-HPLC. Contrastingly, results from these preliminary assays revealed a significantly higher expression of dermatan sulfate when compared to chondroitin sulfate. In ongoing studies, we are investigating the effects of presenting monosulfated or oversulfated CS-GAGs on 2D substrates, and in 3D hydrogels on human neural stem cell homeostasis.

Financial Stress among College Students

Blake Mathews, CURO Research Assistant
Dr. Brenda Cude, Financial Planning, Housing & Consumer Economics, College of Family & Consumer Sciences

Previous studies have shown a negative correlation between financial stress and academic performance, so the feasibility and practicality of measuring financial stress appears to be a worthwhile research question. Using data gathered in survey results of UGA students since 2008, the pre-existing financial stress instrument used in this study assesses 13 different components of the financial stress of students. Students that took this financial stress survey also provided other information, such as their college of study, age, gender, and whether they took out student loans. Students were asked to indicate a stress level of between one and four for the 13 different components of the test, which resulted in an average total of 24.576. The maximum and minimum potential scores were 52 and 13, respectively. Certain traits seem to impact stress in different ways. Using regression analysis, two factors seemed to impact overall stress levels the most: student loans and the college that a student is a part of. On average, students who had taken out student loans for which they were responsible showed significantly higher levels of overall financial stress, while majors in the college of business showed lower levels. Age and gender also impacted certain elements of financial stress. The instrument used has a Cronbach's alpha of 0.82, which suggests that it is a reliable measure. Such a measure could be useful to ascertain students most in need of assistance, allowing for the provision of limited resources to those that would benefit from them the most.

Changing Cones: Students' Images of a Dynamic Situation

Kathryn Mauldin, CURO Research Assistant
Dr. Kevin Moore, Math & Science Education, College of Education

The Common Core State Standards for Mathematics (CCSSM) emphasize the importance of students reasoning quantitatively and modeling, but there is limited research on students' activity as they model dynamic situations, including their images of such situations. Researchers have found that students' quantitative reasoning and images of situations have the potential to

play an important role when students engage in modeling. The goal of this study was to explore the images students leveraged as they made sense of and modeled a relationship between two quantities in a dynamic situation. We used semi-structured task-based clinical interviews to obtain data of ten undergraduate students representing the relationship between the height and the outer surface area of a computer generated dynamic cone that was growing and shrinking. Students relied on various images as they completed this task. Two out of the ten students only leveraged images of quantities changing constantly with respect to time when constructing any relationship within the situation. The remaining students relied on the use of more sophisticated images, such as 2-D and 3-D representations of the cone. Although both the 2-D and 3-D images permitted students to develop feasible solutions, neither type of image guaranteed a correct solution. The results indicate that students developed idiosyncratic images that greatly impacted their solution to the task. Thus, teachers need to be attentive to students' images as they model situations in order to support students in reasoning quantitatively.

The Effects of TnAV-2a on the Complex Interactions between the Parasitoid *Microplitis demolitor* and Various Lepidopteran Species

Johnathan Mayfield, CURO Research Assistant
Dr. Gaelen Burke, Entomology, College of Agricultural & Environmental Sciences

Ridding a crop of devastating agricultural pests requires comprehensive approaches to find an effective solution. One alternative solution to harmful insecticides involves parasitoids, which are insects that parasitize other insects and kill them, all the while completing some of their development within the host. Moreover, many parasitoids are more successful in parasitizing because of mutualistic viruses that evolved from previously pathogenic ones. Thus, studying viruses and their role in the complex interactions between insect parasitoid and host proves beneficial economically and environmentally. The purpose of this study was to explore the complex interactions between the parasitoid wasp *Microplitis demolitor*, the lepidopteran hosts it parasitizes, and TnAV-2a, an ascovirus. TnAV-2a is a pathogenic ascovirus, but there is another ascovirus that is mutualistic with a species of parasitoid wasps, supporting the idea that TnAV-2a could evolve to become mutualistic with *M. demolitor*. Five lepidopteran species were used as potential hosts for *Microplitis demolitor* and include *Pseudoplusia includens*, *Heliothis viriscens*, *Spodoptera frugiperda*, *Trichoplusia ni*, and *Helicoverpa zea*. These same five species were used as hosts for TnAV-2a. *M. demolitor* attempted oviposition in all five species, but *S. frugiperda* and *T. ni* were unsuccessfully parasitized. Furthermore, all species were inoculated with TnAV-2a and showed characteristics of TnAV-2a infection which include arrested development, white hemolymph, and premature death. Preliminary trials of TnAV-2a injections on parasitized lepidopterans show 100% mortality of the wasp larvae within the host. Further research is necessary to fully understand the elaborate interactions between TnAV-2a, parasitoid wasps, and lepidopteran hosts.

The Impact of Severe Weather Events on Market Returns

Thomas McBrearty, CURO Research Assistant
Dr. Bradley Paye, Banking & Finance, Terry College of Business

This paper examines the impact of the monsoon season on equity and bond markets in Southeast Asia. Data consist of daily equity and bond market index returns from six Asian markets (China, Indonesia, Philippines, Japan,

South Korea, Vietnam, Singapore), seasonal indicators capturing the monsoon season, and daily precipitation data from the National Oceanic and Atmospheric Administration. I will test whether variables capturing the effects of the monsoon season relate to equity and bond market returns in affected countries, and whether weather-related variables impact the risk (volatility) associated with these assets. Specifically, I will be measuring the deviation of daily precipitation levels from the annual mean and exploring this deviation's relation to equity and bond returns. This empirical analysis is novel for several reasons. First, most existing studies relating weather conditions to asset prices focuses on US and European markets. Second, much existing research focus on behavioral and psychological channels connecting weather to asset prices. Our study emphasizes the real effects of flash floods, severe drought, and the infrastructure damage associated with the monsoon season in Southeast Asia.

Algorithmic Forecasting through Big Data Analytics

Thomas McBrearty, CURO Research Assistant
Daniel Sanchez, Andrew Angoyar, Carson Aft
Dr. Qing Zhang, Mathematics, Franklin College of Arts & Sciences

"A spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities." In these timeless words, John Maynard Keynes described the "animal spirits" by which our economies move and grow. Prior to the advent of the Internet, it was impossible to accurately measure, but thanks to the exponential growth of data from search engines and social networks, it is now possible to gauge the spirits behind the movements. Harnessing data from social networking and search engines, we intend to use multivariate regressions to measure the impact of keyword frequency (e.g. debt, inflation, iPhone, mortgage, retirement) on market indices. It is our intention to parse data in real-time, then measure amplitude of deviation from the predicted numbers as a forecasting tool. Based on a literature review of this relatively new forecasting method and preliminary findings, we expect to find a strong relationship between keyword trends and market movement. Beyond generalities, we believe that there will be strong emergent relationships as the degree of specificity grows, both with the type of index and the keywords analyzed. The significance of this research goes to building more predictive ways of quantifying finance beyond the tools used today. While this may not be viable as an absolute predictor, it will help to explain the underpinnings of the increasingly complex marketplace of the 21st century.

Procedural Polarization: Examining Changes in the Construction of the Roll Call Voting Record, 1877-2012

Jordan McKissick, CURO Research Assistant
Dr. Anthony Madonna, Political Science, School of Public & International Affairs

Scholars of congressional politics frequently report that polarization is at an all-time high. However, these observations are almost exclusively based on longitudinal analyses of roll call vote data. While this has given scholars an accurate impression on how roll call voting has changed over time, less attention has been given to changes in the roll call generating process. We argue this has led to biased inferences about ideology and American political institutions. To gain leverage on this topic, we utilize an original dataset of all amendments to major legislation from congresses sampled from the 45th Congress (1877-1879) to the 111th Congress (2009-2011). Utilizing these data, we examine the link between the ideology of the amendment sponsor and the likelihood a recorded vote was taken. We hypothesize that

desirability of a roll call vote has not been constant across time and amendment sponsor.

The Photodissociation of SH+ in the Interstellar Medium

Elizabeth McMillan, CURO Research Assistant
Dr. Phillip Stancil, Physics & Astronomy, Franklin College of Arts & Sciences

Photodissociation is a chemical reaction that uses photons to break down a chemical compound. This reaction is an important mechanism for the destruction of molecules in the interstellar medium. In the search for novel molecular species in interstellar and circumstellar environments, sulfur-containing molecules have been observed and identified in diffuse and translucent clouds. The sulfur-bearing molecules SH and SH+ have recently been detected in the interstellar medium. SH and SH+ facilitate the formation of other sulfur-bearing molecules, so information about their concentrations is necessary for the investigation of the chemical composition of astrophysical environments. As searches for new molecular species continue, molecular destruction processes involving sulfur are of considerable interest. These molecular destruction processes, along with other processes, can be used to create a chemical network that can predict the concentrations of major sulfur species in various astrophysical environments. Using ab initio molecular potential energy curves and transition moments, as well as quantum-mechanical processes, we have carried out calculations for the photodissociation of SH+. Prior to this study, no calculation of the destruction rate of SH+ through photodissociation had been performed. This calculated photodissociation rate can be used to improve sulfur chemical network models, giving astronomers a better idea of the concentrations of sulfur-bearing molecules in various astrophysical environments.

Examination of Localization of *Mycoplasma pneumoniae* in relation to Tethered Mucins MUC1 and MUC4

Alison McWhorter Anderson, CURO Honors Scholar
Dr. Duncan Krause, Microbiology, Franklin College of Arts & Sciences

Walking pneumonia is a chronic infection most commonly seen in young adults and children, caused by the bacterium *Mycoplasma pneumoniae*. Infections are transmitted by aerosol, allowing the bacteria to infect the ciliated epithelium of the conducting airways. We use Normal Human Bronchial Epithelial (NHBE) cells in an *in vitro* model because they create a mucocilliary barrier comparable to the one that forms in the human airway *in vivo*. Previous studies demonstrated that *M. pneumoniae* attaches initially to the cilia and then slowly spreads laterally on the epithelial surface. In addition, it is also known that localization of the tethered mucins MUC1 and MUC4 differs on cilia from the rest of the cell surface. Based on this knowledge, we hypothesize that the localization of MUC1 and MUC4 affects the speed by which *M. pneumoniae* spreads on infected cells. We predict that the cells in this study will show distinct colonization patterns consistent with this hypothesis, and our goal here is to test that hypothesis by correlating *M. pneumoniae* infection patterns on NHBE cells with MUC1 and MUC4 distribution. We infected underdeveloped and terminally differentiated NHBE cells with *M. pneumoniae* for four hours and then examined *M. pneumoniae* localization in relation to that of MUC1 and MUC4 by using immuno-histochemical staining and fluorescent and scanning laser confocal microscopy. Preliminary results have shown that MUC1 and MUC4 localization patterns differ on both underdeveloped and terminally differentiated NHBE cells.

Abstracts

Concussive Traumatic Brain Injury Therapy Using iPSC-NSCs in a Porcine Model

Mary Mehegan, CURO Research Assistant
Dr. Franklin West, Animal & Dairy Science, College of Agricultural & Environmental Sciences

In the year 2000, 2.5 million people suffered from a TBI. In the United States alone, approximately 50,000 deaths result from TBI annually, with toddler-age children being the most affected demographic. At this time, there is no adequate TBI treatment available. Recently, the West Laboratory developed induced pluripotent stem cell-derived neural stem cells (iPSC-NSCs). These iPSC-NSCs may potentially serve as a regenerative cell replacement therapy, as they are capable of differentiating into neurons, astrocytes, and oligodendrocytes and produce regenerative factors such as VEGF. These cells have been shown to lead to significant structural and functional improvement in rodent models that have suffered similar neural injuries. However, treatments that have been developed in rodent models have regularly failed in clinical trials, and therefore more predictive large animal models are needed. The pig serves as a potentially excellent large animal model, with a large gyrencephalic brain that has gray-white matter composition similar to humans, unlike rodent models. In this study, we propose to develop a novel piglet concussive TBI module. We hypothesize that piglets receiving a corticalimpact at 2, 4, and 6 meters per second will develop brain lesions, show changes in inflammatory response, macrophage infiltration, and glial scaring, and show changes to motor function deficits ranging from mild to severe based on impact speed. Development of this model will allow for the testing of efficacy and safety of novel stem cell therapies as well as traditional pharmacological and device approaches.

Evolution of Root System Morphology and Nitrogen Uptake in Genus *Helianthus*

Benjamin Miller, CURO Research Assistant
Dr. Lisa Donovan, Plant Biology, Franklin College of Arts & Sciences

The acquisition of nutrients from the earth to the plant is a key function of the root system; however, how plant root systems have evolved across soil fertility gradients is not well understood. We examined three pairs of *Helianthus* species chosen as phylogenetically independent contrasts with respect to native soil fertility to further understand the relationship between local adaptation, root morphology, and nitrogen (N) uptake levels. Morphology was measured using the appropriate length measurements, and N uptake was tracked through isotope 15N. While N supply in all experiments remained the same in all species, species native to low nutrient soils exhibited a higher rate of N uptake, higher root tissue density, and lower overall root mass relative to their high nutrient adapted sister-species. In contrast, species native to high nutrient soils had a higher root/mass ratio and a higher total root length. The consistent differences detected between species native to soils differing in nutrient availability indicate repeated evolution of root morphology and nutrient uptake traits across nutrient gradients. The significance behind this study is that N uptake and root morphology likely play an important role in adaptation to soil fertility levels. This study provides information for breeding crops which can efficiently use soil resources and prevent wasted products.

Practical Grant Writing

Jennifer Milley
Dr. Fran Teague, Theatre & Film Studies, Franklin College of Arts & Sciences

This research project centered around the methods and practices of writing a successful

grant. Grants are awarded throughout the academic and professional world as means to fund a broad spectrum of projects, studies, etc., and are an integral part of the financial structure of our world. Thus, as a skill, grant writing is a highly valuable and useful tool for nearly every profession and area of study. The research took two directions: research into grant-writing and research into three children's theatre companies. The culmination of this research was to write a mock grant which requested funding to start an international children's theatre festival in Athens with the purpose of providing community outreach and education. The festival would last for three days and incorporate performance and workshops from three children's theatres which have a strong educational component. The oral presentation will discuss the different parts of a grant and the steps to take to gather the appropriate information in order to write a successful grant. Examples of each step will concern the theatre companies, why they were chosen, and the benefits of having such a festival in the Athens area.

Purification of Hirano Bodies in *Dictyostelium discoideum*

Sandip Minhas, Foundation Fellow
Dr. Marcus Fechheimer, Cellular Biology, Franklin College of Arts & Sciences

Hirano bodies are paracrystalline structures that have been found in the post-mortem examination of human brain tissue. They have been shown to be associated with aging, diabetes, alcoholism, cancer, and neurodegenerative diseases such as Alzheimer's disease. Hirano bodies are composed primarily of filamentous actin and actin-associated proteins. The study of the physiological significance of Hirano bodies has been hampered by the lack of a model in living cells. Our laboratory induced the formation of model Hirano bodies in *Dictyostelium*, cultured mammalian cells, and transgenic mice. Hirano bodies protect cells from death induced by the intracellular amyloid precursor domain, enhance death due to forms of tau in frontotemporal dementia, and cause impaired spatial memory in mice. The goal of this project is to purify model Hirano bodies in *Dictyostelium* in order to determine the protein composition of these inclusions. The cells were lysed, and the Hirano bodies were collected using low speed sedimentation and fractionation with iodixanol gradients. The fraction containing the Hirano bodies was analyzed for purity of the inclusions by searching for the presence of various other cellular components such as cell nuclei and mitochondria. Gel electrophoresis and western blotting was used to initially identify possible proteins present in the Hirano bodies following the density gradient purification. Mass spectroscopy was subsequently utilized to identify the candidate proteins from the fraction containing the Hirano bodies. Future research conducted in this area will examine and verify the roles of the suspected proteins in the formation of Hirano bodies.

Promoting Products, Cutting Costs: Advertising Industry Strategies and Tactics in the United States, 1973-1976

Sapna Mistry, CURO Research Assistant
Dr. James Hamilton, Advertising & Public Relations, Grady College of Journalism & Mass Communication

The purpose of this study is to a) explore possible relationships between specific advertising strategies and tactics, and overall national economic health, and b) document specific ways in which consumers were directly involved in marketing communication prior to the rise of the Internet and user-generated content. The assumption guiding research design was not only that advertising strategies and tactics change to adapt to times of economic hardship, but that building relationships with consumers and involving

them more directly in marketing communication has long been a key cost-cutting measure in place, not only recently instituted with the rise of the Internet. To investigate this assumption, researchers examined 105 randomly selected issues of the advertising trade journal *Advertising Age* from the years 1973-1976, which was a time of national recession and stagflation. Every item was coded that mentioned a form of direct consumer involvement in marketing. Frequencies of different forms were plotted over time and compared with each other. The data lend support to the assumption. At the start of 1973, *Advertising Age* stories noted the value of contests, sweepstakes, and other games that directly engaged their target markets. By the end of 1973 and into 1974, the frequency of items that mentioned the use premium incentives also increased. By the end of 1976, as the national economy came out of the recession, the frequency of mentions of premium incentives decreased as presumably greater resources were now available to engage in more costly forms of marketing communication, such as traditional advertising.

***Gracilaria vermiculophylla's* Impacts on Herbivory in Georgia's Coastal Ecosystems**

Timothy Montgomery
Dr. Jeb Byers, Odum School of Ecology

There are an unprecedented number of non-native species, with the potential to alter critical ecosystem functions or services, colonizing habitats around the world. *Gracilaria vermiculophylla* (hereafter referred to as *Gracilaria*) is an invasive red seaweed that is highly tolerant of various physical stresses such as temperature and salinity. These tolerances enable it to persist in a wide range of conditions. Georgia is relatively void of any native seaweed species, thus *Gracilaria* represents a source of primary production with potential to alter key ecosystems. Georgia's coastal marine communities have historically been fueled by detritus and the microphytobenthos; however, with the introduction of *Gracilaria*, there is potential for food webs to be based off of macrophyte primary production instead. We conducted a series of feeding experiments consisting of isolated non-choice and choice (*Gracilaria* vs *Ulva*) trials with local marine herbivores: *Eurypanopeous depressus, Ilyanassa obsoleta*, *Lagodon rhomboids*, and the invasive *Synidotea laevidorsalis*. All listed species are locally abundant and categorized as generalist herbivores. Our results suggest that native herbivores do not consume *Gracilaria*; however, the invasive *S. laevidorsalis* significantly consumed *Gracilaria*. This suggest that *Gracilaria* may be largely avoided by generalist because of its chemical defenses, since they are likely yet to develop methods of dealing with such chemical defenses.

Cloning, Expression and Purification of MexT and AmpR from *Pseudomonas aeruginosa*

Kathryn Moore
Dr. Cory Momany, Pharmaceutical & Biomedical Sciences, College of Pharmacy

Pseudomonas aeruginosa is a prevalent hospital pathogen and a leading cause of death in patients with cystic fibrosis. One feature of its high virulence is attributed to its innate antibiotic resistance. Two LysR-type transcriptional regulators (LTTR's) found in *P. aeruginosa,* MexT and AmpR, are known to regulate the transcription of molecules involved in this antibiotic resistance. MexT is a transcriptional activator of the drug efflux pump gene, *mexEF*. Expression of the MexEF transporter leads to the activation of antibiotic resistance against multiple drugs, but significantly against tetracycline. AmpR is a regulator of the gene encoding a β-lactamase, AmpC, which provides penicillin resistance. The *mexT* gene was successfully cloned, and the MexT protein purified from

E. coli cells overexpressing the protein. Additionally, the gene encoding AmpR was cloned, and purification of the protein is in progress. Ultimately, the goal is to crystallize both MexT and AmpR and then to determine their atomic structures by X-ray crystallography. Thyme extracts, which have antibiotic activity against *P. aeruginosa*, will be evaluated as a source of small molecule inhibitors of MexT and AmpR function. Small molecules that bind to MexT or AmpR and inhibit transcriptional activation could be lead compounds for the development of the next generation of antibiotics.

Exploring Evolution in the Classroom: Developing a Hands-On Activity Using *Mimulus guttatus*

Ananya Moorthy, CURO Research Assistant
Dr. Andrea Sweigart, Genetics, Franklin College of Arts & Sciences

My research project aims to create a hands-on laboratory activity for local high school biology students that teaches important concepts in genetics and evolution. The activity I have developed focuses on adaptation to serpentine soils in the yellow monkeyflower (*Mimulus guttatus*). This wildflower species shows tremendous ecological variation in nature, and certain populations have evolved tolerance for the metal saturated environment that characterizes serpentine soils. Currently, I am working to optimize assays to measure serpentine tolerance in *M. guttatus*. I have developed a hydroponic solution to test for differences in seedling germination and survival between individuals collected from natural populations that occur on and off serpentine soils. Previous research has shown differences in serpentine tolerance among adult plants, but a focus on seedlings will allow the experiment to be easily reproduced in a classroom with limited resources. Throughout this project I will be working on a lesson plan to be used in local high school classrooms. This experiment will allow teachers to supplement their evolution unit in the classroom, as well as give students in the Athens area a glimpse of a university science research lab.

Assessment of Proteomic and Glycomic Profiling of Medaka (*Oryzias latipes*) to further the Understanding of the Physiological Response to Low Level Ionizing Radiation

Jason Moraczewski, CURO Summer Fellow, CURO Research Assistant
Dr. Carl Bergmann, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Ionizing radiation (IR) is recognized to cause proteomic changes in various organisms. Most prominent studies performed in the field of proteomics primarily focus on the effect of radiation at acute, high doses. However, very little is known about the biological responses when organisms are exposed to chronic, low levels of ionizing radiation. Using medaka (*Oryzias latipes*) as the model aquatic organism, this study will examine the physiological responses to chronic, low-dose IR. Specifically, the proteome and glycome of medaka will be analyzed to quantify any changes that have occurred due to the low levels of IR. The first part of the project is aimed to standardize the methodology for protein extraction and protein fractionation using a control group and a high dose group. Mass spectrometry and bioinformatics will be used to help elucidate any metabolic pathways associated with adaptation to IR exposure. This will advance the understanding of how IR can affect evolutionary processes.

The Effects of Travel on Team-Based Performance

Christopher Morgan, Kyle Ledesma, Rebekah Trotti, Parker Thomas
Dr. Karl Kuhnert, Psychology, Franklin College of Arts & Sciences

We examined the relationship between distance traveled to work and job performance. As teams in the workforce are required to go on longer trips, the impact of travel is becoming more relevant. Current research indicates that travel induces stress, but there has been little to no research on how travel influences job performance. Using team-based sports data, we examined the relationship between distance traveled and job performance. In addition, we evaluated how the total accumulated miles that teams travel impacts the relationship between travel and performance. Similarly, we looked at how a team's average job experience affects the relationship between travel and performance. Our study shows that the further teams travel for their job, the worse they perform. However, our research indicates that employees are less sensitive to trips over time. The findings of our study are important because there are tangible consequences of travel for one's job. Based on our findings, employers should seek alternative methods for long distance work. However, if travel is inevitable, organizations should be aware that with more trips the negative effects of traveling are weakened. Organizations can further reduce these adverse effects by selecting teams with more average job experience.

High Dynamic Range Imaging For X-ray Image Acquisition

Logan Morrison, CURO Research Assistant
Dr. Mark Haidekker, College of Engineering

X-ray images made from objects with very dense and less dense materials (e.g., bone and muscle tissue) often require a balance between long exposure times that make details in the dense material visible and shorter exposure times that prevent overexposure of the background and less dense regions. In quantitative x-ray images, such as DEXA images for bone densitometry, background information is crucial for normalization of the measured intensities, and overexposure cannot be accepted. High dynamic range imaging (HDRI) is a method presently becoming popular in digital visible-light photography. It involves combining well-exposed pixels from a bracketing series of photographs into one image that represents the actual physical irradiance of the scene. We have adapted this principle to x-ray images, whereby multiple images of the same specimen were taken with varying exposure times. These images were then combined into a composite with only the best exposed pixels from the series accepted into the composite. Moreover, pixel intensities were scaled to match that of the background intensity, and the composite image reflects actual sensor irradiance in exposure regions where otherwise there would be only noise. Accuracy and effectiveness of this method have been demonstrated with calibration phantoms, bone phantoms, and common specimens that contain extremely inhomogeneous densities. HDRX, as we call this method, can be universally applied to any biomedical x-ray imaging system and for non-destructive materials testing purposes to increase the density range in which useful x-ray data can be obtained.

The Effect of Race and Household Structure on Adolescent Alcohol Use

Santana Mowbray
Dr. Natasha Ganem, Sociology, Franklin College of Arts & Sciences

Past research has examined two-parent versus single-parent homes and the delinquency of teens from these households, but few have examined in depth, household structure and

race and its effect on the use of one substance in particular: alcohol. The data for this research was drawn from 5,935 teens who completed a survey on the evaluation of the Gang Resistance Education and Training Program (GREAT) conducted between 1995 and 1999. There are three questions to be addressed in this research: 1) Does race impact the likelihood of teens drinking alcohol? 2) Does household structure (Mother only vs. Both Mother and Father) have an impact on the likelihood of teens drinking alcohol? 3) Does household structure as a third variable have any impact on race in determining a teen's likelihood to drink alcohol? Responses to questions regarding household makeup, race, and alcohol use were drawn from the survey and statistical measures were used to determine the significance of the results. Based on the Social Bond Theory and previous research examining alcohol use, it was hypothesized that teens from "Mother only" households will be more likely to use alcohol. Additionally, it was hypothesized that due to differences in how households are broken up within different racial groups, White teens will be more likely to use alcohol than Black teens. All hypotheses were supported in this research. The results show that household structure amplifies the effects of alcohol use, particularly among teens in single, "Mother only" homes and more specifically among White teens.

Function of Kinesin Proteins in *Toxoplasma gondii*

Kurt Mueller
Dr. Boris Striepen, Cellular Biology, Franklin College of Arts & Sciences

Toxoplasma gondii is a parasitic protozoan and an important human pathogen that causes toxoplasmosis. It is estimated that *T. gondii* infects up to 33% of the world's population. This disease is usually asymptomatic, but can greatly affect individuals with weakened immune systems, such as pregnant women and those with AIDS. Toxoplasmosis has been linked to numerous neurological diseases and can cause encephalitis. *T. gondii* is also a good model for understanding diseases caused by similar parasites such as malaria. This parasite uses a variety of conserved proteins, such as kinesins, that are common to other organisms. Kinesins are motor proteins that move along microtubule filaments and serve a variety of cellular functions such as meiosis, mitosis, and cellular transport. We hypothesize that kinesin proteins play a role in each step of endodyogenous replication of *T. gondii*. Using epitope tagging, protein markers, transformation, and immunofluorescence assay microscopy, we localized and characterized various kinesin proteins throughout the *T. gondii* cell cycle. Proteins such as Kinesin-5 and Kinesin-14S localize to the centromere during metaphase and anaphase of mitosis, while proteins such as Kinesin-14 and Kinesin-8-Kinesin-4/10 localize to the conoid of daughter budding cells during mitosis. Kinesin-14L localizes to the leading edge of daughter buds in replicating cells. The data will also show that inducible knock down of these proteins results in decreased viability, structural morphology, and invasive ability of *T. gondii*. Further studies will determine which proteins are most essential for parasite viability and may have significant medical implications.

Neural White Matter Alterations in Schizophrenia

Megan Murphy, Ramsey Scholar
Dr. Jennifer McDowell, Psychology, Franklin College of Arts & Sciences

Cognitive control (CC) refers to the management of processes such as working memory, attention, and task flexibility. Patients with schizophrenia (SZ) frequently exhibit low CC. Some healthy subjects from the general population, however, exhibit similarly low CC. Deficits in CC are apparent

at the level of neural white matter (WM) connections such as the superior longitudinal fasciculus (SLF), which connects frontal, parietal, and temporal regions, mediating several CC processes. Reduced WM integrity in SLF is linked to lower scores on CC tasks. In this study, we assessed WM integrity in patients with SZ and otherwise healthy individuals with high or low CC (HCC, LCC). We hypothesized that WM integrity of SLF would be greater in the HCC group than the SZ group but would not differ between the LCC and SZ groups. We recruited 24 patients with SZ; 49 healthy participants were recruited and divided into HCC (n = 24) and LCC (n = 25) groups based on performance on a working memory task (SSPAN). Diffusion tensor imaging scans were performed and analyzed using fiber tracing software to obtain fractional anisotropy (FA) values for the SLF. FA is a measure of WM integrity with higher values indicating more efficient myelin structure. FA was significantly higher in the SLF for the HCC group than the SZ group, but no FA differences were found between the LCC and SZ groups. This suggests that WM differences in SLF between healthy and SZ groups may be more attributable to CC differences than to disease.

Carbohydrate T cell Recognition and Presentation

Seema Mustafa, CURO Research Assistant
Dr. Fikri Avci, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

The overall purpose of our research is to identify the mechanism of molecular interactions involved in how carbohydrate antigens are taken in by the cell, processed and presented by antigen presenting cells (APCs). My aim in this project is to isolate and characterize T cells specific for the synthesized Pn3-TT antigen and aid in characterizing their corresponding epitopes from the carbohydrate moieties. It was demonstrated in Dr. Avci's *Nature Medicine* paper, "A mechanism for glycoconjugate vaccine activation of the adaptive immune system and its implications for vaccine design" that carbohydrates that were previously considered to be "T-cell independent" antigens are in fact recognized by carbohydrate specific CD4+ T cells (Tcarbs). Recent research has shown monosaccharides and oligosaccharides that are glycosidically linked to peptides can be recognized by T cells. T cell recognition of these glycopeptides depends on the structure of both the peptide and glycan portions of the antigen. Based on the findings, Dr. Avci explores the role that carbohydrate epitopes generated from glyconjugate vaccines had in activating helper T cells. It was then found that these epitopes are presented to specific carbohydrate recognizing T cells through a unique mechanism that is broadly summarized in his paper. Based on the discovery of T cell specific recognition of carbohydrates that induce adaptive humoral immune response and the scientific literature on the existence and function of glycan specific broadly neutralizing antibodies (bNAbs) against HIV-1, our lab hypothesized that the human CD4+ T cell repertoire contains a population of these T cells that is able to recognize epitopes generated from the N-glycan shield of gp120, and by characterizing them and isolating their glycan epitopes, the lab hopes to design and develop glycoconjugate vaccines that are enhanced for T-cell specific stimulating epitopes, whose immunizations will produce strong and long lasting immune response to protect from HIV-1. Flow cytometry, immunofluorescence, T cell proliferation, and ELISASPOT are the primary experimental techniques utilized in the lab. Immunofluorescence is a technique used for light microscopy with a fluorescence microscope. This technique uses the specificity of antibodies to their antigen to target fluorescent dyes to specific biomolecule targets within a cell, and therefore allows visualization of the distribution of the target molecule through the sample. ELISPOT is a

laboratory technique for detecting cells that make (or "secrete") various substances, more specifically in our case detecting cytokine secretion. Flow cytometry is a laser-based technology employed in cell counting, cell sorting, biomarker detection and protein engineering, by suspending cells in a stream of fluid and passing them by an electronic detection apparatus. A common variation is to physically sort particles based on their properties, so as to purify populations of interest and it was used for the purposes of our lab to determine optimal antibody titrations. Western Blot analysis is used to detect protein and Northern Blot is used to detect RNA.

Analysis of Cancer Mutations in Protein Kinases using Semantic Web Technologies

Anish Narayanan, CURO Summer Fellow, CURO Research Assistant
Dr. Natarajan Kannan, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Protein kinases comprise an extensive superfamily of proteins. These complex biological entities are critical in initiating diverse signal transduction pathways, effecting activation of cellular processes through the phosphorylation of target substrates. In order to improve our ability to study kinases, our lab has developed the Protein Kinase Ontology (ProKinO), which captures and aggregates kinase data from a large variety of publicly available data sources into a queryable format. Using this data, it is possible to create large-scale SPARQL queries which can probe interesting questions and elucidate the fundamental nature of the kinome. In this project, a two-pronged approach is taken to analyzing protein kinases. First, with the assistance of an alignment of all of the protein kinase sequences to PKA, a mutational co-occurrence study is performed to identify interacting residues and key motifs in the kinase domain. Second, the breadth of available data currently available in databases, while vast, is limited to a handful of curated, tabulated tables. By performing a large-scale text-mining analysis of Pubmed Central's Open Access Subset containing over one million articles, it is possible to dramatically increase the knowledge base available in ProKinO. Through the careful and judicious use of NLP (Natural Language Processing) algorithms and skilled curators, the impacts of mutations are effectively extracted from the latest primary literature and research, information which can be used in the future to analyze patient cancers in personalized medicine and prescribe ideal, calculated treatments.

Investigating the Influence of Rac1 and Rho Family GTPases in Hair Follicle Biology

Nina Navalkar, CURO Research Assistant
Dr. Tamas Nagy, Pathology, College of Veterinary Medicine

Rac1 is a small G protein in the RhoA family of small G proteins and is expressed ubiquitously throughout the tissues of the body. Rac1 has been known to promote the cell cycle and oncogenic transformation, hence the interest in its role in mammary carcinogenesis. We previously created a mutant mouse line that has mammary gland specific deletion of Rac1 in the mammary epithelium, using the Cre-LoxP system. In analyzing the phenotype of our mutant mice, we found that Rac1 deletion also occurs in the skin as well as results in a phenotype. Thus, the additional goal of our research has become to understand the role of Rac1 in the maintenance of skin and hair follicles. So far we have tested the deletion of Rac1 using PCR, primers, western blotting, and immunohistochemistry and pursued other experiments in order to learn more about the molecular basis of the observed phenotype. We observed that mice lacking Rac1 (skin specific deletion) displayed early onset

alopecia while displaying no lesions in the epidermis. These results provide evidence for the indispensable role of Rac1 in the maintenance of hair follicles and have advanced existing knowledge of Rho family GTPases in hair follicle biology.

"Please Excuse Me as I Am in Need:" Bondage and Freedom in Civil War-Era Athens

Laura Nelson, CURO Summer Fellow, CURO Graduation Distinction
Dr. Christopher Lawton, History, Franklin College of Arts & Sciences

Studying the lives of slaves challenges outmoded, monolithic mythologies of the past and instead recognizes the enormous struggles and equal contributions of both black and white Americans. This research does so by reconstructing and examining the life of Aggy Mills (1827-1900), an Athenian woman enslaved by the elite Cobb family. She was remarkably literate, and through several extraordinary letters that she wrote to her owners, aspects of her life in slavery and freedom, like her role in her master's home and her place in the multicultural Athenian community, become apparent. Trace details of her life were first seen in these letters, but these only recount a portion of her life. To see Aggy as more than a servant, these letters are examined in conjunction with sources in the Athens-Clarke County Heritage Room, property deeds at the courthouse, census records, and various other local sources. Studying Aggy's life helps to give a more multifaceted version of the antebellum South, one where slaves' and whites' lives were intertwined, and slaves managed to define their own lives outside of the realm of their bondage. This research has been transformed into a digital sketch of Aggy's life as a part of the Georgia Virtual History Project. Viewers can hear Aggy's story and see the places connected to her life via a downloadable app for smartphone or tablet.

Giving Up Appointment Television: How Millennials Are Changing What It Means to Watch Television

Kim Nguyen, CURO Research Assistant
Dr. Karen Whitehill King, Grady College of Journalism & Mass Communication

With the increasing popularity of online streaming services, such as Netflix and Hulu, and the increased price of cable television subscriptions, many millennials are changing the way they watch television content. Selecting alternatives to cable television has given rise to a generation of audience members who have discontinued their cable subscriptions (cord-cutters) and people who have never had cable subscriptions (cord-nevers). While advertisers often target millennials, this generation poses a new challenge for advertisers since reaching them through traditional media is no longer as viable as it was for previous generations. Interviews conducted with college-aged millennials provide insight on the motivations that give rise to these trends, television show viewing habits of cord-cutters and cord-nevers, and what implications their decisions have for the advertising and television industries.

A #whitewashed Landscape: Internalized Racism, Linguistic Discrimination, and the Policing of Ethnic Identity on Twitter

Minh Nguyen, CURO Graduation Distinction
Dr. Chad Howe, Romance Languages, Franklin College of Arts & Sciences

The microblogging platform, Twitter, has enabled individuals to create an online community of searchable conversations by means of the hashtag (#), allowing users to find others who share common interests and values. Using data extracted from Twitter, this study analyzes the English expression *whitewashed* as it occurs with and without a hashtag (ex: #whitewashed vs. *whitewashed*) through corpus analysis. The paper also

investigates the grammatical and semantic functions of the hashtag with regard to the racial meaning of English *whitewashed*. The study explores #whitewashed as a metacomment on human behavior, as #whitewashed serves to characterize beliefs about what actions are considered socially unacceptable with respect to performing an "authentic" ethnic identity. Based on qualitative analysis, the data suggest that the use of #whitewashed, as opposed to *whitewashed* without a hashtag, carries a meaning predominately informed by internalized racism and works to bind ethnic minorities to racial stereotypes. And while #whitewashed is used to refer to many ethnic minorities, the data also show that the most salient meaning of #whitewashed is one linked to national identity and xenophobia. The study explores how online users understand ethnic identities shaped by internalized racism and how they communicate these views through the grammatical function of the hashtag.

The Impact of Runoffs: Electoral Reform and Duvergerian Factionalism in Metropolitan Atlanta

Cameron Niakan, CURO Research Assistant
Dr. Charles Bullock, Political Science, School of Public & International Affairs

In Part I, I address claims made by City of Duluth, Georgia officials that runoff elections: (i) inflict too high of a cost, (ii) draw too small of a voter turnout, and (iii) produce inequitable results. Drawing data from 48 Metropolitan Atlanta cities, I examine 160 municipal election returns and their corresponding election invoices from 1993-2013. (i) I utilize average price per ballot cast as a metric of electoral cost and find that Duluth enjoys inexpensive runoffs in comparison to those of other Metropolitan Atlanta cities. (ii) I render the ratio of average runoff turnout to average general election turnout as a metric of "turnout efficiency" and find that Duluth indeed has poor turnout efficiency, whereas Metropolitan Atlanta as a whole has a strong turnout efficiency. (iii) I define an instance of an "inequitable electoral result" as an instance of the "leader loses" phenomenon and/or of an anomalous majority and find that runoffs in Duluth and in Metropolitan Atlanta are reasonably equitable. In Part II, I test whether municipal elections in Metropolitan Atlanta align with Bradley Canon's findings that electoral rules decide patterns in factionalism. In Part II, I utilize the same election returns as those used in Part I to determine, by electoral system, the average number of candidates that ran per post. I find that Canon's "primary structure" hypothesis does not apply convincingly to patterns of factionalism in Metropolitan Atlanta. Although plurality-rule municipal elections are, on average, almost perfectly bifactional, majority-rule municipal elections lean toward bifactionalism, not multifactionalism.

Cloning and Constructing of a Complete RNA Polymerase from *Acinetobacter*

Hanna Nune
Dr. Cory Momany, Pharmaceutical & Biomedical Sciences, College of Pharmacy

RNA polymerases are multi-subunit proteins that transcribe DNA to RNA. In prokaryotes, the enzyme has five subunits: a b subunit involved in ribonucleotide chain elongation; a b' subunit that contains the active site for nucleotide chain polymerization; two a subunits involved in regulation and DNA recognition; a w subunit; and the s subunit that directs promoter specificity. Although we know a great deal about RNA polymerases, a major question remains: how does RNA polymerase communicate with transcriptional regulators? The objective of this research is to produce RNA polymerase from *Acinetobacter baylyi* ADP1. The first step of this project was to PCR amplify RNA polymerase genes from ADP1. The PCR-amplified DNAs encoding

the b and b' subunits (the *rpoB* and *rpoC* genes) were introduced into the vector pRARE2, which has chloramphenicol antibiotic resistance. Each has its own T7 RNA polymerase promoter and terminator. The PCR-amplified DNA encoding a, w, and s subunits (*rpoA*, *rpoZ*, and *rpoD)* were introduced into the pet-28b vector, which has kanamycin resistance. In this construct, a single T7 promoter is used. The two vectors, pRARE2 and pET-28b are compatible with one another in *E. coli*, where the proteins will be co-translated. Purified RNA polymerase from ADP1 will allow studies to be performed to examine the communication between RNA polymerase and transcriptional regulators. Ultimately, the enzyme will be used to identify small molecules that prevent transcriptional activation. By blocking essential regulatory networks in microorganisms, the resulting therapeutics would represent a new class of antibiotics.

The Influence of Structural Factors on Mental Health of Young Women in Post-Conflict Liberia

Mary Elizabeth Nuttall, CURO Honors Scholar
Dr. Tamora Callands, Health Promotion & Behavior, College of Public Health

The aim of this qualitative study was to identify what and how structural factors influence mental health among young women in post-conflict Liberia. We conducted five focus groups with 49 young women and 16 in-depth key informant interviews. Our interviews focused on identifying the impact of everyday stressors and struggles young women in Liberia encounter. We focused primarily on sexual health, mental health, gender roles, and exposure to violence. In this study, young women described ways in which structural factors influence adverse mental health outcomes. The major interconnections are the result of shifts in family structure and dynamics, compromised interpersonal relationships, and unaddressed trauma stemming from war-related violence. Understanding how these connections impact mental health outcomes is key to developing culturally relevant intervention to reduce mental health issues among young women in post-conflict Liberia.

The Effects of Incumbent and Challenger Campaign Spending on Election Results

Kasey O'Brien
Dr. Anthony Madonna, Political Science, School of Public & International Affairs

The purpose of this research design is to identify the effects of campaign spending and to evaluate policy proposals for campaign finance reform. This will be determined by comparing the effects of additional spending by two types of candidates – incumbents and challengers. The experiment would be limited to House elections; because more House seats are up for election each year, a wider sample is available for testing. The findings would show that, in conjunction with conventional wisdom, the effects on vote shares by challenger spending far outweigh the effects of incumbent spending. However, the second component of this theory breaks from relevant academic literature in that additional spending by both candidates is negligible beyond a certain point. Challenger campaign spending eventually reaches a level that puts them on an "even playing field" with the incumbent. At this maximum threshold, the challenger's spending has granted them the same name recognition and other built-in advantages enjoyed by an incumbent, and the marginal gains of spending by either candidate are relatively equal. The experiment examines campaigns over the course of the election cycle, comparing spending data to polling data. The maximum threshold will be determined by accounting for the challenger political quality, brand name recognition, and number of terms served by the incumbent.

These findings could have implications for campaign spending limits, which, if set below the maximum threshold, could be detrimental to challenger success.

Ryanodine Channel Protein in Insects: A Novel Pesticide Target

Onyinyechi Ochiobi, CURO Research Assistant
Dr. Michael Adang, Entomology, College of Agricultural & Environmental Sciences

Ryanodine receptor (RyR) proteins are large-sized calcium channel proteins located in the sarcoplasmic/endoplasmic reticulum that regulate calcium signaling between muscle and neural cells in animals. Ryanodine is a compound in a neotropical bush that is a natural insecticide which locks the calcium channel causing irreversible muscle contraction and insect death. Diamides are synthetic forms of ryanodine with high specificity for caterpillars. Diamides have a critical role in managing caterpillar pests in cotton, soybean, and other crops. However, resistance in the diamondback moth has stimulated interest in RyR proteins of field insects that differ in susceptibility to diamides. My thesis is that by cloning a soybean looper RyR, we can model RyR structure and conduct analyses of RyR-diamide interactions. In our present study, the full length cDNA of *Chrysodeixis includens* RyR (CiRyR) was cloned from adult looper thorax mRNA. CiRyR cDNA contains a 15273-bp ORF encoding 5090 amino acids with a predicted molecular weight of 574.9 kDa. CiRyR has up to 99% amino acid identity with other lepidopteran RyRs. All common conserved structures are present in CiRyR, including six transmembrane domains at C-terminal and a consensus calcium-binding site. Other conserved domains such as MIR (Mannosyltransferase, IP3R and RyR) domains, RIH (RyR and IP3R Homology) domains, SPRY (splA and RyR) domains, and RyR domains (RyR repeated domain) were identified in CiRyR. Significantly, three alternative splice sites were identified in the CiRyR gene. These results provide the foundation to analyze and understand the relationship between structure and function of RyR in *C. includens*.

Transcriptional Interference and Regulation of the Hyb Hydrogenase Operon of *Salmonella*

Selin Odman, CURO Research Assistant
Dr. Anna Karls, Microbiology, Franklin College of Arts & Sciences

Bacterial transcription initiation requires a sigma factor to interact with core RNA polymerase for identification of promoters and opening double stranded DNA. Sigma54 interacts with unique promoter sequences and atypically requires the presence of a DNA-bound activator capable of hydrolyzing ATP to initiate transcription. Recent microarray and ChIP-chip (Chromatin Immunoprecipitation linked to microarray analysis) assays in *Salmonella* Typhimurium (SalTy), which detected sigma54-regulated genes and sigma54-holoenzyme DNA binding sites, identified an antisense sigma54-dependent promoter associated with annotated transcription start sites for the hyb hydrogenase operon. Activation of this sigma54-dependent promoter appears to be associated with decreased transcription of the hyb operon. This novel promoter was identified in the presence of a constitutive, promiscuous activator of sigma54-dependent transcription6, so the focus of this work is to define the physiologically-relevant conditions that activate expression of this sigma54-dependent promoter. Two of four SalTy hydrogenase operons are known to have sigma54-dependent promoters in *E. coli* and are controlled by the activator FhlA. FhlA is activated by anaerobic conditions and formate; it stimulates transcription from promoters that have an associated DNA binding site for FhlA. I am currently

evaluating transcrition from the sigma54-independent promoters for the hyb operon and the antisense sigma54-dependent promoter using a plasmid reporter system and quantitative reverse transcriptase polymerase chain reactions (qRT-PCR). This work is predicted to establish the native activation conditions for the antisense sigma54-dependent promoter indicated to interfere with transcription from the hyb operon promoters in assays performed with the constitutive, promiscuous activator.

Efficacy and Effectiveness Study of Instructional Conditions When Using IRIS Modules in Teacher Preparation

Susan Oh, CURO Research Assistant
Dr. Kristin Sayeski, Communication Sciences & Special Education, College of Education

IRIS multimedia modules, created by Vanderbilt University, are a promising avenue for increasing teacher candidates' knowledge and skills, but research was needed to verify the efficacy of the modules and the effectiveness of the modules under different instructional conditions. The following research questions were addressed: to what extent do IRIS modules increase candidate knowledge of special education related content; is there a relation between instructional condition and learning outcomes for select IRIS modules; does instructional condition influence participants' perception of the overall importance of the content addressed by the module and degree to which the content was learned; and when provided with three different instructional conditions, do candidates express a clear preference for one condition? For this research project, we examined the efficacy of three IRIS modules under three different instructional conditions, which were: Independent condition–where participants completed the modules on their own time outside of class; "Flipped classroom" condition–where participants completed the module independently and then participated in a class discussion and an application activity; and Facilitated condition–where module completion was facilitated by an instructor. 115 participants enrolled in an introductory special education course at a large public university participated in this study. The study employed an experimental pretest-posttest-maintenance across three instructional conditions design. Each week, participants engaged in a different instructional condition with a different IRIS module. The following data were collected as a part of the study: (a) a pretest, posttest, and maintenance assessment for each module (b) five Likert-tye questions immediately following completion of each module and (c) a final questionnaire related to participants' overall preferred instructional condition. Results demonstrated the efficacy of the modules across all instructional delivery formats and a preference for the Flipped (n = 52) and Facilitated (n = 35) instructional conditions. There were significant differences across all three instructional conditions from pretest to posttest with significant effect sizes (PALS module = $F(1.94, 203.49) = 378.67$, $p < .001$; Classroom Management module = $F(2) = 55.80$, $p < .001$; Accommodations module = $F(2) = 94.11$, $p < .001$). In addition, a significant effect for instructional condition was found for the PALS module only. As the majority of content learned in the PALS module relates to how to implement this evidence-based approach, it can be inferred that the implementation of the role-play activity for the Flipped condition supported participants' understanding and knowledge of PALS implementation, thus contributing to higher scores. Overall, findings from the study demonstrate that IRIS modules are successful in teaching the content. Future research should explore knowledge associated with planning and skills related to implementation to determine if the Flipped and Facilitated condition produced learning not assessed by the multiple-choice assessment.

Abstracts

Genetic Determination of Obesity Induced Inflammation and Blood Brain Barrier Alterations

Whitney Okie, CURO Research Assistant
Dr. Robert Pazdro, Foods & Nutrition, College of Family & Consumer Sciences

Obese patients exhibit an increased risk for chronic diseases such as cardiovascular disease, diabetes, and several cancers. The genetic mechanisms that couple obesity and disease are incompletely defined. Mouse studies have addressed this issue by examining the effects of diet-induced obesity in strains exhibiting disparate sensitivities to a high-fat diet. In the present study, we tested whether obesity-induced changes in gene expression are determined by genetic background in three obesity-prone inbred mouse strains: C57BL/6J (B6), DBA/2J (D2), and AKR/J (AKR). Mice from each strain were assigned to either a control (10% fat) or high-fat (60%) diet for 10 weeks, after which tissues were harvested. Expression of genes related to inflammation (IL-6, IL-1β, TNFα) and blood-brain barrier (BBB) integrity (Claudin-5, Occludin) were analyzed by qPCR. Obesity caused a decrease in liver IL-6 ($p = 0.0035$) in B6 mice and an increase in liver IL-1β ($p = 0.005$) in AKR mice. Obesity also caused an increase in the Blood Brain Barrier marker Occludin in AKR ($p = 0.044$). DBA/2J did not show a significant change in expression in any of the three inflammatory markers, and heart tissue was also consistently resistant to obesity-induced changes in gene expression. Our results suggest that obesity-induced changes in gene expression are: 1) dependent upon genetic background and 2) tissue-specific.

Examining the Digestibility of Methionine in Poultry

Ijeoma Okoye, CURO Summer Fellow, CURO Research Assistant
Dr. Sammy Aggrey, Poultry Science, College of Agricultural & Environmental Sciences

L-Methionine is an essential amino acid required for protein synthesis and normal growth of animals. It is also the first limiting amino acid in a typical corn-soy poultry diet. Utilization of protein or amino acids is affected when deficient or excess levels of a limiting amino acid are supplied. Amino acids interact, and amino acid transporters maintain coordination and integrity of metabolic events. Since methionine is the first limiting amino acid in poultry diet, deficiency in or excess of dietary methionine has the potential to affect nutrient availability and molecular transport. We investigated the growth, feed intake, feed conversion ratio, digestibility, and ileal molecular expression of amino acid transporters in a chicken population fed deficient (DEF: 75% of requirement), normal (CONT: 100% requirement) or excess (EXC: 125% of requirement) dietary methionine over an 18 day period. The body weight gains were 1.52, 177 and 1.64 kg in the DEF, CONT and EXC groups, respectively. There were significant differences in feed intake, digestibility and amino acid transporter expression among the groups. Dietary methionine needs to be optimal to support growth. Deficiency or excess in dietary methionine can affect growth through differential digestibility and nutrient transport of methionine and other essential amino acids.

Evaluating the United States Counterterrorism Strategy Regarding Violent Extremism

Matthew Oldham, CURO Research Assistant
Dr. Dan Silk, Political Science, School of Public & International Affairs

Homegrown violent extremism (HVE) has been perceived as a growing problem in the United States, and community policing has been suggested as an approach needed to address this challenge. This paper provides a metadata analysis of the United States' *Empowering Local Partners* strategy, the United Kingdom's *Prevent* strategy, and articles and

policies to identify growing problems that surround today's model of community policing. Building off existing research, this article will contribute to help academics and policymakers alike, understand the growing issues associated with policing in order to build a better understanding of community engagement programs. The primary areas of focus relate to building relationships with affected communities, identifying homegrown violent extremism, and understanding cultural practices in order to build a more informed police unit.

Investigating the Cell Walls of *Arabidopsis thaliana* Organs using Screenings with Glycan-directed Monoclonal Antibodies and Electron Microscopy

Fatai Olorunsola, CURO Research Assistant
Dr. Michael Hahn, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Plant cell walls are primarily composed of polysaccharides, including cellulose, hemicellulose (e.g., xyloglucan, xylan, and mannan), pectin (e.g., homogalacturonan, rhamnogalacturonan, substituted galacturonans) and arabinogalactans [1]. A large and diverse collection of monoclonal antibodies has been generated that bind to various non-cellulosic polysaccharides present in the primary and secondary cell walls of plants [2]. The cell wall structure and composition can now be explored systematically from the whole plant to the sub-cellular levels because of this large collection of antibodies [2]. However, the complexity of the cell wall has made it difficult to observe the composition of the cell wall [3]. Screenings of wall extracts with cell wall glycan directed mAbs allow for the simultaneous comparative examination of cell walls from larger numbers of samples [2]. The results of such screens can further be used to inform the selection of antibodies to be used for more detailed immunohistochemical studies [2]. The studies described in this paper center on growing Arabidopsis wild type plants, isolate organs, preparing cell walls from the harvested tissues, preparation and screening the cell walls extracts against the monoclonal antibody collection. Each reagent used is able to extract specific portions of the plant cell wall. The experimental plan here is to generate cell wall residues from multiple organs that vary in their structure and make up by treating the wall with specific reagents that remove distinct wall components selectively. The final resulting residues will be examined using scanning electron microscopy (SEM) for understanding the net structural changes.

Analysis of P1 Function in *Mycoplasma pneumoniae* Adherence and Gliding

Babajide Oluwadare, CURO Honors Scholar, CURO Summer Fellow, CURO Research Assistant
Dr. Duncan Krause, Microbiology, Franklin College of Arts & Sciences

This study focuses on *Mycoplasma pneumoniae*, a human pathogen causing bronchitis and primary atypical, or "walking" pneumonia. Mycoplasma adherence to respiratory epithelium is mediated by a differentiated terminal organelle. Located on the surface of the terminal organelle is the P1 protein, which functions directly in both cell adherence and motility. There is evidence from recent studies to indicate that P1 repeatedly catches and releases sialic acids, present on airway cell surfaces, to thrust the mycoplasma cell forward. Furthermore, P1 is believed to exist in conformationally distinct subpopulations that shift when mycoplasma cells glide. Little is known about the specific mechanism by which the bacterium exhibits motility via the P1 protein. Learning about this unique form of movement can lead to new strategies for treatment of infections and a greater understanding of bacterial motility. By means of immunofluorescence microscopy with

monoclonal antibodies specific for P1, mAB1 and mAB2, we sought to define quantitatively the location and relative amounts of P1 subpopulations. The antibodies mAB1 and mAB2 consistently yielded distinct labelling patterns, which were not the result of background or "noise." Furthermore, mAB1 appeared to bind only to a subset of P1 proteins and only at specific times, as opposed to mAB2, which appeared to bind to all P1 at all times.

Analysis of the Effects of High-Fat and Low-Fat Diets on Blood Lipid Profiles

Maria Orlando, CURO Research Assistant
Dr. Brian Cummings, Pharmaceutical & Biomedical Sciences, College of Pharmacy

Obesity is the condition of containing excess body fat and is a risk factor for many diseases. It can be induced by various stimuli such as high-fat diet. We used lipidomics to test the hypothesis that fat content in the maternal diet affects the phospholipid profiles of offspring. To determine these changes we extracted phospholipid from whole blood of mothers fed high-fat and low-fat diets and also extracted phospholipid from the blood of their offspring. These samples were analyzed using electrospray ionization-mass spectrometry, followed by multivariate analysis, which allowed us to identify differences in the phospholipid profiles between groups. As expected, mothers fed a high-fat diet for six weeks had significant differences in their blood lipid profiles as compared to those fed a low-fat diet for six weeks. Interestingly, we also observed significant differences in the phospholipid profiles of female offspring of high-fat diet fed dams and low-fat diet fed dams. Statistical analyses will be performed to identify significantly altered lipid species, followed by the tentative identification of these species using mass spectrometry. The current data suggest that diet can affect blood lipids and could serve as a precursor for obesity-related disease states in offspring. These findings will ultimately allow us to better understand the effects of parental diet on offspring's lipidome.

Investigating Macular Pigment Optical Density in Pregnant Mothers during Prenatal and Postnatal Stages

Mallory Osborne, CURO Research Assistant
Kaitlyn Barrow, Selena Soviravong, Kayla Patel, Rosie White, Katelynn Porto, Noopur Luthra
Dr. Janet Frick, Psychology, Franklin College of Arts & Sciences

The carotenoids lutein (L) and zeaxanthin (Z), which are obtained via diet (e.g., green leafy vegetables), accumulate in the central retina where they are referred to as macular pigment. Macular pigment optical density (MPOD), a measurement of L and Z in the retina, has been positively correlated with adult cognition and visual functioning (e.g., processing speed; Bovier et al., 2014). During prenatal development, L and Z are deposited in the fetal retina in high concentrations (Bone et al., 1988), and lutein is the predominant carotenoid in infant brain tissue, despite comparatively low dietary intake from mature breastmilk (Vishwanathan et al., 2011; Hammond, 2012). These discoveries have led to the idea that L and Z are actively transported to fetal and infant neural tissue, perhaps being taken from maternal tissue stores (e.g., macular pigment) to meet the developing infant's nutrient demands when maternal dietary intake is insufficient (Hammond, 2012). The current study examines women's MPOD, measured with a Macular Densitometer™ (Wooten et al., 1999), and dietary intake of foods containing L and Z, during pregnancy and postpartum to see if maternal MPOD changes over the course of pregnancy and early breastfeeding. We predict that MPOD will decrease across pregnancy, with dietary intake of L and Z moderating the slope of the decline. These

findings could have significant implications for prenatal dietary recommendations in order to maintain optimal health for both mother and infant.

The Effects of Lutein and Zeaxanthin on Cognitive Function and Neural Efficiency in Older Adults with and without Cognitive Impairment

Meredith Osborne, CURO Summer Fellow, CURO Research Assistant
Dr. Lisa Renzi, Psychology, Franklin College of Arts & Sciences

Low levels of circulating dietary carotenoids lutein (L) and zeaxanthin (Z) and low macular pigment optical density (MPOD, or L+Z levels in the neural retina) have been associated with increased risk for neurodegenerative diseases such as age-related macular degeneration (AMD) and Alzheimer's disease (AD). L and Z serve a number of functions *in vivo*. For example, L and Z have anti-inflammatory properties and are antioxidants. Consequently, L and Z, in high concentration, might protect metabolically active neural tissue from oxidative stress and inflammation known to cause neurodegenerative disease. L and Z also influence formation of gap junctions and, as a result, might influence neural efficiency. The protective hypothesis has been tested previously, but the neural efficiency hypothesis has not been widely tested. In order to test the neural efficiency hypothesis, 100 adults between 18-92 years of age were tested. Serum L+Z, MPOD, cognitive function, temporal visual function, and neuroimaging measurements were conducted at baseline and, for most measurements, at 4-month intervals over the course of one year. Participants were given either a lutein supplement (12 mg / day) or placebo, and both participants and experimenters were masked to treatment type. Although the study is ongoing, the purpose of the current sub-study is to examine the relationships between processing speed, baseline L+Z levels and speed-based cognition measures in healthy adults. It is predicted that individuals with higher serum L+Z and MPOD will have improved processing speed at baseline relative to other healthy adults with low L+Z levels, indicating improved neural efficiency.

Do Non-Native Apple Snails Feed Preferentially on Non-Native Aquatic Plants in Lake Seminole, Georgia?

Jack Owen
Dr. Alan Covich, Odum School of Ecology

Invasive species are increasingly affecting natural communities and creating novel food webs. The first species to invade Lake Seminole in Georgia was *Hydrilla verticilata,* which dominated the submerged vegetation. More recently, the "giant apple snail", *Pomacea maculata*, was found to be widespread around the lake's shoreline. These large snails, native to South America, are known as voracious herbivores. Their appetite has made them a species of concern to both ecologists who study the lake's ecosystem and recreationists who use the lake for fishing and boating. Many speculate whether the snails will help control the *Hydrilla* problem or if they will consume other less dominant, non-native plants such as water hyacinth (*Eichhornia crassipes*), that float on the lake's surface near shore. To test the hypothesis that the apple snails would not selectively consume one plant species more than another, I fed two sizes of snails three different types of food: romaine lettuce (control), *Hydrilla* and *Eichhornia*. I measured how the snails' body masses and shell sizes responded to the different types of food they ate. While preliminary studies had suggested that snails would grow fastest when fed water hyacinth, other literature suggested that the snails do not prefer water hyacinth. My study found that snails fed *Hydrilla* grew at a faster rate than did snails fed either lettuce or *Eichhornia*.

Abstracts

Using Environmental DNA to Detect and Track Dispersal of the Island Apple Snail Invasion in Lake Seminole, Georgia

Jack Owen
Dr. Alan Covich, Odum School of Ecology

One of the challenges in determining the dispersal of species in an aquatic ecosystem is the need for direct observation. This project seeks to utilize the novel method of environmental DNA (eDNA) analysis to map the dispersal of the island apple snail, *Pomacea maculata*, in Lake Seminole of southwestern Georgia. Typically, the snails' large egg masses are considered an approximation of dispersal. To validate this assumption, water samples were taken at sites containing a range of egg mass abundance. Water samples were then filtered at the lake, preserved, and transported to the University of Georgia for analysis. DNA was extracted from the samples, and then amplified via polymerase chain reaction (PCR). Primers used in PCR ensured that only a 650 base pair strand of the snail's cytochrome c oxidase subunit I, or COI, was amplified. This segment of mitochondrial DNA is the one generally used as a DNA "barcode" when identifying animal species. Gel electrophoresis was then performed on each sample to confirm the identity of source DNA. While we hypothesize that we will find DNA in the samples from areas where apple snails have been observed, we also expect that apple snail DNA will be amplified in at least some of the samples from areas where apple snails were not directly observed. These findings will provide greater information on the range of apple snails in Lake Seminole and help track patterns of dispersal into nearby lakes and wetlands, hopefully serving as a means of "early detection" of an invasion.

Vocal Repertoire and Call Structure of Red-and-Green Macaws (*Ara chloropterus*)

Joel Owen, CURO Summer Fellow
Dr. Dorothy Fragaszy, Psychology, Franklin College of Arts & Sciences

The behavioral biology and vocal repertoire of Red-and-green Macaws (*Ara chloropterus*) are virtually unstudied in the wild, with only one known study (Schwob et al., unpublished). Our objectives for this study were three-fold: to document the repertoire of the Red-and-green Macaw and analyze call structure; to match vocalizations with behavioral patterns to gain insight into call function; and to compare calls with those of the Blue-and-gold Macaw (*Ara ararauna*). The study area was in the Cerrado of Brazil on Fazenda Boa Vista (FBV), a privately-owned property. Data collection occurred between May 2014 and July 2014 and involved opportunistic audio recording. A total of 177 recordings were made, yielding 111 processed calls. Vocalizations were processed using Audacity and SoundRuler software. To analyze the calls, several structural and temporal parameters were used: duration, dominant frequency, maximum and minimum fundamental frequency, and frequency band. We categorized vocalizations as *flight* (shorter duration; frequency modulation) or *alarm* (longer duration; no modulation) depending on the parameters. Statistical analysis of the data involved principal component analysis (PCA) and discriminant function analysis (DA). A total of 37 *A. chloropterus* calls and 36 *A. ararauna* calls were tested in the PCA and DA. Preliminary results show that the three temporal components explain 75.4% of the variation of all variables. The DA is currently ongoing to determine which parameter discriminates between the calls of each species. Structurally, *A. chloropterus* vocalizations appear to be noisier and contain less structural bands than those of *A. ararauna*.

Theatrical Imagery in Nabokov's *Invitation to a Beheading*

Meredith Paker, Foundation Fellow, CURO Research Assistant
Dr. Charles Byrd, Germanic & Slavic Studies, Franklin College of Arts & Sciences

The Russian-American author Vladimir Nabokov calls his 1935 work *Invitation to a Beheading* his "dreamiest and most poetical novel" for which he has "the greatest esteem" (*Strong Opinions,* 76, 92). The mysterious Cincinnatus C. has been convicted of "gnostical turpitude" and awaits his execution in torment in an atypical prison setting. To many readers, *Invitation to a Beheading* is an abstract work of art, aesthetically beautiful but thematically abstruse. However, by analyzing the theatrical imagery of the surreal execution scene, the theme of "all the world's a stage" emerges. The imagery Nabokov uses in this scene includes the doubling of two characters, the portrayal of the executioner as a larva, and the falling of two-dimensional trees. When Cincinnatus realizes the unsubstantiality of this theatrical world, he divests himself of it and causes its collapse.

The Welfare Effects of Off-Label Prescriptions

Meredith Paker, Foundation Fellow
Dr. Jonathan Williams, Economics, Terry College of Business

Though the FDA restricts the marketing of a drug to its set of FDA-approved "on-label" uses, physicians can prescribe any prescription drug for any condition. Many prescription drugs are prescribed "off-label" because it is costly for pharmaceutical companies to get new uses of existing drugs FDA-approved. These off-label prescriptions have potentially desirable effects if they allow for the best treatment of a patient's condition or if they permit innovative new uses of safe drugs. However, off-label prescriptions could be undesirable if they become wasteful or if they cause patient harm. Little is known about which populations receive off-label prescriptions and whether the potential benefits to patients from off-label prescriptions outweigh the costs. We find that about thirty percent of prescriptions are for off-label uses, and our results suggest that off-label prescribing may enhance patient welfare, motivating a deeper welfare study. We combine the U.S. government's Medical Expenditure Panel Survey data on doctor visits and prescription records with yearly Physician's Desk Reference data on the conditions each drug is FDA-approved to treat to identify off-label prescriptions. Determining the welfare effects of these prevalent and controversial off-label prescription practices will add an important dimension to the national policy conversation regarding the FDA's regulatory environment.

Reducing the Disparity between Federal Sentencing of Crack and Powder Cocaine

Bailey Palmer, Ramsey Scholar
Mallika Madhusudan, Foundation Fellow
Dr. Linda Renzulli, Sociology, Franklin College of Arts & Sciences

Federal sentencing for crack cocaine has been one of the greatest sources of inequality and racial discrimination in recent years. Though the 2010 Fair Sentencing Act reduced the 100:1 sentencing disparity between the pharmacologically identical crack cocaine (usually found in lower income neighborhoods with large minority populations) and powder cocaine (typically used by affluent Caucasians), there remains continual discrimination within federal sentencing structures. Current FSA policy has changed the sentencing disparity between crack and powder cocaine to 18:1 though the drugs' similarities suggest a 1:1 sentencing ratio would be more appropriate. Furthermore, though reduced crack penalties were made retroactive, alterations to

mandatory minimum legislation were not made retroactive. This means thousands of offenders remain in prison under excessive, outdated sentences. According to Michael Nachmanoff, a federal defender for Virginia, "A person with crack will have to have 28 grams before triggering a mandatory 5 year minimum sentence. But the person with powder cocaine must still have a much larger amount – at least 500 grams." Our policy would implement a 1:1 sentencing ratio for both powder and crack cocaine and second, remove mandatory minimum restrictions that prevent retroactive sentence reductions. Though there have been some proposed policies to fix the residual issues in federal cocaine sentencing such as Rep. Bobby Scott's proposed House Bills and Smarter Sentencing Act as proposed in the 113th Congress, none of these policies have passed. There are currently no sentencing bills introduced in the current 114th Congress.

Democratic Institutions and the Human Right to Health

Eytan Palte, Foundation Fellow
Dr. K. Chad Clay, International Affairs, School of Public & International Affairs

The human right to health is enshrined in various human rights regimes, first appearing in the 1948 Universal Declaration of Human Rights and further elaborated upon in subsequent conventions. Despite these guarantees, there is a disparity between what is enshrined in international law and what is effectuated by governments worldwide. Although this gap can be attributed to various factors, this paper focuses specifically on how differences in democratic institutions affect the enjoyment of this human right. Previous research has demonstrated that certain democratic institutions lead to more representative governments, while other institutions yield more accountable ones. We predict that a nation's healthcare system will be related to the degree of representativeness incentivized by its state's electoral institutions, while the effectiveness of those systems for the covered populations will vary according to the incentive for accountability. We will test these hypotheses using quantitative data sets on healthcare systems and comprehensive indicators of health outcomes in democracies.

Using the Chemical Reporter Strategy to Analyze Glycoproteins in Pompe Disease

Sora Park, CURO Summer Fellow
Dr. Richard Steet, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Lysosomes are organelles within cells that help degrade macromolecules so that precursors such as amino acids and sugars can be recycled and reused by the cell. Lysosomal Storage Diseases (LSDs) have some type of abnormal lysosomal storage, and it is likely that this storage causes altered storage or recycling of glycoproteins. Using a chemical reporter strategy employed previously for Niemann Pick Type C disease, we will test this possibility by studying Pompe disease (PD), an LSD characterized by the storage of glycogen within lysosomes. Our initial experiments will focus on the visualization of glycoprotein storage using microscopy- and biochemistry-based methods. Confirmation of storage would lead to the development of technology that would allow isolation and identification of the glycoproteins that accumulate inside the cell. Discovering the identity of the stored glycoproteins would be greatly insightful to their pathological roles in in LSDs. This work could potentially lead to a clarification of the pathophysiology of not only Pompe disease and Niemann-Pick disease, but of LSDs in general. A better understanding of how storage leads to impaired movement of other molecules in the cell will hopefully lead to the development of more effective therapies.

Tea Polyphenols Inhibit Activity of Pancreatic Lipase

Sungwhan Park, CURO Research Assistant
Xiaoping Yang, Key Laboratory of Horticultural Plant Biology, Huazhong Agricultural University, Wuhan, China
Dr. Fanbin Kong, Food Science & Technology, College of Agricultural & Environmental Sciences

The purpose of this research was to investigate the effect of tea polyphenols, found in green tea, on pancreatic lipase activity under *in vitro* conditions. Porcine Type II pancreatic lipase was dissolved in ultra-pure water to make 0.5 mg/mL solution. The lipase solution (100 μL) was mixed with 450 μL of 0.02% (w/v) pNP laurate substrate, 350 μL of pH 7.2 Tris buffer, and 100 μL tea polyphenol solution with concentration ranging from 0.1 to 1.0 mg/mL. Control was prepared by using the same amount of lipase and substrate but with 450 μL buffer. The control and sample mixtures were incubated in a water bath at 37°C for 2 hours, and the mixtures were then analyzed in a spectrophotometer with wavelength at 400 nm. The result showed that tea polyphenols inhibited the lipase activity. The inhibition increased with tea polyphenol concentration, and reached maximum at concentration 0.5 mg/mL, where pancreatic lipase activity was reduced by 47.83%. The reduction in lipase activity was 2.38%, 15.24%, and 37.77%, for tea polyphenol concentration of 0.1 mg/mL, 0.25 mg/mL, and 1.0 mg/mL, respectively. It has been known that drinking green tea helps reduce the risk of obesity and cardiovascular disease. This study indicated that the enzyme inhibition may be part of the mechanism. The result also confirmed that green tea could be used as a natural medicine to reduce the risk of these diseases.

Rolling the Dice: The Economic Impact of Casinos

Davis Parker, Foundation Fellow, CURO Research Assistant
Dr. David Mustard, Economics, Terry College of Business

Over the past 30 years, the prevalence of casinos and legal gambling has skyrocketed across the United States as state legislatures have begun granting casino licenses to Native American tribes and private corporations in mass. Seen as a means for greater employment, tourism, and development, these new casinos offer a bouquet of gambling opportunities such as blackjack, slots, poker, dog racing, and bingo. Yet, definitive conclusions on the efficacy of casinos in creating economic prosperity have often evaded researchers. Using data from the Bureau of Labor Statistics as well as a homemade dataset of casino start and closing dates, we study the economic impact of casinos. Applying high-level data analytics, we identify the intertemporal effects casinos can have on establishment counts, levels of employment, and wage rates. Additionally, we examine how these effects vary across counties by population size and region. We hope that our research will better inform policy makers at the national and local levels in their deliberations on the consequences, both positive and negative, of licensing casinos.

UGA Employee-Benefit and Retirement Preparedness

Jessica Parks
Dr. Heidi Ewen, Institute of Gerontology, College of Public Health

The purpose of this study is to understand the ways in which UGA employees make decisions regarding their available retirement planning options. Retirement preparedness and the financial confidence of UGA employees has much room for exploration. With changes in social security benefits and employee-based investing plans, the need for

retirement preparedness is even more important for the financial well-being of UGA employees. I am recruiting employees who are eligible for UGA's two retirement options (the Teacher's Retirement System and the Optional Retirement Plan). They will be asked to complete an online survey of questions related to their financial planning and anticipated retirement needs. Their responses will be recorded in a database, coded for security and then analyzed. Data will be analyzed using mixed methods, qualitative and quantitative, testing for relationships among age, employment type, gender, marital status, family size, religious affiliation, political ideation, health, and future plans. Data collection is still in progress.

Understanding Floral Trait Evolution in Wild Sunflowers

Hiral Patel, CURO Summer Fellow
Dr. Lisa Donovan, Plant Biology, Franklin College of Arts & Sciences

To predict crop and wild species' reproductive success and persistence under looming environmental changes, we must understand how floral traits are adapted to specific climates. This project investigates ecological and evolutionary causes of variation in floral traits across the genus *Helianthus*. Thirty species of wild sunflowers were grown using common garden techniques to assess an evolutionary trade-off between investment in pollinator attraction and seed production. The evolutionary strategy adopted by specific species under this trade-off is hypothesized to be affected by differences in life history and environmental factors. It is hypothesized that annuals will invest more in attraction as they get one chance to reproduce, compared to perennials which are expected to invest less in attraction because they have many opportunities to reproduce over their multi-year lifespan. Investment in attraction and flower size will decrease in hotter, drier environments in order to avoid water loss. Investment in attraction and flower size will decrease as soil fertility decreases to conserve resources. Evolutionary statistical analyses such as ancestral state reconstruction and phylogenetically independent contrasts will be performed to determine which traits are evolutionarily conserved and which are labile and potentially adaptive. Understanding trade-offs in floral biomass allocation has ecological consequences. Species adapted to specific environments may be unable to adapt to changing conditions under the short time scales of current climate change and could be threatened by the increasing frequency of droughts due to water loss from investment in large attractive petals, which are not able to control water loss like leaves.

Expression and Purification of PRMT1 and Mutant Variants

Viral Patel, CURO Research Assistant
Dr. Y. George Zheng, Pharmaceutical & Biomedical Sciences, College of Pharmacy

Epigenetics involves cellular and physiological traits that are heritable by conceived generations in a manner that is independent of the core DNA sequence. It has often been observed that many pathological conditions and malignant tumors have an epigenetic basis for disease onset (Yang, Bedford, 2013). In the post-genomic research era, epigenetic processes are proving to be increasingly important as scientific data accumulates. One key epigenetic process involves remodeling of chromatin to regulate gene expression. Post-transcriptional modifications such as methylation, acetylation, or phosphorylation of histone tails change chromatin stability and alter the binding of transcription factors (Zhang et al., 2013). Histone modifying enzymes, such as PRMT1, can methylate residues in histones to either reduce OR sometimes increase its gene expression. PRMT1 specifically methylates guanidine nitrogens of arginine residues in certain histones. Understanding the regulatory factors

of such chromatin remodeling complexes, along with their specificity and functional roles are critical for further understanding of disease association with epigenetics. In order to perform such studies, the enzymes involved themselves must be expressed or generated for further experimentation. Using standard molecular biology techniques, PRMT1 was expressed multiples times, along with mutant variants. The goal was to improve yield and purity of the obtained protein. The model organism *Escherichia coli (E. coli)* was used to conduct the experiments. Specifically, the BL21(DE3) strain was used due to the several biotechnological advantages, such as lower acetate yield and a higher biomass, which are beneficial for protein production, the overall goal of the experiment (Waegeman et al., 2011). The BL21(DE3) *E. coli* were transformed with the pET28b+ plasmid, which contains the genetic code for histidine-6x-human-PRMT1 (his-6x-h-PRMT1), Kanamycin resistance, and the lacl repressor protein. A sample of the *E. coli* were inoculated in Kanamycin and Lysogeny broth (LB) media and further incubated for growth at 37° C until the proper optical density (OD) was reached. Isopropyl β-D-1-thiogalactopyranoside (IPTG) was added to initiate transcription and translation of his-6x-h-PRMT1. After approximately 16 hours of incubation, post-IPTG addition, the BL21 cells were collected from their media using centrifugation. The collected cells were suspended in *Cell Lysis Buffer* and then disrupted. After further centrifugation, the resulting supernatant contained the recombinant protein. Using Nickel (Ni) beads in purification columns, the protein was collected. The isolated PRMT1 was aliquoted and stored at -78° C after it was concentrated using dialysis and centrifugation through a filter membrane. Bradford assay and sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) of the protein and purification column samples were conducted to test for the purity and quality of the expressed protein.

Folic Acid Knowledge and Use among Participants of a Community-Based Intervention Study in Pregnant Women

Meagan Patterson, CURO Research Assistant
Dr. Dorothy Hausman, Foods & Nutrition, College of Family & Consumer Sciences

Periconceptional supplementation with folic acid is an important public health recommendation aimed at reducing the risk of neural tube defects (NTDs). Unfortunately, many women may be unaware of this recommendation or fail to follow it before becoming pregnant. To determine the extent of folic acid knowledge and use and potential factors influencing use, we conducted a secondary analysis of baseline data collected as part of an on-going folic acid supplement intervention study in pregnant women. Select data were extracted from medical records and baseline health behavior questionnaires of study participants (n=31, age range=20-37, 55% White, 16% African American, 29% Hispanic) for which information on age, race, parity, and marital status, prior folic acid knowledge, source of knowledge, and multivitamin use before and in early pregnancy, were available. Chi-square analysis was used to determine prevalence of folic acid knowledge and use by demographic and lifestyle factors and logistic regression was used to estimate predictors for multivitamin use before pregnancy. Results showed that although 87.1% of participants had heard of folic acid, only 45.2% took multivitamin supplements prior to pregnancy. Regression analysis indicated that older age (age≥28, P=0.028) and being married (n=14, P=0.0463) were significant predictors of periconceptional multivitamin use while race, parity, and prior folic acid knowledge were not. All married participants and 28.6% of single participants reported taking multivitamin supplements during early

pregnancy. Although this was a small study, the results indicate that public health recommendations for periconceptional folic acid intake need to be reinforced, particularly among younger, sexually active single women.

Investigating Invertebrate Utilization of Bryophytes in a Mid-Order Piedmont River

Meryom Pattillo
Dr. Mary Freeman, Odum School of Ecology

Over the past few decades anthropogenic effects on stream structure and function have been increasingly studied, particularly concerning in-stream and out-of-stream water needs in relation to flow regulation. Human-driven impacts resulting from abstraction of surface water can drastically alter stream structure and function, especially pertaining to plant assemblages. One such group of plants are the bryophytes consisting of mosses, liverworts, and hornworts. Bryophytes inhabit both terrestrial and aquatic systems but little is known about their function in riverine ecosystems. Bryophytes offer excellent habitat for aquatic macroinvertebrates because they provide food through captured organic matter and offer protection from predation through their chemical defenses. This study focused on assessing aquatic macroinvertebrate utilization of bryophytes on rock outcroppings in a piedmont sand bottomed river. Bryophyte samples were collected from the Middle Oconee River near Athens, GA where submerged samples of the bryophyte *Porella* as well as other bryophytes were collected from rocks and trees trunks. We predicted a higher density of macroinvertebrates in bryophyte mats compared to literature values for other common invertebrate habitats and a significant difference in invertebrate biomass and diversity between different species of bryophytes. This research is important because it provides insight into a poorly understood yet widespread macroinvertebrate habitat. Furthermore this research has implications for riverine management and conservation practices because flow regulations preventing inundation of riverine bryophytes could negatively affect macroinvertebrate habitat availability.

Do You Know Why 6 - - 2 Is the Same as 6 + 2?

Andrew Peake, CURO Research Assistant
Dr. Jessica Bishop, Math & Science Education, College of Education

How do 7th and 11th grade students think about subtracting negative numbers? As a field, we do not know much about students' understanding of integers. When compared with research on rational numbers or place value, the research on students' understanding of integers is relatively sparse (NRC, 2001). We interviewed forty 7th graders and forty 11th graders to better understand how they thought about integer arithmetic. We investigated their success and underlying reasoning when solving integer subtraction problems. We found that although most 7th and 11th graders could correctly solve integer subtraction problems, over 70% of the students could not explain why their procedures worked. The majority of students initially changed subtractions problems like 6 - -2 = __ to an equivalent addition expression using rules or procedures like "keep-change-change" (keep the sign of the first number, change the operation, and change the sign of the second number).

Differential Consumption of *Eurypanopeus depressus* When Infected by *Loxothylacus panopaei*

Sarah Perry
Dr. Jeb Byers, Odum School of Ecology

Populations of the mud crab *Eurypanopeus depressus* are often heavily infected with the parasite *Loxothylacus panopaei*, a castrating barnacle parasite. To determine if the

predators differentially preyed upon infected or healthy mud crabs, we conducted a tethering experiment on Skidaway Island in summer 2014. Healthy mud crabs were paired with infected mud crabs, and the pairs were interspersed on tethers along an oyster reef in the intertidal zone. We deployed the crabs during low tide and collected them during the following low tide (approximately 12 hours of exposure). We conducted a total of five nighttime and three daytime trials. Infected *E. depressus* were consumed at a significantly higher rate than uninfected *E. depressus* during the nighttime trials. There was no significant difference between infected and uninfected *E. depressus* during the daytime trials. We conducted a literature review to determine which nocturnal predators could be driving the observed predation differential and found that the red drum (*S. ocellata*), Chesapeake blue crab (*C. sapidus*), pinfish (*L. rhomboids*), and grey snapper (*L. griseusi*) are likely contributing. Parasitic infection is apparently making *E. depressus* a more enticing prey target, and its consumption could reduce prevalence of *L. panopaei* reducing its spread.

The Impacts of Iron Deficiency Anemia on Mitochondrial Capacity

Kelly-ann Peters, CURO Research Assistant
Joanna Szymonik
Dr. Kevin McCully, Kinesiology, College of Education

Iron deficiency anemia is the most common blood disorder and nutritional deficiency in the United States. General fatigue and weakness often accompany this deficiency and can greatly impair overall work capacity and athletic performance. The primary aim of this study is to determine if iron deficiency impacts the function of skeletal muscle mitochondria, the organelle responsible for producing energy in the cell. Ten participants with a known history of iron deficiency anemia will be observed in this study. Each participant will be matched to a control in order to best compare results (20 participants total). Hematocrit and hemoglobin levels will be measured in each participant in order to determine iron deficiency status and severity. Mitochondrial capacity will be measured with near-infrared spectroscopy using the recovery rate of muscle oxygen consumption after a short bout of exercise of the brachioradialis muscle in the forearm. Metabolic rate will be measured as the slopes of the HHB, HbO2, and HbDiff during short duration arterial occlusions. We hypothesize that iron deficient anemic individuals will show a lower mitochondrial capacity in their skeletal muscles compared to a matched control. The establishment of the relationship between iron deficiency status and mitochondrial function can provide information to guide future studies to improve the health in people with iron deficiency anemia.

Spoken Word Activism in the Age of Social Media

Sonja Petrovic
Dr. Chris Eaket, Theatre & Film Studies, Franklin College of Arts & Sciences

With the rise of social media, there has been an increase in the popularity of spoken word. Spoken word has evolved to mean performance-based poetry that is usually socially-aware and centered around identity politics. Although social media has often been considered "slacktivism," spoken word generally attempts to show and educate the audience about how dominant, oppressive systems function to privilege certain groups over others. It is with the help of YouTube, Twitter, and Facebook that organizations such as Button Poetry (over 300,000 subscribers) as well as individual and group performers are able to reach such large audiences. This presentation explores the history of spoken word, starting in the Harlem Renaissance (within the frame of Black Activism) and moving onward into other identity politics. bell hooks's theory of language as a site of

resistance states that one can choose and vocalize their space in the margins in order to resist; applying this theory, this presentation states that spoken word poetry brings social justice issues and systems of inequality to light and actively resists them. Spoken word plays with and blurs the conventions between the narrator and author by having the speaker adopt a persona and speak either genuinely or ironically. This allows them to critique societal values and power structures by using everyday experiences while simultaneously remaining at a distance. Spoken word has navigated the difficulties of social-media culture and become a form of activism that's accessible. It stands to have an unprecedented impact in the social media era.

Analyzing Persistent Organic Pollutants in the Tissue of Stranded *Tursiops truncatus* along the Coast of Georgia, USA: Effects of State of Decomposition and Stranding Location

Tabitha Phillips, CURO Research Assistant
Dr. Susan Wilde, Warnell School of Forestry & Natural Resources

Tissue samples are collected from stranded bottlenose dolphin (*Tursiops truncatus*) from the Georgia coast annually by the Georgia Department of Natural Resources. Blubber samples from stranded dolphins were analyzed (n=12) for a suite of persistent organic pollutants (POPs) which include: PCBs, PBDEs, and other organochlorine pesticides (OCPs) with the goal of determining the relationship between state of decomposition and stranding location on contaminant load. Skin samples (n=11) were also analyzed for total mercury (THg). No statistically significant differences were found between POP class and the state of decomposition. Significant differences were found between Aroclor 1268 proportion and stranding location. A positive correlation was found between total body length and THg concentration in skin (R2=0.5576).

Closing the Achievement Gap: Elementary Second Language Education in Philadelphia Schools

Laura Pontari
Dr. Gary Green, Warnell School of Forestry & Natural Resources

Research was conducted to formulate a policy proposal for an elementary bilingual education program in the School District of Philadelphia (SDP.) The goal of this policy is to improve the quality of education provided by the SDP without putting additional strain on its already-failing budget. The project outlines a program that establishes a partnership between the SDP and local public universities in Philadelphia to provide qualified college students as assistant teachers for second language education programs in the SDP. To address the rapidly increasing Latino population, the program would provide second language instruction in Spanish to elementary students from Kindergarten through third grade. This program gives college students in local education programs practical experience, and exposes elementary students to Spanish vocabulary and basic grammar to create a basis of knowledge for further fluency.

Controlling Contamination of Algal Grazers Using Nitrogen Sources

Grace Power
Dr. Manjinder Singh, College of Engineering

Microalgae biofuels answer the current need for new and sustainable energy sources. Before algae biofuels can become mainstream, however, production of fuel must become more cost effective. Currently, biomass yields are threatened by algal grazers. Ciliate and rotifer populations are commonly controlled by pesticides, but alternate nitrogen sources may offer a safer and cheaper substitute. This experiment introduced grazer control using Poultry Litter Extract and Ammonium bicarbonate. Two algal strains *Chlorella*

sorokiniana (Cs) and *Chlorella minutissima* (Cm) were grown in 250 mL flasks and inoculated with ciliate and rotifer populations. Three treatments of growth medium supplementation were tested for each strain; Ammonium bicarbonate (100mg/L Nitrogen), 5% Poultry Litter Extract (PLE) and control grown in standard BG11 medium. Algal growth, and Ciliate/ rotifer populations were monitored at regular intervals. The average growth rate in both strains in control treatment was negative. The ciliate growth rate was 1135 and 528 ciliates/d in *Cs* and *Cm* respectively. Ammonium bicarbonate treatment eliminated grazers completely; however, algal growth rate was also lower relative to control. In PLE, grazers' population declined by an average 52 and 86% in *Cm* and *Cs* respectively during five days incubation. However, algal growth was also negatively impacted by 5% PLE. Further studies with longer incubation periods are being carried out to evaluate algae recovery from high nitrogen shock and achieve net positive growth after grazers' elimination.

The Impact of Rest and Game Location on NBA Team Performance

Steven Pugh, Mckenzie Benson, Rebecca Gaines, Mary Catherine Kelley
Dr. Karl Kuhnert, Psychology, Franklin College of Arts & Sciences

In today's globalized society, travel has become an accepted element of work. However, travel is associated with factors that have the potential to affect performance. Previous research shows a negative relationship between traveling and performance. It has been found that people perform better in familiar environments. Rest has the capacity to counteract the negative effects of traveling. Sports data have been used to analyze these relationships due to the availability of information. For example, the game's home versus away status can be used to measure an unfamiliar environment, point differentials can measure performance, and days rest can objectively measure time between games. For this study, we examined home versus away status and the amount of rest between games using NBA data. We expected that teams playing at an away location would attain less sleep, and therefore away games would amplify the negative impact of lack of rest on performance. Results show that teams performing at away games, who received less rest, performed worse. Teams lost more frequently at away locations than at home. Results support the original prediction of a negative relationship between away game location and performance. Results found from this study can be applied to the work environment by suggesting that managers give employees adequate rest time while traveling. Traveling employees given ample rest time could offset some of the negative effects of travel. Therefore, business managers should allow for recovery time upon arrival at their business trip destination or run the risk of increased exhaustion and decreased performance.

Validation of CRISPR/Cas9 for Genome Editing of Fktn in C2C12 Mouse Myoblast Cell Lines

Vedika Rajasekaran, CURO Research Assistant
Dr. Aaron Beedle, Pharmaceutical & Biomedical Sciences, College of Pharmacy

Dystroglycanopathies are caused by defects in glycosylation of α-dystroglycan. Current *in vivo* research, involving the genes associated with glycosylation, are time consuming, expensive, and do not provide a full understanding of dystroglycanopathy gene functions. Therefore, the purpose of our project is to create genetically modified C2C12 mouse myoblast cell lines, with knockout of dystroglycanopathy gene *Fktn,* using CRISPR/Cas9 technology. C2C12 cells were used because they can be differentiated into rudimentary myotubes in culture to model

skeletal muscle dysfunction *in vitro*. C2C12 cells were transfected with a CRISPR/Cas9 plasmid, including a guide RNA targeting the mouse *Fktn* gene, under different conditions. Transfected cells were selected by Fluorescent Activated Cell Sorting and plated to generate clonal lines. In order to determine if mutations occurred in transfected C2C12 cells, a relevant region of the *Fktn* gene was sequenced. Development of genetically modified cell lines is ongoing. Generation of knockout cell lines in *in vitro* research will enable a better understanding of the genes specific to glycosylation of α-dystroglycan and allow us to discover better therapeutic strategies for dystroglycanopathies treatments.

Surveying *Mycobacterium tuberculosis* Gene Function by Complementation

Ashitha Rajeurs, CURO Research Assistant
Samantha Tucker, Graduate Student
Dr. Russell Karls, Infectious Diseases, College of Veterinary Medicine

Mycobacterium tuberculosis (*M.tb*) is a leading cause of morbidity and mortality in humans. In 2013, *M.tb* caused 9 million new cases of TB disease and 1.5 million deaths. Understanding the physiology and biosynthetic capabilities of *M.tb* bacteria may aid in the development of new drugs and vaccines to fight this global health threat. Coenzyme B12 functions as a cofactor in various metabolic enzymes in a wide range of organisms, but is only made by bacteria and archaea. Coenzyme B12 is a complex molecule requiring over 20 enzymes for its synthesis. The *M.tb* genome has homologs of many B12 synthesis genes; however, coenzyme B12 is not detected in strains grown under standard culture conditions. Either all of these strains have mutations in the B12 synthesis pathway or production of this molecule is only made under specific environmental conditions, such as those found inside a human host. To assay *M.tb* genes predicted to function in B12 synthesis, selected genes were cloned into expression plasmids and introduced into mutants of *Salmonella enterica* (*S.en*) blocked in individual steps of the B12 synthesis pathway. At the submission of this abstract, the first *M.tb* gene assayed has been found to restore B12 production by an *S.en* mutant. This supports that this gene encodes an enzyme with the predicted role in B12 synthesis. Results of all of the genes tested using this type of functional complementation assay will be reported. This work will help elucidate whether *M.tb* encodes functional enzymes for all steps in the B12 synthesis pathway.

Convergent and Divergent Validity of the WISDM-68

Marie Rapoport, CURO Research Assistant
Dr. Lawrence Sweet, Psychology, Franklin College of Arts & Sciences

Despite the well-known dangers, cigarette smoking is still the leading cause of preventable death in the United States. Dependence occurs when an individual is unable to quit or reduce smoking despite adverse consequences. Impulsivity is a key construct in addiction research, but it is multi-faceted and inconsistently measured. Prior research has shown that impulsivity is associated with higher rates of substance abuse and dependence and lower success rates in treatment. However, the association between impulsivity and an individual's motives for substance use has been understudied. In the current study, we will use a battery of behavioral and self-report measure to assess impulsivity (go/no-go, delay discounting, the cigarette purchase task, the UPPS Impulsive behavior scale) and its relationship to nicotine dependence and nicotine dependence motives. To assess dependence and motives we will use the Fagerstrom Test for Nicotine Dependence (FTND), a measure of nicotine dependence, and the Wisconsin Inventory of Smoking Dependence Motives (WISDM-68), a measure

of an individual's motives for smoking. We predict that the motives in the WISDM-68 and FTND will be significantly related to impulsivity with specific motives for nicotine dependence differentially associated with individual measures of impulsivity. These results will help inform understanding of how impulsivity translates into substance use.

Effect of Music on People with Developmental Disabilities during Physical Activity

Caroline Ray, CURO Research Assistant
Dr. Kevin McCully, Kinesiology, College of Education

People with intellectual disabilities (ID) are typically less involved in regular physical activity and unhealthier than people without disabilities. The aim of this study was to investigate the effect of music on the exercise intensity selected by participants with ID. The hypothesis was that participant-requested music would result in higher heart rates during exercise compared to non-specific or no music while walking on a treadmill or while cycling. Six participants with ID enrolled in a wellness program course were recruited and permission of their guardians was gained. Three musical situations were carried out: a control situation with no music, a second general "gym music" situation, and a situation with requested music. Heart rate was recorded while on a treadmill or a stationary bike for each situation in separate trials. Questions were asked after each session regarding enjoyment of the workout. Starting at the same speed each session, participants walked or biked for ten minutes during each trial and were encouraged to control their speed. During the first semester of research, the study proved to be a feasible way for measuring the comparison between exercise intensity and different music conditions. It was determined that 80% of participants were not reaching their individual cardiovascular training zones during physical activity; however, more measurements are needed to complete the study. There appears to be a positive effect of self-selected music on exercise intensity. We feel self-selected music might be an important tool to allow fitness programs to provide health benefits to people with ID.

The Relationship between CEO Risk-Taking Behavior and Employee Attraction and Retention

Shelby Reilly, Adam Lowe
Dr. Brian Hoffman, Psychology, Franklin College of Arts & Sciences

Given the likelihood of today's employees to switch companies frequently throughout their careers, organizations that attract and keep the most talented workers often enjoy a competitive advantage (Ployhart, Weekley, & Baughman, 2006). Additionally, CEO behavior plays an important role in how employees view organizations (Quigley & Hambrick, 2014). Therefore, it is possible that how risky a CEO's behavior is perceived to be can impact employee attraction and retention. However, despite the potential impact of CEO behavior on current and potential employees, the relationship between CEO risk-taking and employee attraction and retention has yet to be examined. To meet this end, this study analyzes the relationship between environmental uncertainty (via risk-taking behaviors) in the workplace and employee recruitment and retention. 155 chief executive officers (CEOs) (N = 155) from various Italian organizations and 493 (N = 493) of their followers completed an online survey of study measures. Study findings show that risk-taking behavior is positively related to employee attraction yet negatively related to employee retention. The differing effects of CEO risk taking on selection and retention can present a challenge to organizations, as the same CEO behaviors are not equally successful in recruiting and maintaining employees. Therefore, these

findings suggest that leader strategies designed to attract workers should differ from strategies designed to retain workers. More specifically, leaders should highlight their risk-taking behaviors when recruiting employees, but downplay them during their day-to-day interactions with current workers.

College Students' Credit Experience and Behavior

Anthony Reyna, CURO Honors Scholar
Dr. Brenda Cude, Financial Planning, Housing & Consumer Economics, College of Family & Consumer Sciences

Credit reports provide a very specific window into a person's behavior and experience, and for two and a half years this project has been observing the "windows" of college students. The purpose of this research is to better understand college students' credit experience and their credit behavior based on their credit reports. The credit report data was gathered from University of Georgia students enrolled in the "Money Skills for Life" course (FHCE 3110) from 2008-2013. Credit experience was measured in four ways – whether the student used credit (binary variable measured as 1 if the student's credit report consisted of any accounts attached to their name, zero otherwise), the ownership of the credit (a binary variable measured as 1 if the student had individual ownership of at least one credit account, zero otherwise), the debt-utilization ratio (the ratio of a student's total current balances to his/her total available credit), and a student's total number of open credit accounts. We used Microsoft Excel to build and analyze the dataset and partnered with a graduate STAT course for important findings. A deeper understanding of the relationship college students have with the credit system will help shape course content and effectively present the best practices for credit management to college students.

The Evolution of Quail Hunting Attire in South Georgia and Northern Florida

Lucille Reynolds, CURO Research Assistant
Dr. Katalin Medvedev, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

The story of quail hunting is an important part of Southern heritage that has not been documented in depth. Formalized quail hunting first gained popularity in the region when wealthy northern industrialists migrated south to purchase vast, bankrupt farms to create sporting plantations for winter vacationing. With their arrival, the dress and kit of quail hunters became more practical, suited to the rough, briar-laden environment. The objective of the project was to identify a timeline of the evolution of quail hunting dress, which includes snake-proof boots, briar britches, safety vest with numerous pockets, and a hat with brim to shade the eyes. To collect data field research was conducted through attending quail hunts, visiting historic locations where quail hunting used to be practiced, face-to-face interviews with quail hunters, and the review of available published materials. The traditional plantation hunting culture has influenced contemporary dress practices by borrowing hunting and shooting features, accents, and materials from the traditional quail hunting attire. Prestige brands, such as Barbour and Orvis, are today staples in non-hunters' wardrobes who seek association with the distinct dress of quail hunters. Although changes in agricultural practices depleted the wild quail population in the region, conservation efforts by organizations such as Tall Timbers Research Station & Land Conservancy offer hope for the preservation of the quail hunting tradition and the wild lands that foster it. They will likely keep its dress traditions alive as well because they are associated with status and convey nostalgia for a disappearing lifestyle.

Abstracts

Nostalgia Inverted: The Golden Age Motif in Strepsiades' Pre-Dramatic History

Elizabeth Ridgeway, CURO Research Assistant
Dr. Charles Platter, Classics, Franklin College of Arts & Sciences

K.J. Dover sketches the protagonists of Aristophanic comedy as figures of opposition who jeer against social custom, myth, public figures, and "all those who in one way or another are superior to [them]selves" (Dover, 1974, p.19). My research applies Dover's claim to lines 43-5 of *Clouds*, positing that, on the one hand, Strepsiades' narrative of his own "*ἥδιστος βίος*" (p. 43) reflects the longing for a prehistoric Golden Age manifest in traditional Greek thought. On the other hand, Aristophanes juxtaposes Strepsiades' ridiculous behavior throughout the play with the literary and cultural prestige accorded the legendary Golden Age. Ultimately, Strepsiades' account of his pre-dramatic life mocks both temporal tradition and comedic archetype. This paper proposes to trace extra-narrative allusions in Strepsiades' life prior to *Clouds*. In lines 43-5, contrast creates laughable distance between Strepsiades the buffoon and his former prosperity. Aristophanes draws on a common cultural understanding of the Golden Age to heighten the humor of this juxtaposition. To argue this claim, I'll consider several specific points: first, that structure and contradiction in lines 43-5 serve to mock several elements of Greek culture, including the Golden Age; second, that fragments of Aristophanes' contemporary Eupolis attest to the cultural prevalence of the Golden Age ideal; and finally, that the passage's content finds thematic precedents in Hesiod, Pindar, and what we know of the Kronia festival. For an Athenian audience, these recognizable cultural allusions bring Strepsiades' absurdity into hilarious relief.

State-Driven Development Initiatives under Kenya's Vision 2030 and Perceptions by Project-Affected Persons in the Northern Rangelands

Paola Rivera, CURO Honors Scholar, CURO Summer Fellow
Dr. Laura German, Anthropology, Franklin College of Arts & Sciences

This paper seeks to explore ongoing state-driven development initiatives (SDIs) in the northern rangelands of Kenya under the Government of Kenya's (GoK) *Vision 2030* development plan. Since the *Vision 2030* projects discussed in this paper are still in their early stages, the analysis is meant to explore early outcomes in light of project goals and GoK legal commitments to project-affected persons (PAPs) so as to highlight issues not consistent with the project goals before they are too late to amend or mitigate. The research is situated theoretically in the wider literature and critiques of state-driven "betterment schemes" which highlights the divergence between project aims on the one hand, and outcomes (both intended and unintended) on the other. Reasons behind the failure of projects to live up to expectations, and the generation of unintended effects, may be productively explored through a look at the processes through which these initiatives are carried out. This paper aims to do this through an ethnographic analysis of Koija Group Ranch in Laikipia County during early stages of implementation of *Vision 2030*. Projects include a megadam, an irrigation scheme, a road, and a power line, which are all on schedule and receiving more funding. The GoK has already started work on the power line and transport road and has hired workers and set up a camp for the megadam. Drawing on published information and interviews with PAPs, we document early project activities and evaluate them based on the extent to which they reflect duties of the GoK towards PAPs (as enshrined in relevant policy and legislation). In interviews

conducted with PAPs in the Koija Group Ranch, some attendees expressed dissatisfaction with the consultation and awareness process of some projects.

Regulation of Mitochondrial Dynamics in *C. elegans*

Spencer Robinson, CURO Research Assistant
Dr. Edward Kipreos, Cellular Biology, Franklin College of Arts & Sciences

Mitochondria play a vital role in maintaining the health of most eukaryotic cells by generating ATP, the predominant source of chemical energy for cellular processes. Production of ATP varies in response to the energy needs of a cell, and mitochondrial morphology changes to meet this need; as a deficit of ATP develops, the incidence of mitochondrial fusion increases. Fused mitochondria have been shown to produce ATP more efficiently than their tubular (non-fused) or fragmented counterparts. As such, regulation of mitochondrial morphology is critical to cellular function. Mitochondrial dynamics is regulated by several GTPase proteins. Using the nematode *Caenorhabditis elegans* as a model organism, we can study the regulatory pathways that would signal the mitochondria to adapt to the cellular bioenergetic state. EAT-3 is a conserved GTPase that induces mitochondrial fusion in *C. elegans*. SPG-7 and PPGN-1 are mitochondrial proteases, which can inhibit fusion. We hypothesize that SPG-7 and PPGN-1 inhibit fusion by proteolytically cleaving EAT-3. We aim to fluorescently tag SPG-7, PPGN-1 and EAT-3 to enable us to study their role in regulating mitochondrial fusion in *C. elegans*. These constructs are then integrated into the *C. elegans* genome by microinjection into the gonad, inducing expression of the tagged proteins in subsequent generations. It is expected that expression of SPG-7 and PPGN-1 will result in vastly reduced rates of mitochondrial fusion due to proteolytic cleavage of EAT-3, which can then be visualized under a fluorescence microscope.

Resolving Offensive and Defensive Realism

William Robinson
Dr. Andrew Owsiak, International Affairs, School of Public & International Affairs

Both offensive realism, as defined by John Mearsheimer, and defensive realism, as defined by Kenneth Waltz, are predicated on the anarchic nature of international affairs. The two theories differ, however, on how states pursue security. In offensive realism, each state is a power maximizer and seeks to become a regional hegemon; a state's security is assured by increasing its share of power at the expense of others. In defensive realism, security is dependent on reaching a balance of power; a state's security is assured by bandwagoning with or balancing against a threatening power. Despite sharing several core assumptions, the two theories remain unreconciled. I argue that by modifying the theories to account for state capacity, the two theories can be merged. Only states with a substantial share of power or potential power would abide by offensive realist thinking because only those states could become a regional hegemon. Minor powers, contrastingly, would be forced to bandwagon with or balance against the more capable, power maximizing state, and would therefore abide by defensive realist thinking. The utility of both theories is their explanatory and predictive powers. As separate theories, each provides useful insight into one segment of states, either minor or great powers. By fusing the two, the joined theory would provide more accurate explanatory and predictive powers in a way that can be applied to all states.

Abstracts

Fetal Outcome of Pregnant C57BL/6 Mice Infected Late Pregnancy with 10^3 *Plasmodium chabaudi chabaudi* AS

Kerryn Roome
Dr. Julie Moore, Infectious Diseases, College of Veterinary Medicine

Despite immunity in malaria-endemic regions, pregnant women have an increased susceptibility to a significant infection. In these women, red blood cells infected with malarial parasites can accumulate in the maternal side of the placenta, leading to drastic changes in the placental tissue which hampers fetal intrauterine growth. This leads to low birth weight, stillbirth, and preterm abortion. Due to ethical and anatomical limitations in studying placental malaria in humans, murine models are a common alternative. In this experiment, pregnant C57BL/6 mice, aged 8-12 weeks, were intravenously infected with 10^3 *Plasmodium chabaudi chabaudi* AS on day 6, 8 or 10 of gestation. The courses of infection and pregnancy status were monitored until day 18 of gestation when the mice were sacrificed to have organs and plasmas collected for assessment. Mice that were infected during mid to late pregnancy showed significantly higher parasitemia levels compared to non-pregnant infected females. Mice infected on day 6 and 8 aborted their pregnancies on days 15.5 and 16.5, respectively. The majority of mice infected on gestation day 10 did not abort by day 18, so these mice had their placentae and fetuses weighed to compare against those of uninfected pregnant mice. Although viable, these pups weighed significantly less than the pups from healthy mothers. Activated macrophages and tissue factor expression in the placentae will be analyzed via immunohistochemistry staining. Giemsa staining will then compare the placental and peripheral parasitemia. Finally, Western blot analysis will be used to assess the extent of fibrin deposition in the placentae.

Reflections on the City: Urban Space and Ideology

Lazarus Roth, CURO Research Assistant, CURO Graduation Distinction
Dr. Athanasios Samaras, Philosophy, Franklin College of Arts & Sciences

Ideology is the guiding force in shaping the physical arrangement of urban space, and through that arrangement, ideology is reproduced and reinforced into and through the members of the given society. Drawing on the works of Henri Lefebvre, David Harvey, Antonio Gramsci, and others, this paper will attempt to draw a connection between ideological reproduction and the material production of urban space. Urban space will be presented as a product of the hegemonic nature of ruling class ideology and is arranged in such a manner as to reinforce the power structures and dynamics of the society in which it manifests. To justify a ruling class conception of the normative use-values of urban space, a science like urbanism is necessarily constructed that justifies and directs the ideological formation of urban space and rationalizes the proscriptions and prohibitions for the use of that space. Finally, urban space will be presented as a site of manifestation for the unconscious desires that have been shaped by ideology in material social space.

Investigating the Effects of Removing Genes for DHPS Degradation in *Ruegeria pomeroyi* DSS-3

Selena Roth
Dr. Mary Ann Moran, Marine Sciences, Franklin College of Arts & Sciences

Nutrient cycling between marine bacteria and phytoplankton plays a significant role in carbon and sulfur cycles occurring in the ocean. Studying the interactions between a single population of a marine bacterium of the Roseobacter clade and a diatom, *Thalassiosira pseudonana* CCMP 1335, allows for closer

investigation into compounds that are important in the ecological association and the environment. In the bacterium *Ruegeria pomeroyi* DSS-3, genes key to a metabolic pathway involving the degradation of 2,3-dihydroxypropane-1-sulfonate (DHPS) are up-regulated during co-culture with diatoms. One of the final enzymes in this pathway, *cuyA* allows formation of pyruvate and bisulfite from cysteate. Pyruvate is used in cellular processes while bisulfite is expelled, contributing to the oceanic supply of dissolved sulfur compounds. A genetic knockout was performed specifically targeting *cuyA* in *R. pomeroyi*, investigating the gene's role in the overall function of the bacterium. To study the effects of an inactive *cuyA* gene, both wild type DSS-3 and the mutant Δ*cuyA* strain were grown in media with DHPS as the sole carbon source or sole sulfur source at varying concentrations. In addition, wild type DSS-3 and the Δ*cuyA* strain were each grown in co-culture with diatoms, using flow cytometry analysis to observe the population growth of each organism. In both manipulated media and especially co-culture with diatoms, the mutant strain showed stunted growth. Contributing to our understanding of sulfonate cycles in the ocean, this indicates the bacterium cannot function properly at normal levels without being able to produce pyruvate and bisulfite through DHPS degradation.

Can People with Low Self-Esteem Directly Self-Enhance?

Sahar Sabet, CURO Research Assistant
Dr. Michelle vanDellen, Psychology, Franklin College of Arts & Sciences

Self-enhancement is the desire to possess and enhance positive aspects of the self-concept. Regardless of their approach, people tend to accentuate the positive in themselves while ignoring the negative. Research consistently finds people with high self-esteem are able to self-enhance more easily than people with low self-esteem; these differences are largest on direct measures of self-enhancement. One possible reason for this disparity is that, when asked to think positively about themselves, people with low self-esteem experience more self-doubt. The purpose of this study was to investigate whether people with low self-esteem could self-enhance directly. When there are no indirect options available, participants are only able to self-enhance directly. We predicted that by alleviating some of the pressure people with low self-esteem experience when asked to directly self-enhance, the opportunity to self-doubt would be minimized. Participants reported their trait self-esteem and self-enhancement. Then participants either circled positive attributes they thought were more descriptive of themselves than their peers or they crossed out positive attributes they thought they possessed to a lesser degree than their peers. After the manipulation, participants reported their state mood, self-esteem, and implicit self-esteem. Our findings indicate that condition (circling versus crossing out) interacted with trait self-esteem to predict state self-esteem. Crossing out attributes tended to improve state self-esteem for low self-esteem participants whereas it lowered state self-esteem for high self-esteem participant. These findings suggest that this opportunity for self-enhancement functioned differently for people with low and high self-esteem.

Evaluation of Novel Antiviral Drug NSC95397 for Treatment of Swine Influenza Infections in Pig Cells

Preston Samowitz
Dr. Ralph Tripp, Infectious Diseases, College of Veterinary Medicine

Discovering countermeasures for the influenza virus has faced many obstacles because the virus incessantly evolves, causing vaccines and antiviral drugs to be ineffective. Targeting host factors instead of the virus is

thought to be an approach to limit resistant, since host targets are stable. A novel drug NSC95397 targets host cell mechanisms to treat influenza virus infections. RNA Interference (RNAi) was utilized to screen for host genes involved in the influenza virus replication and found the host gene cell division cycle 25 B (CDC25B). CDC25B is a phosphatase that dephosphorylates cyclin-dependent kinases (CDKs). An influenza non-structural protein (NS1) has been identified to be phosphorylated by a CDK, CDK1. The phosphorylation of NS1 modulates its nuclear localization and chromatin association. The viral NS1 protein inhibits host antiviral genes such as the interferon (IFN) response. Activation of the IFN response stimulates IFN-stimulated genes (ISGs) to mount an antiviral response. NSC95397 inhibits the CDC25B activity; as a consequence, the phosphorylation of NS1 does not occur causing a modulation of its interferon inhibition activity and nuclear localization. The purpose of my studies is to determine if NSC95397 can be used as an effective treatment for veterinary use in pigs to treat swine influenza infections. My project will evaluate if there is a specific escape mutation that occurs when passaging a clinical isolate of swine influenza A virus in pig kidney epithelial (PK1-LLC) cells treated with increasing drug concentrations. I hypothesize that specific mutation(s) in the influenza virus genome confer resistance to NSC95397.

Functional Consequences of Different CAAX Motifs

Colby Samuelson-Ruiz, CURO Honors Scholar
Dr. Walter Schmidt, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Many eukaryotic proteins possess a C-terminal tetrapeptide CAAX motif. This motif is known to drive a trio of post-translational modifications: isoprenylation, endoproteolysis, and carboxylmethylation. These modifications influence CAAX protein interactions with other proteins, membrane association, and can be essential for protein function. A thorough understanding of how CAAX proteins are modified post-translation is important because many CAAX proteins are of significant biomedical relevance. The Ras GTPase is a prime example: mutated Ras is associated with 90% of pancreatic cancers, 50% of lung cancers, and 30% of all cancers in humans. Given the similarities among CAAX motifs, it has been assumed that all CAAX proteins undergo the same post-translational modifications at the C-terminus. This study used the yeast mating pheromone **a**-factor and heat-shock protein chaperone Ydj1p as reporters in the model organism *Saccharomyces cerevisiae* to investigate whether CAAX proteins are processed in a similar manner. Over the course of this study, four distinct CAAX motifs were independently assessed in the context of our two reporters, and the impact on protein function was assessed. We demonstrate that the motifs markedly differ in their ability to support function of the reporters. Moreover, our findings support an unanticipated divergence in the post-translational processing of CAAX proteins that allows some proteins to be isoprenylated but not undergo the proteolysis and carboxylmethylation events that are widely thought to be coupled downstream events. We will discuss the impact of our findings, especially the potential that this noncanonical pathway may be more widespread than anticipated.

Stemflow as a Contributing Source to Early Runoff

Sam Santoso, CURO Graduation Distinction
Dr. John Dowd, Geology, Franklin College of Arts & Sciences

Panola Mountain Research Watershed (PMRW), located near Atlanta, GA, has been studied extensively for over 30 years. Earlier work by Richard Cary used geochemistry to separate storm hydrographs into four component hydrographs. During most storms, water from current rainfall was not a significant component of flow until relatively late in the storm despite bare rock in the upper reaches of the watershed. Water to the stream early in the storm, but with the geochemical signature of soil water is stemflow from trees. To investigate the potential for stemflow to contribute to early storm flow, four Yellow Poplar trees (*Liriodendron tulipifera*) were wrapped and caulked with a collar funneling the water through a tipping bucket measuring device. The tipping buckets were connected to an Arduino to save the time of each tip. A GPS was used to synchronize the high resolution real-time clocks. The timing of stemflow compared to rainfall and stream flow will be used to evaluate stemflow contributions to runoff.

MindPlay Virtual Reading Coach

Lisa Savchenko, CURO Research Assistant
Dr. Jennifer Lindstrom, Communication Sciences & Special Education, College of Education

What are the effects of an online reading intervention on at risk students' reading performance in grades one and two? We are hoping to determine whether there are significant mean differences in decoding, encoding and fluency achievement scores of at-risk students (those that are receiving Tier 2, Tier 3, or Special Education Services.) The MindPlay Virtual Reading Coach online reading intervention will be used in addition to standard English/Language Arts instruction. Participants come from a public primary school in the Southeastern United States. There will be 90 participants. Approximately half of the participants will interact with the MindPlay intervention and the other half will conduct business as usual. Intervention is on-going and results will be calculated in Spring 2015.

Understanding the Role of *Helicobacter pylori acxABC* in an *Escherichia coli* Model System

Scott Schaffer
Dr. Timothy Hoover, Microbiology, Franklin College of Arts & Sciences

Helicobacter pylori is a gram-negative bacterium that is responsible for being one of the leading causes of peptic ulcers and chronic gastritis in humans. Since *H. pylori* colonizes the stomach mucosa, it has a variety of essential genes that facilitate its ability to survive the harsh, nutrient-limited environment of the stomach. One set of genes, HP0695 (*acxA*), HP0696 (*acxB*), and HP0697 (*acxC*) allow *H. pylori* to utilize acetone as a potential carbon source. These set of genes encode for an enzyme that is homologous to acetone carboxylase from *Xanthobacter autotrophicus* and *Rhodobacter capsulatus*. Acetone carboxylase catalyzes the reaction of acetone to acetoacetate, which can then be fed into central metabolism through subsequent enzymatic events. The genes encoding for the three subunits of this acetone carboxylase, *acxA*, *acxB*, and *acxC*, have been shown to be important for the efficient colonization of *H. pylori* in the murine gastric mucosa. In our study, synthetic *acxABC* genes were generated, cloned into the expression vector pLAC22, and transformed into *Escherichia coli*. *E. coli* was chosen as a model organism as it utilizes acetoacetate, but not acetone, as a carbon and energy source. The goal of my research project was to determine if an *E. coli* strain expressing *H. pylori* acetone carboxylase is able to use acetone as a sole carbon source. Such a result would be significant, as it would allow us to use the *E. coli* strain to screen possible inhibitors of acetone carboxylase that may

have therapeutic value in controlling *H. pylori* infections.

Microwave-Assisted and Benzotriazole-Mediated Synthesis of 1,2,4-Triazole-Based Peptidomimetics

Lewis Schendowich, CURO Research Assistant
Dr. Richard Morrison, Chemistry, Franklin College of Arts & Sciences

1,2,4-Triazoles derivatives are dynamic compounds that serve a wide range of biochemical applications, including antifungal drugs, antibacterial activities, CRF1 receptors antagonists, H2 antagonists and contain inhibitory properties on Janus associated kinases. Furthermore, 1,2,4-triazoles can been utilized as a structural peptidomemtic that is highly resistant to hydrolytic cleavage at a wide variety of peptide amide bond angles, including cis and trans. Developing new and efficient techniques to synthesize 1,2,4-triazole moieties are critical for medicinal and pharmaceutical chemists. Microwave organic synthesis provides a fast and high-yielding method of synthesizing a diverse range of chemical compounds. Currently we are employing benzoletriazole chemistry along with traditional and microwave techniques to synthesize a library of single and diamino acid substituted 1H-1,2,4-triazoles. The library will contain amino acids at a variety of positions attached to a triazole core and mimic known peptide bond angles. The microwave not only enables the reaction to occur, but also expedites several reaction times to less than 40 minutes. By combining low-cost starting materials like benzoletriazoles and amino acids with the efficient technology of microwave chemistry, we have produced in good yields a technique for further triazole synthetic chemistry.

Incidence of Anesthesia-Related Fatality in Birds

Amanda Seamon, CURO Graduation Distinction
Dr. Erik Hofmeister, Small Animal Medicine & Surgery, College of Veterinary Medicine

While there is ample research about the anesthesia-related fatality rate for cats, dogs, and humans, there is little research into the rate in birds. The purpose of this study was to determine the fatality rate in birds associated with general anesthesia. Our hypothesis was that birds will have a higher fatality rate due to anesthetics than the rates in dogs, cats, and humans. Data were collected from cases seen between 2004 and 2014. Cases were identified by searching the records for patients designated as "avian" and having any inhalant anesthesia charge on their bill. Patients were organized into four groups: intensive-care unit related death, anesthesia related death, euthanized, and survived to discharge. Data collected includes date of visit, age, species, gender, pet vs. wildlife, weight, body condition score, diagnosis, procedure, American Society of Anesthesiologists status, premedication, induction medicine/anesthesia, maintenance medicine/anesthesia, fluid type, fluid route, crystalloid volume, colloid volume, heart rate nadir/peak, end-tidal CO2 nadir/peak, Inhalant anesthetic nadir/peak, temperature nadir/peak, intraoperative events, estimated blood loss, anesthesia duration, surgery duration, recovery time, recovery notes, survive to discharge, time of death, total bill, and anesthesia bill. Comparisons were made between the birds who did not survive to discharge and birds that did survive to discharge. The outcome for birds was survival to discharge 86%, died during anesthesia 3.4%, died in the intensive care unit 4.3%, or euthanized 6.3%. Overall, none of the variables studied are associated with the likelihood of death due to anesthesia in birds.

Abstracts

Behavioral Testing on Piglets to Assess Cognitive Deficits of a Traumatic Brain Injury

Kathryn Sellman
Dr. Franklin West, Animal & Dairy Science, College of Agricultural & Environmental Sciences

Traumatic brain injury (TBI) affects over 150,000 children per year and is a leading cause of neurological disability and death during childhood. There are limited treatments available, but recently induced pluripotent stem cell-derived neural stem cells (iNSCs) have shown potential as a regenerative option. Due to similarities to children in brain formation and development, we have chosen to use a piglet model to 1) develop applicable and quantifiable behavioral tests to assess cognitive function, 2) quantify cognitive deficits after sustaining a TBI and 3) determine the effectiveness of iNSC treatment in reducing cognitive deficits after TBI. To assess cognitive function we will use a spatial plus T-maze test and an object recognition test. The spatial plus T-maze test will access learning and spatial memory. Piglets will start from a north or south arm and can enter both the east and west arms, with only one arm being baited. We expect the piglets to find the reward by using extra-maze visual cues, not motor memory. The object recognition test will test spontaneous trial-unique memory. Piglets will be exposed to two similar objects within an arena for 10 minutes. After a 10-minute delay, piglets will be reintroduced to one familiar and one novel object. Time spent with each object will be measured. We expect the piglets to prefer the novel over the familiar object, based on the piglets' memory of the familiar object. The successful development of these behavioral tests will enhance our ability to assess cognitive function in piglets.

Is Everyone on Twitter Better Than You?: Correlations between Twitter and Exercise Motivation among College Students

Patrick Semanie, CURO Research Assistant
Dr. Juan Meng, Grady College Of Journalism & Mass Communication

Purpose: The purpose of this research is to better understand the effect that Twitter can have on individuals' perceptions on their own personal fitness and exercise habits. Particularly, the researcher is interested in investigating the perceptions of college-aged individuals, as they are generally attracted to a wide variety of social networks. *Research Methods:* A 30-question online survey was distributed to the students at the University of Georgia by using a convenience sampling strategy. In addition, two focus groups (one comprised of males and the other of females) were conducted in order to gather in-depth insights about the participants' perception of Twitter's effects on exercise motivation both on themselves and others. *Results:* Results of the research will show differences amongst various demographics and their perception of Twitter. The results also show that participants believe that Twitter has a greater effect on the fitness and exercise habits of others, as opposed to on their own habits. Prior research showed that Facebook could lead to negative social comparison (Chou, 2012). Findings in this research reveal similar patterns about Twitter as it pertains to exercise. *Practical Implications:* This research will help us understand how Twitter can be used to stimulate the motivations to exercise. More importantly, it will also help better explain how Twitter must be used responsibly in order to promote a positive body image amongst its users.

Mapping the Genetic Basis of Leaf Physical and Chemical Defenses in Sunflower

Rahul Shah, CURO Research Assistant
Dr. Lisa Donovan, Plant Biology, Franklin College of Arts & Sciences

Plants are faced with a variety of threats to their survival and reproduction. Such threats include disease from bacterial or fungal pathogens as well as herbivory from pests like insects. Plants have evolved a wide array of physical and chemical defenses to reduce the impact of these factors, and such traits are incredibly diverse among species. This work seeks to understand the genetic basis of variation in leaf defenses in the crop sunflower (*Helianthus annuus*). Using a 288-line association mapping panel that captures ~90% of the genetic diversity across all crop sunflower varieties, we phenotyped key defense traits including thickness, toughness, trichome density, tannin activity, and leaf ash content. Here we map variation in these traits to the sunflower genome using published genotype data for this association mapping panel, including ~5500 single nucleotide polymorphism (SNPs). Based on insights from previous studies of leaf defense evolution across wild *Helianthus*, it is hypothesized that (1) leaf defenses are likely controlled by few regions of large effect, and (2) leaf defenses likely do not share common genetic bases, with the possible exception of leaf thickness and leaf ash content. Identifying the genetic bases of leaf defenses informs breeding efforts and will improve our understanding of pest and disease dynamics in crop sunflower.

Promoting Success for English Learners: Dual-Language Immersion in Georgia

Rahul Shah, CURO Research Assistant
Dr. Linda Harklau, Language & Literacy Education, College of Education

In the last two decades, Georgia experienced unprecedented growth in immigration rates. The resultant enrollment rate of English learners (ELs) in Georgia public schools has increased by 400 percent, with nearly 90,000 new ELs enrolling annually. ELs are severely academically disadvantaged because Georgia schools do not adequately support their English acquisition needs. For example, high school ELs have lower End-of-Course-Test passing rates in all 10 tested subjects compared to their non-ELs peers. Additionally, only 44 percent of Georgia's ELs graduate high school in four years—a rate 26 percent below the state average. Georgia currently utilizes a "pull-out" model, in which ELs students are removed from traditional academic courses for a class period to be instructed in English. This places undue burden on ELs who face the pressure of learning English while simultaneously fulfilling complex high school graduation requirements. Because they lack English proficiency, ELs often cannot enroll in courses they need to graduate. This retention is discouraging, and furthers the tendency of English learners to become high school dropouts. To improve English proficiency rates and educational outcomes of ELs, Georgia should subsidize the implementation of dual-language immersion magnet programs in public schools, in which students take coursework taught in Spanish for part of the day and coursework taught in English for the other.

Formation of Mitochondria-Targeted Blood Brain Barrier Penetrating Biodegradable Nanoparticles for Stroke Treatment

Nivita Sharma, CURO Honors Scholar
Dr. Shanta Dhar, Chemistry, Franklin College of Arts & Sciences

Stroke is the third leading cause of death in the United States. There are several developing drug treatments for stroke injuries.

However, only one drug, tissue plasminogen activator, has received FDA approval. The critical need for effective treatments for stroke injuries motivated regenerative stem cell therapy aimed at re-stimulating brain activity and protecting brain cells from further injuries. A devastating effect after a stroke event is the loss of blood supply, and thus, death of brain cells. The dying cells trigger secondary immune and inflammatory responses producing a cytotoxic environment and inflammation in the brain. Several current studies are using adult stem cells (ASCs) to renew cell stimuli and inhibit immune and inflammatory responses that cause cytotoxic environments for the cells. Unfortunately, these recent studies show that ASCs cannot survive sufficiently long in cytotoxic environments to effectively integrate and replace lost cells. To protect stroke patients from significant detrimental effects, it is imperative to consider a new source of stem cells for stroke treatment. In this project, we focus on developing a cell therapy using induced pluripotent stem cell derived neural stem cells (iNSCs) that have the same capabilities as ASCs in addition to effectively integrating into damaged neural tissues. However, the functional success of iNSCs varies because of the cytotoxic brain environment. Accordingly, we are developing an efficacious biodegradable nanoparticle to deliver aspirin that can cross the blood brain barrier to reduce inflammation in the brain so that iNSCs are able to differentiate and integrate more successfully.

Body Mass Index and Performance-Based Functional Independence in Older Adults

Shubam Sharma
Dr. L. Stephen Miller, Psychology, Franklin College of Arts & Sciences

Body mass index (BMI) aids in the classification of individuals as underweight, normal, overweight, and obese, functioning as a tool to determine an individual's risk of developing different problems, including physical health diseases, cognitive dysfunctions, and behavioral issues. One variable BMI has shown a relationship with is functional independence in older adults. Functional independence is characterized by the ability to perform both basic activities of daily living (BADLs) and also more complex, instrumental activities of daily living (IADLs). Previous research has utilized self-report measures to assess functional independence in older adults, yielding inconsistent results. The purpose of the present study was to assess functional ability in 75 older adults using a performance based measure, the Direct Assessment of Functional Status-Revised (DAFS-R). This study hypothesized that BMI level would correlate with an individual's functional ability, specifically IADLs. BMI was calculated according to the World Health Organization's formula: BMI = Weight (in lbs) / Height (in inches) ^ 2. Curvilinear regression analysis was used to analyze the relationship between BMI and functional ability. Results approach significance ($p = 0.084$) suggesting a curvilinear relationship may exist between BMI and functional ability. If borne out, this relationship would suggest that the more extreme an individual's BMI – either higher or lower – the greater the risk for functional disability.

Mitigating the Spatial Mismatch of Social Service Provision and Demand: The Potential of Faith-Based Facilities

Keller Sheppard, CURO Research Assistant
Dr. Sarah Shannon, Sociology, Franklin College of Arts & Sciences

Comparing the concentration of social service programs to the location of neighborhoods with a high potential demand for those services allows for an assessment of the efficiency of the social safety net's geographic coverage. Agencies are not operationally restricted to their own facilities. Indeed, there are a number of means by which agencies can

mitigate the effects of geographic inaccessibility. One such strategy is the utilization of other organizations' facilities. Faith-based facilities such as churches can provide office or meeting space and allow for a more efficient distribution of social services. The current set of social service providers located in Athens-Clarke County and their potential faith-based collaborators will be mapped over the potential demand across the city measured by data from 2009-2013 American Community Survey 5-year estimates. Locations of social services providers are generally clustered in and around the center of the city with geographically underserved areas of high potential demand along the periphery. The potential for faith-based institutions to penetrate these areas both spatially and culturally is examined using a method of qualitative GIS. Faith-based facilities' cultural accessibility and current collaborative behaviors with social service provides are investigated through semi-structured interviews with prominent church parishioners throughout the county. The utilization of faith-based facilities presents an opportunity to more effectively reach underserved and isolated neighborhoods by decreasing the travel costs associated with service uptake.

Role of Glypican-1 in Prostate Cancer Cell Growth

Sheela Sheth, CURO Research Assistant
Dr. Brian Cummings, Pharmaceutical & Biomedical Sciences, College Of Pharmacy

Glypican-1 (GPC-1) is a membrane-bound heparan sulfate proteoglycan involved in intracellular and extracellular signaling, and is suggested to mediate cancer cell proliferation and metastasis. GPC-1 shuffles Group IIA secreted phospholipase A_2 ($sPLA_2$ IIA) between intercellular and extracellular domains. High concentrations of $sPLA_2$ IIA are destructive to the cellular membrane of diseased tissues, such as in arthritis and atherosclerosis; however, prostate cancer cells remain viable under high concentrations of $sPLA_2$ IIA (22-fold increased expression). We hypothesize that GPC-1 mediates prostate cancer cell growth and viability through its interaction with $sPLA_2$ IIA. To initially address this hypothesis we determined the expression of both GPC-1 and Group IIA $sPLA_2$ in non-cancerous (RWPE-1) and cancerous (LNCaP, DU-145 and PC-3) prostate cell lines. Immunoblot analysis demonstrated that prostate cancer cells have increased expression levels of Group IIA $sPLA_2$ compared to RWPE-1. Interestingly, GPC-1 expression was detected in the metastatic prostate cancer cells (DU-145 and PC-3), but was not detected in the non-cancerous (RWPE-1) and moderately metastatic prostate cancer cells (LNCaP). This suggests that GPC-1 may play a role in cancer metastasis and protecting cells from $sPLA_2$ IIA's toxic effect in advanced prostate cancers. We are further testing our hypothesis using lentiviral transfection of shRNA to knock down GPC-1 in PC-3 cells and confirming knock down using immunoblot analysis. These cells will be used in future studies to test their sensitivity to Group IIA $sPLA_2$, as well as their differences in proliferation and migration activities, as compared to control cells.

An Investigation of Anaerobic Methane Oxidation by Consortia of Methanotrophic Archaea and Bacterial Partners Using Process-Based Modeling

Yimeng Shi, CURO Summer Fellow, CURO Research Assistant
Dr. Christof Meile, Marine Sciences, Franklin College of Arts & Sciences

Biological activities, including oxidation of methane in marine sediments, play an important role in the global methane cycle. Methane can be converted to CO2 under anaerobic conditions by microbial consortia

consisting of archaea and bacteria. We used reactive transport models to study the magnitude of methane oxidation. Compared to rates in laboratory incubations, it was shown that reaction kinetics, transport intensities, and energetic considerations all decisively impact the overall rate of methane consumption. We applied the model to different environmental settings and spatial distribution patterns of archaea and bacteria. E.g., in some cases archaea and bacteria separately form their own groups while in some other cases they are well mixed with each other. We also investigated newly proposed potential reaction pathways and studied the effectiveness of various potential chemical species, including acetate, hydrogen, formate, and disulphide between the archaea and bacteria. Moreover, we investigated the effect of hyper diffusion and nanowires, when the potential chemical species diffuses at a higher speed by potential biological vehicles. We concluded that for the six spatial distribution patterns, the well-mixed situation has significant influence on the efficiency of the oxidation of methane, because the vicinity of bacteria and archaea counteracts the build up of products and therefore prevents the thermodynamic shutdown of microbial metabolism. Also, disulphide has the potential to serve as efficient intermediate species. Our simulations with hyperdiffusion or nanowires show that effective electron transport between the point of reduction and oxidation is a critical aspect for efficient anaerobic methane oxidation in microbial consortia.

Asymmetric Functional Movement Screen Scores and Injury Occurrence in Collegiate Female Athletes

Taj Shorter
Dr. Cathleen Brown Crowell, Kinesiology, College of Education

There is limited research discussing the differences in bilateral Functional Movement Screen (FMS) scores and injury occurrences in female collegiate athletes. Increased risk of injury has been observed in athletes with poor FMS scores, but it is unknown if injury occurrence is associated with asymmetric functional movement. The purpose of this study was to determine if injury occurrence is associated with asymmetric FMS scores in the lower extremities of Division I female collegiate athletes. Asymmetry was defined as ≥1 point difference in unilateral tests. The FMS scores of 29 consented female athletes (18 soccer and 11 basketball) were obtained by trained raters prior to the start of the fall semester. Injuries were documented during the season by the teams' sports medicine staff. The injured group contained those who missed ≥1 day of full sport participation due to athletic-related injury. The uninjured group did not miss any time. Nine chi-square tests were performed using variable crosstabulations of the side of lower extremity asymmetry (lower scoring limb) and the side of injury (side variable). No significant results were found for the chi-square tests (Cramer's $V=0.022$, $p=0.904$). Injury occurrence does not appear to be associated with side of lower asymmetry FMS scores in the lower extremities in this preliminary study of female collegiate athletes. Future research should focus on whether an asymmetry in functional movement pattern leads to injury over time.

The Complete Genome of *Diachasmimorpha longicaudata* rhabdovirus: A Symbiont of Parasitoid Wasps

Tyler Simmonds
Dr. Gaelen Burke, Entomology, College of Agricultural & Environmental Sciences

Several lineages of parasitoid wasps employ viral symbionts as a mechanism to deliver immune-suppressing genes to the host to prevent the wasp's eggs from being destroyed during development by the host immune system. These viral symbionts have been acquired at several different points during the

evolution of parasitoid wasps, and show differing degrees of genome re-organization in response to the symbiotic relationship. The Polydnaviruses (PDVs), found in Braconid and Ichneumonid wasps, are the oldest and best characterized parasitoid wasp symbionts and have undergone extensive genome re-organization. In comparison, little is known about the more recent viral symbionts found in other parasitoid wasp lineages. By examining both ancient and recent viral symbionts, we can further understand the process that has allowed these viruses to transition to a beneficial role. We examined one of the more recent viral symbionts acquired by parasitoid wasps, *Diachasmimorpha longicaudata* rhabdovirus (DlRV), via sequencing and phylogenetic analysis. The assembled DlRV genome is 13kb in size and contains a total of 6 open reading frames (ORFs). Three ORFs correspond to the genes for N, G, and L proteins found in other rhabdoviruses. Additionally, a parasitism-specific protein (PSP24) was identified that previously had unknown origin in the fly and wasp system, and may play a key role in mediating successful parasitism. Phylogenetic analysis of the DlRV L amino acid sequence revealed that DlRV is closely related to two recently discovered insect rhabdoviruses, *Spodoptera frugiperda* rhabdovirus (SfRV) and Taastrup virus.

The Role of the Chaperone-Protein Interactions in Driving Protein Trafficking in the Malaria Parasite

Brandon Sims
Dr. Vasant Muralidharan, Cellular Biology, Franklin College of Arts & Sciences

Malaria is a widespread, global disease that causes 225 million cases and hundreds of thousands of deaths every year. *Plasmodium falciparum* is the most deadly cause of human malaria. The goal of my research is to investigate new classes of drug targets in *Plasmodium falciparum*. My lab studies the roles of a family of proteins called chaperones or heat shock proteins (Hsp) in allowing the parasite to establish its habitat within red blood cells. My project is to engineer Hsp expression constructs to generate protein chaperones to test their interactions. I have worked to engineer ten constructs; including five chaperones (Bip, Hsp-660, Hsp70x, Grp-94, and Hsp110) with and without a degradation domain in a pET-28 expression vector. First I amplified the target sequence on the gene of interest via PCR. Next restriction nucleases were utilized to cut both the intended insert and the recipient pET-28 vector. The insert and vector were fused together in a ligation reaction. These reactions were then transformed into *Escherichia coli*. To confirm uptake, DNA from *E. coli* colonies was purified, digested, and run on an agarose gel. Currently Bip, Hsp-660, and Hsp70x in pET-28 and Hsp-660 in pET-28 with the degradation domain have been screened showing successful uptake of the plasmid. The other five are currently being screened. Once all ten constructs have been successfully made I will test protein-chaperone interactions *in vitro* necessary for protein trafficking in *Plasmodium falciparum*.

Will Butterfly Gardens Take Off? Butterfly Dynamics and Recruitment in Response to Planted Gardens

Stuart Sims
Dr. Andy Davis, Odum School of Ecology

Global decline in pollinators poses a threat to ecological communities and processes worldwide. Habitat loss and degradation have led to several efforts to restore habitat area for both plants and their associated pollinators. As a result, butterfly gardens have become an emergent trend in pollinator conservation efforts. Little is known about the recruitment success of pollinator gardens or their most efficient composition. Here, we investigate garden composition, maintenance schedules, and population dynamics of several species in

order Lepidoptera to determine the effectiveness of pollinator gardens for conservation. We also investigated larval survival both inside and outside the garden plots at varying distances. We found that across species, adult abundance, egg counts, and species richness were explained by plant type, month, and number of plants blooming. Maintenance scheme and structural complexity did not have a significant effect. Survival increased outside the gardens, but not strongly with distance from the gardens. Understanding the importance of these variables in pollinator gardens helps optimize their effectiveness in conservation efforts.

Genotype-Phenotype Correlations in POMGNT1 and POMGNT2

Danish Singh, CURO Summer Fellow, CURO Research Assistant
Dr. Lance Wells, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Congenital muscular dystrophies (CMDs) affect the lives of millions of people every year. These genetic disorders are caused by the dysfunction of the dystrophin-dystroglycan complex that helps to coordinate cell movement and are thus appropriately termed dystroglycanopathies. Specifically the protein alpha-dystroglycan is of interest to this project since this protein in heavily glycosylated and the o-linked glycan structures on the protein are important of its function to bind laminin to a transmembrane protein. Dystroglycanopathies occur when these o-linked glycan structures are not glycosylated on to alpha-dystroglycan properly by other enzymes in a process known as post translational modification (PTM). The two enzymes investigated in this project were POMGNT1 and POMGNT2 which extend O-mannose initiated structure of α dystroglycan with a GlcNAc (N-Acetylglucosamine) by producing UDP-GlcNAc. While both these enzymes attach the same sugar they do it in different linkages and the sugar structure is glycosylated differently based on the linkage. Thus if a mutation occurs in one of these enzymes it can result in a glycan not being attached to alpha-dystroglycan which can cause the protein to not to bind to laminin which results in weakened muscle movement, a symptom of congenital muscular dystrophy. The aim of this project was to correlate specific single, nucleotide mutations in POMGNT1 and POMGNT2 to specific changes in enzymatic activity and also to understand how these two enzymes differentiate which one will glycosylate alpha-dystroglycan and when. By doing so this can provide diagnostic information on how to treat specific CMDs.

Profiling the Spatiotemporal Regulation of DNA Methylation in a Social Insect

Daniel Skowronski, CURO Research Assistant
Dr. Brendan Hunt, Entomology, College of Agricultural & Environmental Sciences

DNA methylation plays a role in development through the regulation of gene function in a diverse number of eukaryotes. The methylation is also affected by environmental input and may thus represent a fundamentally important mechanism by which development is influenced by the environment. Evolutionary conserved enzymes known as DNA methyltransferases (DNMTs) are responsible for DNA methylation. *De novo* methyltransferases of the DNMT3 family establish new methylation patterns within an organism's genome. Maintenance methyltransferases of the DNMT1 family maintain previously established methylation patterns across cell generations. In this study we have identified orthologs of DNMT1 and DNMT3 in the genome of *Solenopsis invicta* (red imported fire ant) as well as designed and validated qPCR primers for these genes. We will be profiling patterns of gene expression across seven developmental stages (egg, first through

fourth-instar, pupae, and callow adult) from two nests of the monogyne (single reproductive queen per nest) social form of *S. invicta* in order to provide insight into the timing and levels of activity of mediators of DNA methylation. Our effort represents a novel contribution to the field of insect epigenetics. This research will enable further investigations of the relative roles and temporal patterns of *de novo* and maintenance DNA methylation, which are integral to understanding environmental contributions to social insect development.

A GDOT Case Study for the Beneficial Use of HVFA in Concrete Pavements

Scott Smith, CURO Research Assistant
Dr. Stephan Durham, College of Engineering

The plurality of past academic life-cycle assessments for concrete pavements have shown the beneficial use of high volumes of supplementary fly ash in concrete pavement mixtures. However, because of the overall size and scope of these studies, findings were intangible due to their magnitude. An economic, structural, and environmental study of high volume fly ash (HVFA) in concrete mixtures is detailed in this research, but the scope has been limited to an 11 mile section of pavement located on I-75 in Bogart, GA. Through the use of life cycle assessments, it was found that the total carbon footprint for the pavement section could be reduced 17% by increasing the fly ash content of the concrete mixture from 10% to 20%. Quantitatively, this is enough energy to power roughly 4,500 average American homes for an entire year. This study will provide the quantitative data in areas of structural performance, economic savings, and environmental sustainability that will provide GDOT with the necessary information to modify the current Class I concrete specifications from the current 15% to an increased level. Additionally, a new and innovative metric for communicating the efficiency of a structural material is being developed. The concept is to generate a "nutrition" label, similar to those required by the FDA for food, but for structural materials. This labeling system would provide an understandable metric for contractors, architects, and other consumers to cross-compare service life, cost, and environmental impact.

A De-Demonized Future for the Radical Right in France? Media Framing of Marine Le Pen

Alexandra Snipes, CURO Research Assistant
Dr. Cas Mudde, International Affairs, School of Public & International Affairs

Sharing the core values of authoritarianism, anti-establishment populism, and nativism, populist radical right parties have strengthened their presence and legitimacy across Europe. France's Front National's platform includes an aggressive anti-immigration policy, an emphasis on law and order, a welfare state that privileges French "natives," and a virulent opposition to the European Union. The party traditionally appealed to predominantly male voters with low incomes, low educational levels, and low social statuses. In 2011, party leadership was passed to Marine Le Pen, daughter of party founder Jean-Marie Le Pen, and she has sought to modernize the party's image by declaring a de-demonization strategy for the Front National. This analysis focuses on her and her party, who witnessed a surge in media attention this past summer after their successes in the European Parliament elections. Women in politics are often viewed in the mainstream media as being more liberal than their male counterparts, even if their political opinions are in fact more conservative. Journalists never claimed that the achievements of the Front National under Jean-Marie Le Pen were due to a liberalization of his policy stances, making him more appealing to the mainstream. These claims are

now ever-present in the media stampede surrounding his daughter. To examine whether gendered media bias exists cross-nationally, I analyze articles in two American newspapers, *The Economist* and the *New York Times*, and two French newspapers, *Le Monde* and *Figaro*, focusing on the perception of Marine Le Pen.

Anti-Binge Drinking Public Health Campaigns: Their Effectiveness in Targeting Female College Students

Margaret Sparks, CURO Research Assistant
Dr. Juan Meng, Grady College of Journalism & Mass Communication

Purpose: The purpose of this research is to determine the effectiveness of anti-binge drinking public health campaigns aimed at female college students. In doing so, the research presented in this paper compares different mediums, print and video, used in this particular public health campaign to determine the most effective medium for targeting this particular public. *Research methods*: An online post-test-only experiment was used. Participants were randomly exposed to one of four different conditions (no stimuli, print advertisement, video advertisement, or both the print and the video advertisements), followed by the same questionnaire. Approximately 100 completed responses were collected (approximately 25 responses per experimental condition). A series of focus groups were also conducted in order to obtain insights on the investigated subject. *Findings*: Results suggest that video is the most effective medium for the anti-binge drinking campaign. Participants who watched the video elicited the most negative attitudes toward binge drinking. Results also reveal that increased levels of exposure to anti-binge drinking material will lead to negative attitudes toward binge drinking. *Practical implications*: Public health campaigns targeting female college students should be mindful that video is the most effective medium. Also, it is important to note that increased exposure to anti-binge drinking campaigns will affect audience's attitudes toward the subject. Therefore, future campaigns should integrate such strategies to increase effectiveness.

Development of an Improved Tuberculosis Vaccine

Jaclyn Speer, CURO Research Assistant
Research Professionals: Monica LaGatta, Simon Owino
Dr. Russell Karls & Dr. Frederick Quinn, Infectious Diseases, College of Veterinary Medicine

An experimental tuberculosis (TB) vaccine strain under study in our laboratory features a naturally, cold-adapted *Mycobacterium* species carrying a plasmid encoding the protein Antigen 85B (Ag85B) from the TB-causing bacterium *Mycobacterium tuberculosis* (*M.tb*). The Ag85B protein is known to be secreted to the bacterial surface in both *M.tb* and the vaccine platform strain. While the Ag85B-expressing vaccine yields a strong immune response, our hypothesis is that the vaccine can be enhanced if additional *M.tb* surface or secreted proteins are expressed simultaneously with Ag85B and exported to the surface of the vaccine strain. Genes encoding *M.tb* target proteins were obtained and inserted adjacent to the Ag85B gene, such that the target protein is synthesized as a fusion to the C-terminus of the Ag85B protein. Restriction endonuclease digestion and DNA sequencing was performed to screen for the expected DNA banding patterns and for the absence of mutations in the generated plasmids. A plasmid encoding one of the Ag85B fusion constructs was confirmed free of mutations. It was recently introduced into a fast-growing species (*Mycobacterium smegmatis*) to assess fusion protein synthesis and localization to the bacterial surface. Similar analyses will be performed upon introduction of this plasmid into the vaccine strain. Based on earlier studies with Ag85B, we anticipate that if the

Ag85B fusion protein is surface-localized in *M. smegmatis*, then it is likely to be located similarly in the vaccine strain, which will support future studies to test the efficacy of this new vaccine strain.

Bone Fracture Putty: A Combined Stem Cells and Lentiviral Approach

Karishma Sriram, Foundation Fellow, CURO Research Assistant
Dr. Steven Stice, Animal & Dairy Science, College of Agricultural & Environmental Sciences

Worldwide, there is a need for effective methods of treating non-healing fractures. Some bone fractures, termed *delayed unions*, which do not heal within 20 weeks, or *nonunions*, which do not heal within six months, are the result of more severe fractures, constituting nearly 10% of the 7.9 million fractures sustained yearly. Bone morphogenetic protein 2 (BMP2) can induce rapid ossification when used to treat bone defects. MSCs can function as a vector to deliver BMP2, while the lentivirus, containing the gene for BMP2, can allow transduced stem cells to confer the BMP2 protein. Thus, lentiviral BMP2-transduced MSCs will generate enough exogenous BMP2 to produce heterotopic ossification in mouse models, and the MSC will release trophic factors, enhancing the effects of BMP2, especially when confined inside a hydrogel matrix—such as glycosaminoglycan (GAG). For the mouse experiments, 3 million cells in phosphate buffer saline (PBS) and 350,000 cells in GAG gel were harvested and injected into the leg muscles of 8 non-obese diabetic/severely-compromised immunodeficient (NOD/SCID) mice. Furthermore, GAG gels were lyophilized and combined with GFP-labeled MSC to increase viability and even distribution of the MSC, as well as the total volume of cells injected. Observations from this experiment suggest the possibility of using a greater number of transduced MSCs in lyophilized GAG to induce more bone production. The observations from the mice indicate that the stem cells transduced with the BMP2 gene were successful in producing bone in mice and that the GAG gel successfully encapsulated the cells and enhanced the BMP2 production—and therefore, bone production.

Retinal Development with IFT122

Romik Srivastava, CURO Research Assistant
Dr. Jonathan Eggenschwiler, Genetics, Franklin College of Arts & Sciences

What are the mechanisms controlling the specification and morphogenesis of the mammalian retina? Several cell-intrinsic factors (e.g. Rx, Six3, Lhx2, Pax6, Pax2, Chx10) and cell-extrinsic signaling pathways (e.g. Hedgehog, Bone Morphogenetic protein, Wnt, retinoic acid) have been shown to participate in this process but how they are coordinated and used to execute retinal development remains unclear. To gain a better understanding, our lab is studying several mutations in mouse genes that disrupt specific aspects of retinal development. In addition to characterizing the mutant phenotypes, it will be important to understand the influence of developmental history and tissue-specific requirements of these genes in retinal formation. A useful way to address this question will depend on the characterization of the developmental potential of mutant cells in different contexts. Our goal is to exploit the *in vitro* and *in vivo* differentiation of mouse embryonic stem cells that harbor mutations in these genes. For this purpose, Mr. Srivastava will work to generate mutant embryonic stem cell lines that carry the mutations and express a GFP marker that will allow us to follow the fates of the mutant cells. Following this, we will conduct two types of experiments. First, wild-type and mutant ES cells will be subjected to *in vitro* differentiation protocols to form retinas and optic cups in the culture

dish. We will determine whether the mutant cells, in a heterologous environment, retain an inherent potential to give rise to retinal cell fates and retinal tissue morphogenesis. Second, the mutant and control ES cells will be microinjected into wild-type blastocysts to generate mosaic embryos composed of both types of cells. We will then determine whether, in a largely wild-type environment, the mutant cells are rescued in their ability to give rise to retinal cell fates.

The Effects of a Fucosyltransferase 3 (FUT3) Gene Knockout in *Arabidopsis thaliana*

Heather Steckenrider, CURO Graduation Distinction
Dr. Michael Hahn, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

The Fucosyltransferase (*FUT*) family of genes is currently being characterized in *Arabidopsis thaliana*. However, only *FUT1*, *FUT4,* and *FUT6* have been characterized successfully. It has been found that *FUT1* encodes a fucosyltransferase that fucosylates xyloglucan while *FUT4* and *FUT6* encode fucosyltransferases that appear to fucosylate arabinogalactan proteins. The fucosylation of xyloglucan by *FUT1* has been shown in the leaves of *Arabidopsis thaliana,* and the fucosylation of arabinogalactan proteins by *FUT4* has also been shown in the leaves of *A. thaliana*. The pronounced expression of all three of these *FUT* genes has been shown in the roots of *A. thaliana*. The expression pattern of the *FUT3* gene in Arabidopsis, as well as the subcellular localization of the FUT3 protein remain unknown. The Arabidopsis Information Resource predicts that FUT3 is involved in fucosylation based on its similarity to FUT1, but it predicts that the specific functionality is different. So far, two plant lines carrying homozygous mutations in the *FUT3* gene have been identified (*fut3* mutants). These *fut3* mutant plant lines will be compared through polymerase chain reaction and gel electrophoresis with the wild type *A. thaliana* plants in order to obtain information about the function(s) of FUT3. I have isolated homozygous mutants through these methods to compare with the wild type *A. thaliana*.

The Effectiveness of Counseling and Psychiatric Services at the University of Georgia: An Empirical Investigation

Mara Steine, CURO Research Assistant
Dr. Juan Meng, Grady College of Journalism & Mass Communication

Purpose: The purpose of this research is to identify the effectiveness of mental health programs on the University of Georgia campus by particularly examining the Counseling and Psychiatric Services (CAPS) provided by the University Health Center. The research aims at determining the general knowledge of the CAPS program on campus as well as the success of the CAPS program in its mission to help students.
Design/methodology/approach: The researcher used three research methods in this study to investigate the subject: (1) an online survey of UGA undergraduate and graduate students; (2) two focus groups—one with five participants and the other with four participants—with UGA students; and (3) in-depth interviews with mental health professionals at the University of Georgia.
Findings: Results suggest that students at the University of Georgia are generally not aware of the services CAPS provides to students. Mental health is also an issue on campus since many students struggle with depression and stress stemming from their academic endeavors. *Practical implications*: CAPS needs to find effective ways to reach out to students so that they are aware of the resources and help available on campus. CAPS needs to put emphasis on reaching out to freshmen, since being new to campus can pose many challenges to maintaining mental health. Speaking at new student orientation or

freshmen programs can be a great way to reach those target groups. *Originality/value*: The study provides insights into the effectiveness of CAPS programming and the issues that surround mental health on the college campus. It is important that students receive the help they need in order to be successful in college and beyond.

Understanding and Preserving the Practice of Medicinal Plant Cultivation and Use in San Luis, Costa Rica

Olivia Stockert, CURO Research Assistant
Dr. Jon Calabria, College of Environment & Design

San Luis is a small community in the Monteverde region of Costa Rica with a rich history of medicinal plant use, although few studies have documented this tradition in a way that makes information accessible for other researchers and for the local community. The use of medicinal plants is an important way for members of the community to share culture, and some residents of San Luis have observed that this generational transfer of traditional knowledge is in decline as modern pharmaceuticals become more prevalent. This study was conducted in order to determine residents' attitudes about the use of medicinal plants and the environment where they are found or cultivated. Upon the recommendation of University of Georgia Costa Rica Campus staff, selected residents of San Luis were interviewed in the summer of 2014. Open ended interviews were conducted in Spanish and the interviewer asked about environmental knowledge and ideology, medicinal plant use, and relevance of medicinal plant use to younger generations. Several themes emerged from the interviews indicating that older residents are more likely to use medicinal plants and have concerns about ineffective conservation strategies and limited adoption of medicinal plants by younger generations. Respondents indicated that educating others about traditional medicinal plant practice is an important part of the community's history and identity, which can also foster conservation. These findings reveal the critical role of medicinal plants in the San Luis community and their waning cultivation and use in recent years. Survey respondents suggested solutions to reverse this trend that included direct education of the younger generation and assistance from UGA Costa Rica to preserve this tradition. One way to address this perceived decline in interest and use of medicinal plants is to establish a community of practice. Traditional knowledge of medicinal plant cultivation and use could potentially be preserved while simultaneously strengthening cross-generational bonds within the community, educating younger generations, and encouraging conservation. Further research could implement a formalized community of practice and assess its effectiveness in preserving this important facet of San Luis's culture.

Leaf Litter Quality, Not Local Adaptation of Macroinvertebrate Communities, Drives Leaf Decomposition in Forested Headwater Streams

David Stoker, CURO Research Assistant
Dr. Catherine Pringle, Odum School of Ecology

Resource subsidies from terrestrial ecosystems can be important for stream ecosystem structure and function. Subsidy dynamics between terrestrial and aquatic ecosystems are dependent on the amount, timing, and identity of the resource, and consumer interactions within recipient systems. Forested headwater streams depend on leaf litter inputs, and intra- and inter-specific variation in leaf litter quality affects leaf decomposition and macroinvertebrate community assemblage. Here, we evaluated the relative importance to leaf litter decomposition of (1) local adaptation of macroinvertebrates; and

(2) leaf litter quality. We conducted a full reciprocal transplant experiment between two low- and two high-elevation streams within the Coweeta Hydrologic Laboratory, Otto, NC. Leaf input data were used to create leaf packs characteristic of riparian zones for each elevation, and leaf packs were deployed in home and away sites. We observed greater decomposition of higher quality leaf packs, irrespective of deployment site ($P = 0.001$). There were non-significant differences between leaf packs deployed in home or away sites ($P = 0.406$). Our results suggest litter quality, not local adaptation, drives leaf decomposition in these forested headwater streams.

Design and Analysis of Reactive Red Dye 120 Absorption by Nanocellulose Gel

Zack Stokes
Dr. Abhyuday Mandal & Dr. T. N. Sriram, Statistics, Franklin College of Arts & Sciences
Dr. Suraj Sharma, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

The reduction or elimination of water usage in dyeing fabrics is an important concern to many who participate in the activity on an industrial scale. One way of addressing this issue is to make the dyeing agent more responsive to the material it is being applied to. Research has shown that the nanocellulose gel obtained from wood pulp, when combined with certain dyes, such as Reactive Red 120, can permanently bind to the cotton textile surface as a uniform thin film. The extent to which the dye is absorbed by the nanocellulose is thought to be influenced by several factors, such as the volume and concentration of the dye used, the amount of time for which the gel solution is heated, and the temperature at which this heating is done. We have determined levels for these factors and used a fractional factorial design. Analyzing the data from this experiment, we are investigating the combination of factor levels which maximizes the absorption. Additionally, as a follow up to this process we can quantitatively determine the change in the dye color and use both pieces of information to create a measure for the overall dye performance. Our statistical analysis has the potential to reduce the amount of water needed to complete the coloring process while allowing the dye to maintain much of its original intensity. This could lead scientists to create a more environmentally-friendly process, which has broader social benefits.

The Influence of Caregiver Emotional Functioning on Perceived Barriers and Adherence in Adolescent Solid Organ Transplant Patients

Tyler Stollman, Charlotte Goldman, Kelsie Flanigan
Graduate Students: Cyd Eaton, Ana Gutierrez-Colina, Julia LaMotte
Dr. Ronald Blount, Psychology, Franklin College of Arts & Sciences

Previous studies have shown significant relationships between patient emotional functioning (EF), medication adherence, and barriers to adherence in adolescent solid organ transplant recipients. However, little is known about the role of caregivers' EF on patients' barriers and adherence. This study investigated the influence of caregiver EF (i.e., anxiety and depression symptoms) on barriers and medication adherence, beyond that explained by patient EF, in adolescent transplant recipients. Forty adolescent patients (*M* age= 16.03) and caregivers (*M* age= 44.85) completed self-report measures of their own EF and adolescents' medication adherence and barriers to adherence. Transplant types included 10 kidney, 11 liver, and 19 heart. Correlational analyses demonstrated higher levels of caregiver depression and anxiety symptoms were associated with more patient barriers and lower adherence. Multiple regression analyses showed caregiver EF accounted for significant variance (+

association), beyond that accounted by patient EF, in predicting barriers related to medication ingestion issues (depression model: $R^2 = .552$, $p < .01$; anxiety model: $R^2 = .515$, $p < .01$) and regimen adaptation issues (depression model: $R^2 = .38$, $p < .05$; anxiety model: $R^2 = .234$, $p < .05$). Caregiver EF accounted for significant additional variance (-association), beyond that accounted by adolescent EF, in predicting adherence (depression model: $R^2 = .147$, $p < .05$; anxiety model: $R^2 = .169$, $p < .05$). These results suggest that intervention to reduce caregiver anxiety and depression levels may help lower adolescents' barriers to adherence and increase medication adherence.

Properties of the Monkey Saddle

John Stroud, Foundation Fellow
Dr. David Gay, Mathematics, Franklin College of Arts & Sciences

In mathematics, a critical point of a function is a specific point where the function is level or unchanging. A monkey saddle graph is a three-dimensional surface, often studied in multivariable calculus courses, with an unusual type of critical point. The monkey saddle itself is similar to a normal saddle graph, but with three depressions instead of two. The interesting feature of this saddle is that its critical point is always an inflection point and never a local minimum or maximum regardless of the intersecting plane. We wish to study the monkey saddle to better understand its unusual fixed point and its formation of bifurcations as we perturb the surface. My research concerns creating a short movie using Sage, an open-source Python-based mathematics software, to generate three-dimensional pictures of the monkey saddle changing as its parameters change, as well as mathematically understanding how perturbations of the surface affect its fixed points. Other methods include using the Tachyon ray-tracing system that operates on top of Sage to create more realistic images.

Cryptosporidiosis: New Methods for Combating an Important Disease

Caleb Studstill, CURO Research Assistant
Dr. Boris Striepen, Cellular Biology, Franklin College of Arts & Sciences

Diarrheal diseases are responsible for nearly ten percent of early childhood mortality around the world. *Cryptosporidium*, a unicellular, eukaryotic parasite is among the most important causes of diarrhea in infants. In the United States, *Cryptosporidium* is a threat to people who are immunocompromised due to HIV/AIDS infections or organ transplants. To prevent and cure this disease, better tools for studying the parasite are essential. Recently, we have developed technology that enables us to genetically modify *Cryptosporidium parvum* parasites. I constructed the DNA transformation vectors necessary to accomplish this breakthrough. This included the cloning of plasmids for utilizing the CRISPR/Cas9 system in *C. parvum*. Now, we can detect parasitic infection with great sensitivity and precision. In addition, we can now isolate mutants of the parasite as well as determine gene function within *C. parvum*. In the research presented here, I use cloning and molecular biology techniques to make constructs containing different genetic reporters and drug markers. This will allow us to further develop methods for studying the parasite's cellular biology. I will report on the use of the CRISPR/Cas9 method for modifying *Cryptosporidium parvum* and the effectiveness of these new constructs in the parasite.

Investigating Student Satisfaction and Social Ties in a Biology Research Network

Zoheb Sulaiman, CURO Research Assistant
Dr. Jennifer Jo Thompson, Crop and Soil Sciences, College of Agricultural & Environmental Sciences

This ongoing longitudinal study investigates an interdisciplinary biology research collaboration across several institutions to examine the impact of networked research participation on undergraduates. We have adopted a mixed-methods approach—conducting observation and interviews with undergraduate researchers, and collecting survey data about their network interactions and outcomes. We are conducting a multiyear network analysis to examine the relationship between students' position in the network and their outcomes. For example, preliminary analyses of these data indicate a correlation between research satisfaction and students' total number of ties the following year. In Spring 2015, to further investigate the significance of these preliminary network results, we conducted observations and interviews with undergraduates currently in the research network (N=7). We are analyzing qualitative data to investigate how students characterize research satisfaction, and how satisfaction relates to their formation of social ties to students and faculty. To further investigate the impact of networked research in particular, we are continuing to explore the relationship between student outcomes and ties to individuals outside their home institution. This research contributes to the development of hypotheses of how participation in collaborative science influences undergraduate researchers and their persistence in scientific careers.

Capabilities of Detecting Atmospheric Cosmic Ray Induced Muon Showers by the NOvA Far Detector

Mehreen Sultana, CURO Research Assistant
Dr. Craig Wiegert, Physics & Astronomy, Franklin College of Arts & Sciences

The research goals of Fermilab's NuMi Off-Axis Electron Neutrino Appearance (NOvA) are to observe muon neutrino to electron neutrino oscillations, determine the ordering of neutrino masses, and explain violation of matter/anti-matter symmetry. However, NOvA can also be used to study cosmic ray induced high energy extensive air showers. This presentation describes the initial characterization of NOvA as a cosmic ray detector. The detector has a combination of large size and high spatial resolution that will allow future studies of the hadronic cores of cosmic ray air showers. A large component of these showers are muons. Multiple parallel muon tracks seen in a single event with the NOvA detectors result from the same primary cosmic ray collision in the upper atmosphere. In order to use these muon bundles to probe the cosmic ray physics involved, we determine event characteristics such as the multiplicity of observed multiple muons, the effective area of the detector, the angular resolution of the detector, the scattering of individual muons, and the effectiveness of identifying and isolating these parallel muon shower events from background and noise.

The Evolution of Presidential Unilateral Powers and Congressional Reaction Mechanisms

Rachel Surminsky, CURO Research Assistant
Dr. Michael Lynch, Political Science, School of Public & International Affairs

Congress is actively seeking a means to thwart the expansion of presidential powers by barring unilateral action. President Obama's adjustments to the implementation timeline of the Affordable Care Act rollout in regards to employer mandate waivers catalyzed Speaker John Boehner to purpose a House Resolution authorizing a lawsuit against Obama. We explore the following question: can the federal courts impede presidential executive actions? Assessing factors derived through the analysis of precedent setting legal decisions, we outline the necessary components for a successful lawsuit against the president through the context of Speaker Boehner's pending lawsuit. Through our research, we have found that suing the president is not a productive means

of blocking executive expansion; federal courts will avoid ruling on inter-branch conflict unless all other efforts for resolution have been exhausted.

Assembly of a Dual-Selection Cassette for Gene-Specific Targeting by CRISPR/Cas9 to Recapitulate Dystroglycanopathies

Noreen Syed, CURO Research Assistant
Dr. Aaron Beedle, Pharmaceutical & Biomedical Sciences, College of Pharmacy

Secondary dystroglycanopathies are a class of muscular dystrophies in which the glycosylation of α-dystroglycan is aberrant. Fukutin is necessary for functional glycosylation of α-dystroglycan; however, its specific activity is unknown. Mutations in the *FKTN* gene lead to a secondary dystroglycanopathy called Fukuyama Congenital Muscular Dystrophy. In order to further the research on secondary dystroglycanopathies, we seek to develop a *Fktn*-knockout skeletal muscle cell line for *in vitro* work to complement *in vivo* studies. To increase the flexibility and utility of the cell line, we designed a strategy using homolog-directed repair to modify the *Fktn* locus using CRISPR/Cas9 technology. Therefore, the purpose of our current work is to create a dual-selection cassette plasmid for genome editing. The completed targeting plasmid will be used to promote homologous recombination to disrupt the *Fktn* gene of C2C12 cells using CRISPR/Cas9 technology.

The Relationships between Dietary Protein Intakes and Cortical Bone in Prepubertal Black and White Boys and Girls

Jordan Sylvester, CURO Research Assistant
Dr. Richard Lewis, Foods & Nutrition, College of Family & Consumer Sciences

Understanding the nutritional determinants of bone mass and strength during growth is essential since the majority of bone mass is accumulated by late adolescence. While calcium and vitamin D have been the primary nutrients studied, little is known about protein intake and bone in children. The purpose of this study was to determine relationships between dietary protein and bone measures in black and white boys and girls in the early stages of puberty (9-13 years of age; N=323) who participated in a vitamin D supplementation trial. Dietary protein (g/day) was determined using three-day diet records (Food Processor v.9.7.3). Tibia and radius cortical bone was measured at 66% from the distal growth plate via peripheral quantitative computed tomography (Stratec XCT 2000). There were no significant correlations between dietary protein and skeletal measures when accounting for race, sex, maturation, and energy intake. Using a cutoff of 1.2 g/kg body weight (bw)/day, high (HP; >1.2g/kg/bw) and low (LP; < 1.2g/kg/bw) protein intake groups were created. Protein intake in the LP group was correlated with cortical bone mineral content and cortical bone area at the tibia, and with total bone area, periosteal circumference, endosteal circumference, and strength strain index at the tibia and radius ($r=0.413$-0.271, all $p<0.05$). Protein intake in the HP group correlated with radial cortical thickness ($r=0.155$, $p=0.037$) only. These results indicate that dietary protein intakes between 0.8-1.2 g/kg bw/day, but not higher intakes, may be advantageous for cortical bone strength; however, dose-response intervention studies are needed to confirm this.

The Effects of Interval versus Continuous Conditioning on Physiological and Kinematic Parameters of Equine Fitness

Lindsey Taylor, CURO Research Assistant
Dr. Kylee Duberstein, Animal & Dairy Science, College of Agricultural & Environmental Sciences

Interval conditioning is a method of training which alternates between varying degrees of effort and is frequently used to train elite human athletes. The objective of this study was to determine kinematic and physiological changes of equines in response to either interval or continuous conditioning. Nine unconditioned horses were randomly divided into either a continuous conditioning (CC) or interval conditioning (IC) group. Both groups underwent a conditioning program of increasing workloads 3 times a week for 8 weeks. Horses were evaluated before and after conditioning to establish fitness levels for comparison. Both groups showed improved fitness following 8 weeks of training as measured by a decrease in peak blood lactate post SET. The IC group had a significant decrease in peak blood lactate levels post SET as compared to the CC group ($P<0.05$). Resting hematocrit levels increased for both groups following 8 weeks of conditioning; however, IC horses showed a significantly lower increase in hematocrit levels post SET as compared to CC horses ($P<0.05$). Kinematic analysis of horses at the trot showed shorter hind stance times post training for IC horses only ($P<0.05$) with no significant change in swing time for either the front or hind limbs. IC horses also had a longer period of suspension at the trot post training as compared to CC horses ($P<0.05$). Results from this study suggest that interval conditioning may be more effective as compared to continuous conditioning, indicated by improved physiological response to exercise as well as improved muscular propulsion.

Role of tRNA Nucleotidyl Transferase and 3' Exonucleases in the Biogenesis of Functional tRNAs in *Escherichia coli*

Fahim Thawer, CURO Research Assistant
Bijoy Mohanty, Research Scientist
Dr. Sidney Kushner, Genetics, Franklin College of Arts & Sciences

All mature tRNAs in both the eukaryotes and prokaryotes contain the CCA trinucleotide at their 3' termini, which is required for aminoacylation so that they can function in protein synthesis. In *E. coli*, all of the 86 tRNAs have the CCA determinant encoded in the genome. Accordingly, the gene (*cca*) encoding the tRNA nucleotidyl transferase, the enzyme responsible for adding CCA, is not essential in *E. coli*. It is thought that the enzyme works to repair tRNAs that have been processed incorrectly by the 3'→5' exoribonucleases such as RNase T (*rnt*) and RNase PH (*rph*) so that the CCA determinant is no longer intact. The data in this report show that *E. coli* lacking the CCA adding enzyme grows more slowly compared to a wild type control strain. The growth rate improved significantly in a *cca Δrnt* double mutant compared to a *cca rph-1* double mutant. Additionally, the growth rate of a *cca rph-1 Δrnt* triple mutant was not better than the *cca Δrnt* double mutant. These data suggested that RNase T may be responsible for overprocessing the tRNA 3' ends in the absence of the CCA adding enzyme. Northern analysis will be carried out to identify tRNAs with shorter 3' ends. In addition, the 3' and 5' ends of these tRNAs will be cloned and sequenced to confirm potential defects in their processing. This work was supported in part by a grant from the National Institutes of Health (GM081554) to S.R. K.

The Effects of Travel on Team-Based Performance

Parker Thomas, Rebekah Trotti, Christopher Morgan, Kyle Ledesma
Dr. Karl Kuhnert, Psychology, Franklin College of Arts & Sciences

We examined the relationship between distance traveled to work and job performance. As teams in the workforce are required to go on longer trips, the impact of travel is becoming more relevant. Current research indicates that travel induces stress,

but there has been little to no research on how travel influences job performance. Using team-based sports data, we examined the relationship between distance traveled and job performance. In addition, we evaluated how the total accumulated miles that teams travel impacts the relationship between travel and performance. Similarly, we looked at how a team's average job experience affects the relationship between travel and performance. Our study shows that the further that teams travel for their job, the worse they perform. However, our research indicates that employees are less sensitive to trips the more miles they have traveled. The findings of our study are important because there are tangible consequences of travel for one's job. Based on our findings, employers should seek alternative methods for long distance work. However, if travel is inevitable, organizations should be aware that with more trips the negative effects of traveling are weakened. Organizations can further reduce these adverse effects by selecting teams with more average job experience.

American Film's Portrayal of CEOs: An Increase in Complex and Confusing Personalities from the 1930s

Erin Todd
Dr. Fran Teague, Theatre & Film Studies, Franklin College of Arts & Sciences

In Industrial/Organizational Psychology, great strides are being made to help companies derive an equation for the perfect CEO, but one variable is rarely discussed in the literature: the media. Although a CEO may possess all the qualities for success, without media support her company's success may be capricious. This study seeks to uncover media's portrayal of CEOs as a means to educate both CEOs and the public about the effects media has on leaders. In order to examine media's effects, popular films containing CEOs were analyzed. A standardized method was used to select each film: the top-grossing films of each decade (starting in the 1930s) that contained a CEO as a lead character were selected; then, each CEO was analyzed based on physical characteristics, personality traits, actions, decision-making skills, and various other qualities. Results suggest that CEOs in popular films have become more complex and enigmatic. Older films portrayed CEOs as strictly "good" or "bad," whereas current films characterize CEOs as morally ambiguous, a mixture of good and bad. Taking these results into account, it appears that CEOs should make themselves more available and open to the public regarding their companies and their personal lives. Implications of this study may be used to provide CEOs with feedback of how to establish a positive image with their companies and with the public.

Pretreatment of Cellulose Powder and Nanocellulose Gel Production

Lauren Tolbert, CURO Research Assistant
Dr. Suraj Sharma, Textiles, Merchandising & Interiors, College of Family & Consumer Sciences

Cellulose, the most abundant natural polymer, is found in lignocellulosic raw materials like wood or fibrous plants, having applications including biomedical films that relieve burn victims' pain and car parts made from cellulose-based composites. Although cellulose is naturally easily accessible, extracting its fibrils from wood, cotton, and other natural forms and separation from hemicellulose, lignin, and other components is difficult. Once extracted, size reduction through mechanical and/or chemical processing to a nano-level produces nanocellulose in microfibrillatd (MFC) or nanocrystalline (NCC) form. MFC is mechanically produced using high pressure and shear force from homogenizers or microfluidizers, resulting in lateral dimensions of 5-20 nanometers. Pretreating cellulose pulp

by carboxymethylation, refinement, or addition of specific salts allows mechanical processing of nanocellulose to produce uniform, engineered nanofibril structures. Processing includes knife milling wood pulp sheets in three cycles to form hydrophilic powder. Thermogravimetric analysis determines weight loss due to bound water under a temperature scan (room temperature to 500 deg. C), and scanning electron microscopy (SEM) reveals morphological changes and particle sizes. Pulp cellulose powder is combined with water and carboxymethylcellulose (CMC) to form slurry, which is heated, then cooled to specific temperatures before homogenization, which transforms pulp powder cellulose dispersion to nanocellulose gel. High-energy consumption and harsh chemicals during processing and pretreatment could have substantial economic and environmental impact. Therefore, this research seeks to discover processing and pretreatment methods that optimize gel ratios and characterize nano-gel properties (rheology, morphology and adhesion). Future studies involve structure-property relations and economical and efficient nanocellulose gel production.

Truth & Testimony

Margaret Touchton, CURO Research Assistant
Dr. Andrew Owsiak, International Affairs, School of Public & International Affairs

Truth and Reconciliation Commissions (TRCs) are a form of transitional justice that are meant to be a method of healing for divided nations that have endured civil wars, internal strife, and human rights abuses. TRCs usually focus on creating a dialogue among victims, perpetrators, bystanders, and all those in between in the hopes of reconciling the nation's differences. In these dialogues, an emphasis is placed on obtaining a whole and complete truth from all involved in the conflict or abuses so that a better understanding of the issues can be formed and past grievances can be addressed. TRCs became internationally renowned after the post-apartheid government in South Africa created a TRC to examine human rights abuses that occurred during apartheid. The South African TRC has been widely celebrated as a success and has become a model for transitional justice. Despite the popularity of TRCs, there is still debate over their effectiveness. This paper will explore how well TRCs engaged a specific segment of the population, women. If a TRC's goal is to achieve reconciliation amongst the entire population by establishing a greater truth, then it is important to include the entire nation in the process, which means creating a space for women to tell their stories. Thus my research will attempt to answer the following question: Does the mandate of a TRC affect the subject of women's testimony? I plan to determine this by examining the mandate and testimonies from three TRCs (South Africa, Sierra Leone, and Liberia).

Fostering Peaceful Nuclear Infrastructure Sharing in Southeast Asia

Thomas Trahan, CURO Research Assistant
Dr. Sara Kutchesfahani, International Affairs, School of Public & International Affairs

Recent history has generally been favorable towards Southeast Asian economies, and expansion is expected to continue. As Southeast Asian GDPs rise, so too will regional energy consumption, and states will need to examine new strategies for meeting the rising demand. Peaceful nuclear energy is one such strategy, but only three Southeast Asian states include it in current official policy: Indonesia, Malaysia, and Vietnam. This study investigates how the ten member states of the Association of Southeast Asian Nations (ASEAN) could use their regional intergovernmental organization to promote development of peaceful nuclear energy

throughout the region by means of nuclear infrastructure sharing. It first examines case studies of peaceful regional nuclear cooperation through EURATOM in Europe and ABACC in South America. It will then provide an overview of the current status of nuclear energy in all ten ASEAN states, revealing wide disparities not only in nuclear energy policy but also states' respective histories with non-energy-related nuclear infrastructure. Finally, it will provide recommendations for how ASEAN can grow ASEANTOM, its organ of nuclear safeguards cooperation, in order to address these infrastructure disparities. These recommendations draw on enduring lessons found in the aforementioned case studies, mainly: 1) the effectiveness of a simple, narrowly-defined institutional mandate as demonstrated by EURATOM, and 2) the importance of groups of experts and sustained dialogue as demonstrated by ABACC. Although economic factors are also at play, implementing a collective, infrastructure-focused approach could contribute towards a more equitable nuclear energy future for Southeast Asia.

The Src Homology 3 Binding Domain is required for Lysophosphatidic Acid 3 Receptor-Mediated Cellular Viability in Melanoma Cells

Sterling Tran, CURO Research Assistant
Dr. Mandi Murph, Pharmaceutical & Biomedical Sciences, College of Pharmacy

The LPA3 receptor is a G protein-coupled receptor that binds extracellular lysophosphatidic acid and mediates intracellular signaling cascades. Although we previously reported that receptor inhibition using siRNA or chemical inhibition obliterates the viability of melanoma cells, the mechanism was unclear. Herein we hypothesized that amino acids comprising the Src homology 3 (SH3) ligand binding motif, R/K-X-X-V/P-X-X-P or (216)-KTNVLSP-(222), within the third intracellular loop of LPA3 were critical in mediating this outcome. Therefore, we performed site-directed mutagenesis of the lysine, valine and proline, replacing these amino acids with alanines, and evaluated the changes in viability, proliferation, ERK1/2 signaling and calcium in response to lysophosphatidic acid. Our results show that enforced LPA3expression in SK-MEL-2 cells enhanced their resiliency by allowing these cells to oppose any loss of viability during growth in serum-free medium for up to 96 h, in contrast to parental SK-MEL-2 cells, which show a significant decline in viability. Similarly, site-directed alanine substitutions of valine and proline, V219A/P222A or 2aa-SK-MEL-2 cells, did not significantly alter viability, but adding a further alanine to replace the lysine, K216A/V219A/P222A or 3aa-SK-MEL-2 cells, obliterated this function. In addition, an inhibitor of the LPA3 receptor had no impact on the parental SK-MEL-2, 2aa-SK-MEL-2 or 3aa-SK-MEL-2 cells, but significantly reduced viability among wt-LPA3-SK-MEL-2 cells. Taken together, the data suggest that the SH3 ligand binding domain of LPA3 is required to mediate viability in melanoma cells.

Modeling a Baseline of Forest Energetics: A Method for the Evaluation of Sustainable Practices and Technologies

Mathieu Trunnell, CURO Research Assistant
Dr. John Schramski, College of Engineering

Sustainability metrics most often quantify biogeochemical flows such as nitrogen, carbon, and water. However, energy is also a finite resource. In order to consider acceptable energy consumption limits, appropriate ecosystem-based benchmarks must be derived. Can reasonable energy balance models be created from existing ecosystem data to appropriately develop a balanced thermodynamic model of a typical ecosystem? To test this question, I propose to develop an input-output energy model of

UGA's Driftmier Woods. This study uses data from peer-reviewed literature as well as those gathered by a team of student researchers from UGA's School of Ecology, the College of the Environment and Design, and the College of Engineering to propose a baseline energy input-output computational model describing natural energy flows into and out of these woods, including but not limited to the yearly insolation, biomass accumulation (i.e., spring and summer), biomass loss (i.e., fall and winter), and eventual heat degradation. Driftmier Woods is an old-growth forest with little to no new ongoing year-to-year increase in biomass storage and as such, we model the woods as a steady-state system where the energy inputs are equal to the outputs over a one-year cycle. If successful, this benchmark study of expected energy flows can be used to evaluate prescribed grazing methods currently being proposed to eradicate invasive species and ultimately determine if this is an energetically sustainable practice. This represents an entirely novel means to compare the sustainability of a manmade process or technology to the balanced ecosystem energetics of the biosphere.

The Effects of TNFR1 and TNFR2 on Low Birth Weight as Seen in Malaria-Infected Mice Models

Ha Truong, CURO Research Assistant
Dr. Julie Moore, Infectious Diseases, College of Veterinary Medicine

Placental malaria is a condition where malaria-infected erythrocytes and mononuclear cells, namely macrophages, sequester within the intervillous spaces of a pregnant woman's placenta. In the malaria endemic regions of Sub-Saharan Africa, women experiencing placenta malaria often give birth to babies of low birth weight (LBW), a condition that greatly increases the mortality of these babies as compared to normal weight babies. Poor pregnancy outcomes such as LBW correlate with high levels of inflammation and Tissue Necrosis Factor (TNF), a pro-inflammatory cytokine produced mostly by macrophages. In the Moore laboratory, I am assisting in a project that will observe effects of Tissue Necrosis Factor (TNF) on pregnancies experiencing placental malaria and observe how TNFR1 and TNFR2, receptors 1 and 2 for TNF, are activated in this relationship. We will establish a mice model where pregnant C57BL/6J mice infected with *Plasmodium chabaudi* on day 0 of pregnancy. Up to the tenth day of gestation for the C57BL/6J mice, daily clinical measurements of weight, hematocrit, and parasitemia will be taken. On the tenth day, the mice will be sacrificed and their placentas preserved by fresh frozen in liquid nitrogen for RNA and protein isolation and in neutral buffered formalin for histology. By observing how TNFR1 and TNFR2 affect mice pregnancy, we can evaluate if TNF will be a valuable detector of malaria during pregnancy.

Health Care Policy Evaluation: A Case Study Examination of Workplace Wellness

Abby Tyre, CURO Research Assistant
Dr. Marisa Pagnattaro, Director, Legal Studies Certificate Program, Terry College of Business

The health care industry is one that touches the lives of all individuals as health is a universal principal, encompassing all humans. Currently the US spends approximately 17.9% of its GDP on health care expenditures, translating into $2.9 trillion dollars each year. Yet as health care expenditures are exponentially increasing, quality nor quantity of care is improving. This disparity creates a societal need for drastic health care policy reform. Reform came on March 23, 2010, when the Patient Protection and Affordable Care Act (ACA) was passed into law. The ACA is the policy reform designed to expand health care coverage and health insurance for

all Americans. One component of this legislation includes a $10 billion dollar budget for workplace wellness. The ACA defines wellness as "a program offered by an employer that is designed to promote health or prevent disease." The design of this present study is to produce a policy evaluation of the ACA's expansion of workplace wellness using a thorough review of cost-benefit analysis. Evaluation will occur by comparing and examining several case studies of workplace wellness: small businesses, large businesses, as well as at the University of Georgia. By examining several direct examples of workplace wellness, a conclusion can be made about both financial benefit as well as health benefits including improvement to community health, reduction of health disparities, and reduction of health costs. It is predicted that the ACA's workplace wellness impact will have positive long term health impacts but few financial benefits.

Response of Stream Biofilms across an Urbanization Gradient

Rachel Usher, CURO Research Assistant
James Wood, Graduate Student
Dr. Amy Rosemond & Dr. Seth Weger, Odum School of Ecology

This study examined 30 sites from 2010-14 investigating stream biofilms response to urbanization in Athens-Clarke County, GA. Urbanization initiates cascading environmental stressors impacting stream systems altering abiotic factors including hydrology and water chemistry. Biofilm, the active biological surface on stream bottoms comprised of algae, bacteria, fungi and organic matter, integrates the effects of multiple stressors. Thus, biofilm characteristics including its biomass and nutrient content can indicate the effects of watershed land use on stream condition. We determined watershed land cover and used physical/chemical data provided by Athens-Clarke County to examine biofilm response. We found a positive correlation between impervious surface cover (%ISC) and total nitrogen (TN), dissolved inorganic N, and temperature of stream water. An isotope of N, 15N is typically found in higher quantities in streams with wastewater inputs. Total phosphorus was positively correlated with δ15N, suggesting sewage or wastewater input but surprisingly, there was a negative relationship between biofilm δ15N and %ISC. The δ15N response to forest cover yielded expected values (3-4) in heavily forested areas (>60%), increased values (4 – 9) in moderately forested areas (30-60%), and decreased values (>2.5) in reduced forest area (>15%). These findings suggest that land uses can differentially affect inputs and cycling of N in biofilms, resulting in non-linear relationships between potential source indicators (e.g., δ15N) with single types of land cover change.

Using Model-Based Analysis to Develop a More Robust Measure of Flow-Mediated Dilation

Charles Van Brackle
Dr. K. Melissa Hallow, College of Engineering

Cardiovascular Disease (CVD) is the leading cause of death in the United States. The endothelium is responsible for controlling the dilation and contraction of arteries through control of smooth muscle tone in response to shear stresses. Endothelium dysfunction is an early indicator of atherosclerosis and can predict CVD before it becomes more seriously developed. Ultrasonic assessment of brachial artery flow is used to non-invasively study flow-mediated dilation (FMD) and the function of the endothelium. Currently, FMD is unable to explain variability in the dilatory response due to differences in shear response and other physiological factors in different subjects. We are developing a mathematical model to characterize the relationship between shear stress and the flow-mediated dilatory response, and also account for

varying physiological factors among subjects. This is done in two parts: by modeling the velocity profile observed via ultrasound, and then modeling the blood vessel's dilatory response to that velocity/shear profile. The diameter is modeled as a function of the shear stress on the interior of the brachial artery by an exposure-response relationship. The model seeks to establish parameters that describe the underlying physiological response to shear and that account for physiological variability between subjects. This will remove confounding effects and enable the FMD test to more accurately identify physiological markers that indicate the subject's risk for CVD, improving the clinical utility of this measurement.

Visual Brand Identity on Pinterest

Haley Vann, CURO Research Assistant
Dr. Jhih-Syuan Lin, Grady College of Journalism & Mass Communication

In response to the growing popularity of Pinterest among consumers, global brands have expanded their marketing efforts into the visual wonderland, aiming to build visual brand identity and create a deeper engagement with their consumers. Pinterest is considered an essential social media outlet because consumers on Pinterest are actively seeking and including brands in their possible selves and selecting brands that appear to advance their evolving taste regimes. Considering this, the current research project aims to explore global brands' visual brand identity presentations on Pinterest. As the literature suggests, brand identity is a unique set of associations that a brand aspires to create or maintain. It is the holistic look, feel and style of a brand. The essentials of a brand's visual brand identity include its logo, shapes, colors, typography, location, character and styles. These elements must be cohesive across all platforms to unify the brand and should correlate with the brand's identity so that it emphasizes the brand's core values and philosophies. In order to answer our overarching research question—does brand identity helps facilitate the development of consumer-brand relationships? — we first develop a comprehensive conceptual framework of visual brand identity based upon literature on visual representations in advertising. We then collect data from top 100 global brands' Pinterest official accounts and conduct a content analysis. Specifically, we systematically code samples into categories that deal with brand, board, pin and image level. It is our belief that this research project will provide important insights into visual brand identity development and image-based content strategies useful to advertisers and marketers.

Gender as a Moderator of Work-Family Conflict Coping Strategies

Juhi Varshney, CURO Research Assistant
Dr. Malissa Clark, Psychology, Franklin College of Arts & Sciences

Work-family conflict is pervasive among both men and women (e.g., Gutek et al., 1991). Accordingly, the use of coping strategies in alleviating this conflict has been well documented (e.g., Clark et al., 2014). Prior research shows that gender may affect an individual's work-family conflict (e.g., Gutek et al., 1991), but little research has examined how gender influences the type and the frequency of coping strategies that individuals use. The purpose of this study is to explore the role gender plays in coping with work-family conflict, by specifically examining gender differences in the use of coping strategies. Furthermore, it examines gender as a moderator in the relationship between coping strategies and work-family conflict, as well as whether gender influences the relative importance of these coping strategies. This study collected data from 301 individuals who worked at least 35 hours per week. Multiple regression results showed gender differences

in the use of several coping strategies, with women using certain coping strategies more than men. Specifically, gender moderated the relationship between the coping strategy of exercise and work-family conflict, and the relationship between exercise and burnout. These strategies appeared to be more beneficial for women compared to men. However, relative importance analyses indicated that the relative importance of the coping strategies in relation to work-family conflict did not vary by gender. This research helps advance our understanding of the relationship between gender and work-family conflict coping strategies and has the potential to help men and women better cope with work-family conflict.

Analysis of Heparan Sulfate Fragments by NMR Spectroscopy

Rachel Vecchione
Dr. James Prestegard, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences

Heparan sulfate (HS) is a glycosaminoglycan (GAG) composed of repeating dissacharide units of glucuronic acid (GlcA) or iduronic acid (IdoA) and N-acetylglucosamine. These sugar (or glycan) reisdues are attached through an α1-4 glycosidic linkage from GlcNAc to the uronic acid and a b1-4 linkage from the uronic acid to the next GlcNAc. Sulfation can occur at the 2 position on the uronic acid, the 4 position on the N-acetylglucosamine and the N position on the N-acetylglucosamine. Heparan sulfate is attached to proteoglycans like glypican in the extra cellular matrix of cells where it has an important role in cell to cell interactions. Understanding how heparan sulfate binds to its substrates may increase the ability of pharmaceutical science to capitalize on the regulatory function of heparan sulfate and manipulate it to control certain interactions that may have an effect on biological processes which cause disease. To begin my studies, heparan sulfate was isolated from 15N labeled glypican through digestion with Heparinase II. The oligosaccharides produced from the digestion were separated using size-exclusion chromatography. The fractions (from the size-exclusion column) were then checked for UV absorbance at wavelengths of 194nm, 203nm and 214nm. The fractions showing high absorbance were consolidated and characterized using NMR spectroscopy. 15N is an NMR active nucleus normally found at a very low natural abundance. An ability to isolate HS fragments enriched in this isotope facilitates future observation of HS interactions in biological systems.

The Mini-FLOTAC: An Analysis of a Novel Fecal Egg Counting Technique

Emily Vermillion, CURO Honors Scholar
Dr. Ray Kaplan, Infectious Diseases, College of Veterinary Medicine

Measuring the numbers of worm eggs per gram of feces is important for estimating levels of parasite infections and for assessing anthelmintic drug efficacy. There are several different methods for performing fecal egg counts (FEC), with each having certain advantages and disadvantages. The Mini-FLOTAC is a recently developed novel device used to perform FECs that is designed for both ease of use and higher sensitivity than the commonly used McMaster FEC technique. There are two primary goals of this study: (1) to assess the accuracy, precision, and sensitivity of the Mini-FLOTAC compared to the two other most commonly used FEC techniques, the modified McMaster and the modified Wisconsin; and (2) to assess the overall ease of use and efficiency of the device. To assess the precision and accuracy of the three methods, a simulated fecal egg count reduction test was performed using fecal samples from horses, cattle, and goats. Overall ease of use was assessed by evaluating the ability to see the eggs under the microscope with clarity, and measuring the

amount of time needed to perform the three different methods. Though Mini-FLOTAC is designed for ease of use, we found a decreased sample clarity with the mini-FLOTAC causing an increase in the time required to count the eggs. This was especially a problem when analyzing feces from goats. Experiments investigating the accuracy, precision, and sensitivity are still in progress.

The Influence of Appeal on Overconsumption

Kelsie Walker
Dr. Michelle vanDellen, Psychology, Franklin College of Arts & Sciences

Overconsumption is a form of low self-control; we aimed to discover what factors might predict this behavior. To analyze this question, we asked participants to eat a sample of four types of cookies (sugar, chocolate chip, mint chocolate, and pumpkins spice). They were told that while they needed to eat at least some of each cookie, they were welcome to eat as much as they would like. Each participant was given a plate with 24 cookies (6 of each type). We manipulated the appeal of the cookies by heightening the cookies' aroma and freshness. We did this by randomly splitting the participants into one of two conditions. In the baking condition, experimenters freshly prepared cookies using a portable oven in the same room as the participants completed all study tasks. In the non-baking condition participants tasted day-old cookies. Once the participants were brought to the study room, they completed a questionnaire while they ate the cookies. The questions asked the participants about their current mood, their feelings toward the cookies, how many cookies they felt they should eat, and demographics. A *t* test revealed that overconsumption was higher on the baking versus non-baking days. The results indicate that while appeal does not cause overconsumption, it does have a positive effect on enhancing overconsumption. Implications for reducing overconsumption will be discussed.

The Prevalence of Hemoparasites in Seabird Populations on Middleton Island, Alaska

Morgan Walker, CURO Research Assistant, CURO Graduation Distinction
Dr. Michael Yabsley, Warnell School of Forestry & Natural Resources

In recent years, the nesting seabirds of Middleton Island, Alaska have experienced severe population declines. Since blood parasites have previously been shown to negatively impact the survival and reproductive success of their avian hosts, hemoparasitism may be a factor contributing to these population declines. The purpose of this research was to determine the prevalence of hemosporidian parasites in the seabird community of Middleton Island, with an emphasis on the relative prevalence of parasites of the three genera *Plasmodium*, *Haemoproteus*, and *Leucocytozoon*. From June to August 2014, we collected 290 blood samples from adult Black-legged Kittiwakes, Pelagic Cormorants, Rhinoceros Auklets, Common Murres, and Tufted Puffins. Presence–absence and parasitemia values of hemoparasites were determined through microscopic evaluation of peripheral blood smears. Of the 70 Black-legged Kittiwake and 50 Pelagic Cormorant smears analyzed thus far, no hemoparasites have been identified. The absence of hematozoa in seabirds is unusual, but not unprecedented. There could be several explanations for this absence, including the displacement of potential dipteran vectors by ectoparasites, low hemoparasite prevalence in the area, or protective immunity of the hosts. Since blood smear analysis is presently ongoing, a pattern may still emerge that could provide more explanation into the apparent lack of hemoparasites in the Middleton Island seabird community.

Using Artificial Neural Networks to Predict Solar Radiation in Georgia

Emily Wall, CURO Research Assistant
Dr. Walter Potter, Computer Science, Franklin College of Arts & Sciences

The Georgia Power Advanced Solar Initiative set a target for Georgia Power to obtain 210 megawatts of contracted solar capacity within two years. We implemented an Artificial Neural Network (ANN) on behalf of Georgia Power to predict solar radiation at various locations across the state. We utilized weather data collected from the Georgia Automated Environmental Monitoring Network (AEMN) including temperature, humidity, wind speed, and past values of solar radiation. We then analyzed the prediction error produced from various combinations of input fields in order to produce the most accurate predictions and optimize the performance of our model. We found that input fields day, time, and previous values of solar radiation were the most significant in predicting solar radiation. We ultimately obtained a model with mean-squared error (MSE) of 0.004382. The resulting model will be used to make decisions regarding the optimal placement of solar collection facilities in order to reach the goal of 210 megawatts of contracted solar capacity.

High-Fat Diet Consumption and Behavioral Dysfunction: What Are the Roles of Maternal vs. Post-Weaning High-Fat Intakes?

Matthew Weber
Saritha Krishna, Graduate Student
Dr. Nick Filipov, Physiology & Pharmacology, College of Veterinary Medicine
Dr. Donald Harn, Infectious Diseases, College of Veterinary Medicine
Dr. Claire de La Serre, Foods & Nutrition, College of Family & Consumer Sciences

Obesity, caused in part by high-fat diet consumption, is a major public health concern associated with metabolic and neurological dysregulations. Obesity is growing rapidly amongst the youth. Since children may be affected by the maternal and/or their own diet, we conducted a study where female mice were fed low-fat (LFD) or high-fat (HFD) diets beginning six weeks prior to conception through weaning (postnatal day [PND] 21). To determine pre- vs. post-weaning dietary effects, pups were gender-separated and weaned onto a LFD or HFD. The offspring then went through a series of behavioral tests beginning on PND70. In a forced swim test we found that males with post-weaning HFD swam significantly more, suggesting increased anxiety; only female mice on HFD both pre and post-weaning exhibited a trend towards increased swimming. Additionally, novel object recognition test was used to assess recognition memory. Females that were on HFD pre or post-weaning, but not both, did not show novel object preference. The preference for the novel object in all dietary treatments was not affected in the male offspring, suggesting a gender-specific offspring susceptibility to HFD. In a marble burying test another gender-bias arose. Males on HFD post-weaning exhibited higher burying activity. In contrast, the pre-weaning HFD significantly increased the marble burying by female offspring. While still under analysis, some thought-provoking relationships are emerging from these data. When it comes to anxiety-like behavioral aberrations, maternal diet may be of greater importance to female offspring whereas the postnatal diet may be more important for males.

Molecular and Genetic Analysis of the Ab10 Meiotic Drive Haplotype in Maize and Teosinte

Amy Webster, CURO Graduation Distinction
Dr. Kelly Dawe, Genetics, Franklin College of Arts & Sciences

In *Zea mays*, abnormal chromosome 10 (Ab10) exhibits meiotic drive by segregating into 65-80% of progeny instead of the Mendelian 50%. Ab10 differs significantly from normal chromosome 10 (N10) primarily due to the presence of a distal tip of unknown origin and heterochromatic regions called knobs. Three haplotype variants of Ab10 have been found across subspecies of *Zea mays* called teosinte, the wild progenitor of domesticated maize. They are denoted types I, II, and III and vary in knob content, but all exhibit meiotic drive in maize. The three main goals of this study were to determine genes that could be important for causing meiotic drive, to analyze Ab10 variants in teosinte, and to show that Ab10 exhibits meiotic drive in teosinte. To do this, I first utilized gene conservation principles and expression level analyses to determine three genes that may be important for causing meiotic drive to occur. One of these, a kinesin, is of particular interest and studies of this gene are ongoing. To analyze Ab10 in teosinte subspecies, I first identified plants positive for Ab10 in four teosinte subspecies. I then followed up with one of these, *Zea mays parviglumis*, and used fluorescent *in situ* hybridization (FISH) to identify Ab10 type II in this plant. Then, since Ab10 has only been shown to exhibit meiotic drive in maize and not teosinte, I showed that meiotic drive occurs in *Zea mays parviglumis*.

Does Georgia's Voter Identification Law Disproportionately Affect African American Voter Turnout in Georgia?

Hannah Weiss
Dr. Anthony Madonna, Political Science, School of Public & International Affairs

There is presently a great deal of controversy surrounding voter identification laws throughout the United States. These laws require voters to present some form of identification at a polling place in order to vote. Opponents point to a disproportionate negative impact on voter turnout among minorities, and liken these laws to Jim Crow-era disenfranchisement tactics. Supporters cite examples of voter fraud to justify their necessity. Claims that minority voters are disproportionately affected by voter identification laws may have serious implications for the integrity of the political process in the United States. I expected my study, however, to find that Georgia's voter ID law has inconsequential disproportionate effects on minority voters. I examine the current state of voter identification laws throughout the nation and then turn specifically to Georgia and its voter ID law for a more comprehensive study. Georgia is an appropriate case to study due to its 'strict' voter ID law, the Secretary of State's compilation of turnout data based on race in Georgia, and Georgia's sizable minority population, which should make the results of the study generalizable to other states. Georgia's voter ID law was implemented in 2007, so the study examines white and African American voter turnout in the 2004, 2008, and 2012 presidential elections as well as the 2006 and 2010 midterm elections in order to examine the impact of the implementation of the voter ID law on African American voter turnout relative to white voter turnout in Georgia.

Antioxidant Potential of Anthocyanins in Micronized Tart Cherry Puree

Maddison Wenzel, CURO Research Assistant
Dr. Rakesh Singh, Food Science & Technology, College of Agricultural & Environmental Sciences

Antioxidants are defined as substances that prevent destructive chemical reactions involving the combination of oxygen and other materials in many processes foods. These substances help reduce free radicals, or by-products, that can lead to heart disease, diabetes and cancer. Fruits and vegetables are known to have a high content of antioxidant potential and when they are processed their

phytochemical and nutrient content is generally improved (Ou, 2012). Tart cherries are known to possess different chemical compounds that aid in increasing the overall biotic activities they perform. As far as concerns cherry anthocyanins, studies have demonstrated that they are able to reduce proliferation of human colon cancer cells in culture (Ferretti, 2010). Tart cherry products also possess *in vitro* anti-inflammatory activity and antioxidant capacity against diverse forms of oxidative and nitrosative stress (Ou, 2012). Based on theories such as this, the purpose of this study is to understand the different antioxidant potentials associated with tart cherry puree in relation to particle size. The overall experimental nature of this study was to evaluate the overall color, viscosity and total phenolic content. While comparatively testing the original sample in relation to the micronized sample to determine overall antioxidant potential changes. This information was recorded and analyzed to determine the following applicable results.

Identifying Leadership Qualities of Classroom Teachers for the Purpose of Guiding Pre-Service Teachers

Jane Whatley, CURO Research Assistant
Dr. Amy Heath, Language & Literacy Education, College of Education

In the education system, leadership roles were traditionally considered part of the administrative level, despite a disconnect between the policy and decision makers and the ones most effected – students. However, research has begun to change its focus on teacher leadership by examining how it pertains to those individuals communicating daily with learners – classroom teachers (Boyd-Dimock & McGree, 1995). Research has been used to collaboratively determine definitions and qualifications of a "teacher leader," but the findings do not communicate which specific leadership qualities those leaders possess. Therefore, the overall goal of this study was to identify which common *leadership qualities* are considered most important to teaching instruction in high school English Language Arts (ELA) classrooms. The research method consisted of a five-question electronic survey that asked current ELA certified educators about the leadership qualities they considered most valuable to teaching, the challenges that follow implementation of those qualities, and their professional experiences regarding teacher leadership. Collected data was analyzed by comparing individual selections of leadership qualities and challenges with years of teaching experience and the presence of any official or unofficial teacher leadership positions. A correlation between amount of teaching experience and preferred leadership qualities was expected, as well as a correlation between a presence of official or unofficial leadership positions and preferred leadership qualities. The data gathered from these surveys provided a better understanding of which leadership qualities allow teachers to be most successful in the school environment. Research findings will be presented to the UGA community to educate future educators about developing important leadership qualities in the classroom.

The Enigmatic Country: Analysis of Russian Expansionism in the Modern Age

Patrick Wheat, CURO Research Assistant, CURO Graduation Distinction
Dr. Sara Kutchesfahani, International Affairs, School of Public & International Affairs

Since the fall of the Soviet Union, the Russian Federation has held the international community in a state of almost constant confusion, with the Russian government's actions growing increasingly aggressive towards her neighbor nations over the past several years. A marked change that differentiates this growth from pervious Russian government actions towards their neighbors is an increased tendency to use

military force in engagements with their neighbor nations. To assist with international understanding of the indication factors which make a state more likely to be a target of Russian expansionism, analysis of past actions involving Russia and her neighbors were used to anticipate the key circumstances in which Russia is more or less likely to commit to military expansionism. After analysis of the case studies of Russia's individual relationship with the Republic of Georgia, the Republic of Poland and the Republic of Estonia, the primary indicators towards aggressive action by Russia are the existence of a Russian ethnic minority that claims to be oppressed and an active presence of Russia as an energy provider to that nation. The absence of one or both of these factors markedly reduces the likelihood of Russian expansionism in that country, giving a strong analysis towards the potential indicators of Russian aggression towards her neighbor states in the future.

The Relationship between CH, CO, and Dust in MBM 12

James White, CURO Research Assistant
Dr. Loris Magnani, Physics & Astronomy, Franklin College of Arts & Sciences

The high-latitude molecular cloud, MBM12, is a small, opaque, interstellar cloud below the Galactic plane, which harbors a small association of newly-formed stars. As one of the only high-latitude clouds that are currently forming stars, it is important to characterize its molecular gas and dust properties. We present for the first time a map of the 3.3 GHz emission line from the CH molecule. This molecular species is an excellent tracer of the low-density molecular gas in the cloud. We compare the CH emission to existing infrared maps of MBM 12, which trace the dust distribution. In this way, a comparison of the gas-to-dust ratio between MBM 12 and other small molecular clouds can be made. In addition, a comparison of the CH emission is made with the J=1-0 emission line of the CO molecule. We find that the correlation between CH and dust is excellent, while the correlation between CH and CO is not as robust. Our findings establish that MBM 12 has a lower gas-to-dust ratio than comparable, non-star forming interstellar clouds

An Examination of Two Different Instructional Approaches for Teaching Preservice Teachers Common Phoneme-Grapheme Relations

Jessy Whitenton, CURO Research Assistant
Dr. Kristin Sayeski, Communication Sciences & Special Education, College of Education

Matching phonemes (letter sounds) to graphemes (letters) is an important aspect of the alphabetic principle. Preservice teachers are typically not prepared in how to correctly produce letter sounds (Gormley & Ruhl, 2007). Lack of skill in the production of letter sounds makes it difficult for teachers to (a) identify student errors and (b) serve as a model for students when teaching beginning reading. The purpose of the study is to examine the effects of massed versus distributed practice on teacher candidates' (n = 49) learning of letter sounds. Specifically, the study will explore the concept of mastery learning posited by Benjamin Bloom (Bloom, 1971, 1976). Bloom's theory of learning was based upon the belief that all students can make learning gains when provided with the *necessary time* and *appropriate learning conditions*. Although the principle of mastery learning is not new and has been echoed in the recommendations of other instructional scholars (see Bransford, Brown, & Cocking, 2000; Rosenshine & Stephens, 1986), very few applications of this principle exist in teacher education. To establish appropriate learning conditions, the constant time delay in conjunction with electronic flashcards will be used for instruction. Specific research questions to be answered are: 1) Are there differences in learning outcomes associated with massed versus distributed practice for

teacher candidates learning concepts associated with the alphabetic principle and the correct pronunciation of phoneme-grapheme pairs in isolation? 2) Do conditions for learning, specifically, massed versus distributed practice, result in differences in maintenance of knowledge and skills? For the study, participants (n = 28) in the distributed condition will receive initial instruction (1.5 hours) plus weekly practice sessions (20 min in duration) over a period of 4 weeks for a total of 2.5 hours of instruction. Participants (n = 21) in the massed practice condition will receive a total of 2.5 hours in one session. Pretest, posttest, and maintenance data will be collected.

Quantifying Replicating and Latent CFPHV in Symptomatic and Asymptomatic Infected Turtles

Jordyn Whitfield, CURO Research Assistant
Annie Page-Karjian, Graduate Student
Dr. Nicole Gottdenker, Pathology, College of Veterinary Medicine

Fibropapillomatosis (FP) is a panzootic, neoplastic disease of marine turtles that is associated with an alphaherpesvirus called chelonid fibropapillomatosis-associated herpes virus (CFPHV). An open reading frame with sequence similarity to a latency-associated nuclear antigen (LANA) gene of Kaposi's sarcoma-associated herpesvirus was recently identified within the CFPHV genome. Here, we use necropsy findings and quantitative PCR (qPCR) data to identify and compare the presence, location, and quantities of CFPHV LANA (F-LANA) and DNA polymerase (*pol*) gene sequences in samples that were aseptically collected from 10 green turtle (*Chelonia mydas*) carcasses from Florida (5 with FP, 5 FP-free). Using genomic DNA extracted from 109 (current sample number) biological samples of various types including FP tumors, normal skin, heart, thymus, lungs, kidneys, spleen, liver, urinary bladder, blood, urine, and neurological tissues, including brain and spinal, optic, and peripheral nerves, quantities of each gene target will be evaluated via qPCR to determine whether certain tissue types are associated with relatively higher quantities of *pol* or F-LANA in symptomatic and asymptomatic green turtles. The DNA assay is ongoing; however, we expect to find a correlation between certain tissue types and stage of CFPHV infection (tumored versus infected turtles without tumors) as displayed by relative concentrations of *pol* versus F-LANA in each type. The results from this study are expected to provide valuable insight regarding the CFPHV life cycle including replication, viral loads and cell type infected, and potential sites of latency in turtles with and without FP tumors.

Influence of Maternal Diet on the Offspring Gut Microbiota

Brittany Whitlock, CURO Research Assistant
Dr. Claire de La Serre, Foods & Nutrition, College of Family & Consumer Sciences

An obesity epidemic currently plagues the U.S. and other western nations, threatening the health of millions across the globe. Research efforts over the last decade have pointed towards the gastrointestinal (GI) microflora having a potential role in the development and persistence of obesity and other metabolic disorders. The following study focuses on the inheritance of obesity from mother to child, and asks whether the inheritance of unhealthy GI microbiota could be the vehicle that increases offspring propensity towards metabolic disease. Female C57BL/6 mice were fed either high-fat (HF) or control low-fat (LF) diets for 6 weeks prior to mating and remained on their respective diets throughout pregnancy and lactation. Pups were weaned onto a control LF diet. Microbiota composition and gastrointestinal (GI) health were determined at different time points. This study focuses on the health of pups at post-natal date (PND) 21, who were weaning off of their mother's

milk. It was found that, at weaning, offspring of HF fed, obese dams displayed significant alterations in gut microbiota composition associated with impaired GI epithelial permeability. This microbial profile has previously been associated with obesity and could increase their propensity toward metabolic disorder later in life.

Reviving Our Roots: Reconnecting Teens to Agriculture

Elizabeth Wilkes, Foundation Fellow
Dr. Susannah Chapman, Anthropology, Franklin College of Arts & Sciences

The American farmer is growing older, the American agricultural system is unsustainable, and the American teenager is not interested in farming. The Green Revolution has led to increasingly industrialized and consolidated farms, leaving farmers and consumers starkly disconnected. A new generation of farmers is the key to building a sustainable food system in today's agricultural environment. While the latest Farm Bill promises to invest millions of dollars in beginning farmers, it fails to consider who and from where these new farmers are likely to come. High school students - the majority of whom live in urbanized areas - grow up with no cultural attachment to farming and are agriculturally illiterate. Following a literature review and discussions with community stakeholders, I propose that high schools at the rural-urban interface should implement farmer development programs to address the lack of new farmers. The rural-urban interface (RUI) presents a confluence of ideas, people, and spaces, which offers an opportunity to reimagine farming landscapes. Studies suggest that developing policy to support agriculture at the RUI is warranted, and the "metropolitan farmer" is a growing reality. Farmer development programs can restore intergenerational relationships, encourage transfer of knowledge, and foster more sustainable forms of agriculture, in addition to providing practical skills to teenagers who face an increasingly competitive job market. A model Young Urban Farmer development program in Athens, GA, demonstrates this potential. Further research, evaluation, and engagement should reveal additional insight and inform the creation of pilot programs and related policies in Athens and beyond.

Development of a Chimeric Chick Neural Tube Injury Model incorporating 3D, mESC-Derived Neural Aggregates

Elizabeth Wilkins, CURO Honors Scholar
Catherine Callaway, Foundation Fellow
Dr. Steven Stice, Animal & Dairy Science, College of Agricultural & Environmental Sciences

Due to low cost, availability, and *ex utero* development, the chicken embryo serves as the oldest vertebrate developmental model. During development, the primitive spinal cord, termed the neural tube, is patterned caudally by retinoid signaling, and ventrally by a gradient of Sonic Hedgehog (Shh), yielding five specific progenitor domains. The pMN domain gives rise to motor neurons (MN), which synapse on muscles. The other domains yield interneurons, which compose the premotor control circuit. This neural network is cumulatively responsible for controlling all muscle actuation.We generated three-dimensional aggregates of mouse embryonic stem cells (mESC) from a cell line expressing a green fluorescent protein behind a MN-specific promoter. The aggregates were patterned with retinoic acid and a Shh pathway agonist to mimic organotypic ventral neural tube development. The line also expresses channel rhodopsin-2, a light-gated cation channel, which triggers depolarization in neurons when exposed to blue light. We hypothesize that embryos will survive 72 hours post-injection, and that the aggregates, including optically active motor neurons, will integrate into the injured spinal cord. A portion of the neural tube of developing

chicks was removed *in ovo*, followed by microinjection of neural aggregates. After three days, embryos were inspected for survival and integration. Ultimately, we expect a light stimulus to MN will result in a visible motor response within the embryo. As seen in paralytic injuries, adult spinal tissue has limited regenerative properties, making cell replacement an attractive therapy. Here we provide the first steps towards making that a reality.

Physical Activity Effects on Social Physique Anxiety

John Williams, CURO Research Assistant
Dr. Ellen Evans, Kinesiology, College of Education

Social physique anxiety (SPA) is anxiousness and concern with the evaluation of an individual's own physique by others. Relationships have been seen between SPA and physical activity (PA). A negative correlation has been seen between SPA and CDC PA guideline fulfillments. This study measured pre and post SPA levels with the Social Physique Anxiety Scale 12 item questionnaire. Each participant engaged in a 6-week moderate aerobic or high intensity interval training exercise regiment. The primary aim of this study is to examine a possible reduction of SPA with exercise. This study's hypothesis is exercise will reduce SPA notably in a sample of overweight, college-aged females who were previously sedentary. This study will help educate individuals about how physical activity could positively impact their lives, specifically with regards to social physique anxiety.

Simultaneous Vibration Isolation and Energy Harvesting

Nolan Williamson, CURO Research Assistant
Dr. Benjamin Davis, College of Engineering

Vibration isolators are employed in a wide variety of everyday applications to minimize the force or motion transmitted to a device from a known source of vibration. Recently, researchers have studied vibration isolators that use buckled beams in place of traditional linear springs. A buckled beam exhibits nonlinear stiffness characteristics, a property which is valuable in vibration isolation as it allows for a wider range of isolation frequencies with less static displacement of the test mass. For this experiment, a prototype isolator was fabricated and tested to determine its performance characteristics. Then, piezoelectric patches were added to the buckled beams to allow useful electric power to be harvested from the otherwise wasted vibrational energy of the buckled beams. Performance with respect to vibration isolation and energy harvesting is investigated experimentally by measuring the power produced by the piezoelectric elements and the transmissibility between the applied vibration and the motion of the test mass. This device could be used in a number of applications, as it would allow for the protection of sensitive devices from harmful vibration, while also generating useful electric that can be used to power other equipment.

Characterization of the Inositol Hexakisphosphate Kinase (IP6K) of *Trypanosoma brucei*

Brian Windle
Ciro Cordeiro, Graduate Student
Dr. Roberto Docampo, Cellular Biology, Franklin College of Arts & Sciences

Trypanosoma brucei causes human African trypanosomiasis (HAT), one of the most neglected diseases in the world. The parasite alters its morphology between an insect and mammalian host and different functional stages. The adaptation to these diverse environments requires rapid changes and the involvement of signaling pathways. We are currently studying a signaling pathway that results in the synthesis of inositol pyrophosphates (InsPPs). InsPPs are present

in all eukaryotes studied and have a variety of functions. The first enzyme involved in their synthesis is the inositol hexakisphosphate kinase (IP6K) that converts inositol hexakisphosphate (IP_6) into diphosphoinositol pentakisphosphate (5PP-IP_5, or IP_7), which has a PP_i group at carbon 5. In this work the *T. brucei* IP_6K was cloned, sequenced, and expressed in *Escherichia coli*. For kinetic studies we measured ATP consumption using a Kinase-Glo Max luminescence kit. Furthermore, $TbIP_6K$ reaction products were identified by electrophoresis in 35% polyacrylamide gels. We determined that the optimal pH for protein function was between pH 6.5 and 7.0. We confirmed that $TbIP_6K$ transfers a phosphate from ATP to inositol hexakisphosphate (IP_6) to form IP_7 and ADP. $TbIP_6K$ also has a phosphatase activity, transferring a phosphate from IP_6 to ADP to form ATP and inositol IP_5. Characterizing this pathway not only will provide a better understanding of trypanosoma biology but of the biology of other eukaryotes.

Nutrient Relations of a Sexually Dimorphic Plant Species

Mavis Wolf, CURO Research Assistant
Dr. Shu-Mei Chang, Plant Biology, Franklin College of Arts & Sciences

Geranium maculatum is a perennial herbaceous understory plant that grows along the Eastern side of North America; ranging from Ontario, Canada to Alabama and west to Missouri. *G. maculatum* is a gynodioecious species with female plants coexisting with their hermaphroditic conspecific individuals in some populations. In these gynodioecious populations, the establishment of females in a population of hermaphrodites has been suggested to depend on the habitat and the phenotypic plasticity of sex allocation in the hermaphrodites. Though reports show that abiotic environmental conditions such as soil moisture and precipitation are critical for explaining the lability in hermaphrodite phenotype and success of female reproduction, the effect of environmental nutrient limitation on sex distribution of gynodioecious species remains unclear. In this experiment, we seek to experimentally determine the optimal nitrogen:phosphorus (N:P) ratio for *G. maculatum* by administering nutrient treatments of varying N:P ratios to individuals over a growing season of three months. We will measure vegetative growth rate, reproductive output, and tissue nutrient content during the growing season. Using these data, we will be able to generate the baseline information regarding plant's interaction with their local soil nutrient levels. By comparing such baseline data and those we obtained from natural populations, we aim to achieve the following goals: (1) to better understand how sex distribution of *G. maculatum* in the wild might be related to their abiotic environments in their natural habitat and (2) to identify how and whether levels of nitrogen and phosphorus are limiting to growth for this native plant.

Investigating Interest in Ingesting Insects

Audrey Wright, CURO Research Assistant, CURO Graduation Distinction
Dr. Marianne Shockley, Entomology, College of Agricultural & Environmental Sciences

With a human population projected to reach nearly 10 billion people by 2050, current food production will need to double in order to sustain our species. Because expansion of existing agricultural land is neither likely nor realistically feasible, current farming practices must be reevaluated. Increasing livestock production, though seemingly necessary to supply enough edible protein to the world's population, will also exponentially increase already-high greenhouse gas emissions and exacerbate climate change. A more sustainable solution exists. Since invertebrates make up a majority of the biomass on the Earth, insects—the largest subgroup of

invertebrates—provide the most encouraging and sustainable solution for providing protein to a growing population. While some cultures have been eating insects for ages, a popular taboo exists in the Westernized world that condemns this practice. This study examined the effects of education and exposure on the attitudes towards insects and willingness to consume them as food. We surveyed 50 college students before and after five weeks of entomology and entomophagy education and consistent contact with live insect specimens. Our study supports the notion that increased education and exposure not only increases positivity towards insects, but also the inclination to consume them as food.

The Severity of Cases Admitted into a Small Animal Hospital and the Phase of the Full Moon

Alyssa Wuellner
Dr. Erik Hofmeister, Small Animal Medicine & Surgery, College of Veterinary Medicine

A correlation between the moon phases and human/animal behavior has long been a belief among people. Previous studies have suggested an increase in the number of cases seen or admitted into small animal hospitals during a full moon. However, other studies have shown no significant effect of the full moon. All previous studies have looked only at numbers of cases, not severity of cases. The purpose of this study was to determine if the severity of the cases (as determined by the cost and duration of treatment) admitted into a small animal hospital is correlated with the phase of the full moon. The hypothesis was that there is no correlation between the full moon phase and the severity of cases admitted into a small animal hospital. All data were obtained from the University of Georgia Veterinary Hospital's Medical Records. Cases were admitted to the hospital between 2009 and 2014. A full moon was defined as the date of the occurrence of the actual full moon plus and minus one day. Variables collected included cost of treatment and duration of stay in the hospital. A total of 82,455 cases were analyzed with approximately 9,935 being on dates classified as full moons. Of the cases analyzed so far, the cost of treatment is 17.9% higher on dates of the full moon versus dates of non-full moons, and the duration of hospitalization is 19.7% higher on dates of the full moon versus dates of non-full moons.

Prevalence of Pain in Dogs with Cancer

Alyssa Wuellner, Kayla Hargrove
Dr. Erik Hofmeister, Small Animal Medicine & Surgery, College of Veterinary Medicine

Cancer is painful in people, but the effect of cancer on pain in dogs is unknown. Knowing the prevalence of pain in dogs with cancer could help us to prevent and treat the pain. The purpose of this study was to determine the prevalence of pain in dogs diagnosed with cancer. The hypothesis was that dogs with cancer will have a substantial prevalence of clinically significant pain. Dogs that have been diagnosed with cancer that have no interfering pre-existing medical conditions presenting to the University of Georgia's Veterinary Teaching Hospital were considered for inclusion. After client consent was obtained, data on age, breed, type of cancer the patient has, length of time since diagnosis, and treatments the patient is receiving were recorded. Clients were presented with a survey asking about behavioral traits and the client's impression of their pet's pain level. Pain scoring was done by one of two researchers using a ranking system of either none, mild, moderate, severe, very severe, or worst possible. The average pain level reported on the cases was a level of "none", with no instances of the pain being reported as "severe", "very severe", or "worst possible." Dogs with cancer seem to have a lower prevalence of clinically significant pain than people.

Effects of Bisphenol A on Macrophages when Controlled with Genistein

Shibo Xu
Dr. Tai Guo, Anatomy & Radiology, College of Veterinary Medicine

Bisphenol A (BPA) is a convenient and affordable compound that is used to make clear plastics and epoxy resins, and is therefore used in a mass array of products. However, there have been numerous reports citing its adverse endocrine-disrupting effects on the human body, most relating to immune dysregulation. The objective of this study was to determine the effects of BPA on macrophages, which play a critical role in various diseases including diabetes and autism, by studying its interaction with the isoflavone genistein (GEN), a phytoestrogen found at high levels in soy products that possess many beneficial properties. It is hypothesized that GEN can reduce the detrimental effects of BPA on macrophages. In this study, PMA (phorbol 12-myristate 13-acetate; 10 nM) differentiated U937 macrophages, a widely used cell line for primary human macrophages, were exposed to different concentrations of BPA (0, 0.1, 1, and 10 μM) ± GEN (0,1, and 10 μM) and incubated over a period of 24 and 96 hours. Proliferation was then determined using Alamar blue dye. BPA at 1 and 10 μM significantly suppressed the proliferation of macrophages following 96 hour of exposure, which could be attenuated by GEN at 1 and 10 μM with more effects observed at 10 μM. The proliferation of macrophages was not significantly affected by BPA at 24 h, while it was increased by GEN at 10 μM. Taken together, the results indicate that GEN can attenuate the inhibitory effect of BPA on macrophage proliferation in a long-term cell culture.

Influence of Genetic Background on Anthocyanin-Mediated Antioxidant Mechanisms

Sarah Yoo, CURO Research Assistant
Dr. Robert Pazdro, Foods & Nutrition, College of Family & Consumer Sciences

Glutathione (GSH) is an important cellular antioxidant that mitigates the harmful effects of oxidative stress in diseases such as diabetes. A recent 2014 study by Zhou, et al., identified novel candidate genes that regulate GSH, but the effects of diet on this process remain unclear. Anthocyanins, a class of pigments found in plant tissues, demonstrate many potential health benefits, including protection against oxidative stress. The anthocyanin cyanidin-3-0-beta-glucoside (C3G) stimulates synthesis of GSH, which ultimately reduces oxidative stress (Zhu et al., 2011). We predict that genetic background regulates GSH responses to C3G, and we also hypothesize that C3G-induced GSH synthesis is tissue-specific. To test our hypotheses, mice representing five genetically-diverse mouse strains (A/J, 129s1/SvlmJ, CAST/EiJ, C57BL/6J, and NOD/ShiLtJ) will be fed either a control or high-C3G (100 mg/kg C3G) diet. After six weeks, on their respective diets, mice will be euthanized and several tissues will be harvested, including liver, kidney, and heart; GSH will be quantified in these tissues. This study will serve as the foundation for future efforts to identify candidate genes that determine C3G-mediated antioxidant mechanisms.

The Effect of Anesthetic Variables on Patient Outcome

Courtni Young, CURO Honors Scholar
Dr. Erik Hofmeister, Small Animal Medicine & Surgery, College of Veterinary Medicine

Many patient variables may affect outcome during a medical procedure. Most of the variables examined in the past have been related to the patient's status before the procedure. Events which arise under anesthesia may have a predictive relationship with outcome. The purpose of this study was to compare the correlation between anesthetic

variables and outcome variables. The hypothesis was that the anesthetic variables would have a direct though not proportional correlation to the outcome variables. We defined anesthetic variables as the events that take place before and during anesthesia. Some variables collected included drugs administered, incidents of hypotension, body temperature nadir, and duration of anesthesia. The outcome variables included the time in hospital, the amount of time in the intensive care unit, and the overall financial cost of hospitalization. Data was collected through the records of current and previous patients admitted to the University of Georgia's Small Animal Teaching Hospital. Based on our results, among other things we have concluded that longer time under anesthesia tends to lead to greater chances of having either hypothermia or hyperthermia at some point during the operation, that breed has minimal influence over the amount of anesthesia needed, and that patients under anesthesia longer are more likely to need post operational oxygen after the operation.

Seeing Danger?: How Weapon Priming Changes Beliefs that the World is Threatening

Jacob Young
Dr. Michelle vanDellen, Psychology, Franklin College of Arts & Sciences

Previous research has investigated the effects of seeing weapons on aggressive behaviors but little research has investigated how weapons affect cognition. The purpose of this study was to determine if seeing handguns leads to an increase in how threatening people perceive the world to be. Participants in the study played a computer-based sorting game and were randomly assigned either to a game sorting pictures of handguns and tools or a game sorting pictures of sporting equipment and tools. The participants then reported how threatening they perceived the world to be. Additionally, they read several ambiguous social scenarios in which they rated how hostile a person's actions were and how hostile their response would be if they were in the scenario. Finally, participants completed a personality inventory and demographic information. Though we did not find that seeing handguns increased beliefs that the world is threatening overall, we did find an interaction between political beliefs and condition. Participants who were politically conservative viewed the world as less threatening when exposed to guns compared to when they were not exposed to guns. Participants who were politically liberal, however, viewed the world as being more threatening when they were exposed to guns than when they were not exposed to guns. The results suggest that liberals and conservatives may disagree about gun control in policy in part because they have different cognitive reactions to seeing guns.

Estuarine Flow Rates in Coastal Georgia

Kathryn Youngblood, CURO Research Assistant
Dr. Brock Woodson, College of Engineering

This research project involves identifying flow rates into and out of a small estuary on the Georgia Coast near the Skidaway Institute of Oceanography (SKIO) as part of a larger project to quantify nutrient fluxes and anthropogenic effects in the marshland. The student collaborated with her mentor to develop a sampling design and program the Acoustic Doppler current profiler (ADCP), and then traveled with her mentor to Skidaway to execute a field deployment of the instrument at the mouth of Grove's Creek with members of SKIO faculty. After retrieval of the instrument in two weeks, the student will work with her mentor and use MATLAB to analyze the data for currents and turbulence of the water. They will work with a larger group at SKIO and contribute their findings to nutrient and oxygen data from Coastal Georgia.

Abstracts

The Effects of Preferred Listening on Anxiety, Nausea, and Claustrophobia of Cancer Patients during Radiation Treatment

Pomi Yun, CURO Research Assistant
Dr. Roy Kennedy, Hugh Hodgson School of Music

Purpose: The purpose of this study was to investigate the effects of cancer patients listening to their preferred music on claustrophobia, anxiety, and nausea during radiation treatments. Patients with head and/or neck cancer may experience claustrophobia as a result of having to wear a mask during their radiation treatments. *Method:* This quasi-experimental study included an experimental group who were exposed to music and a control group who were not exposed to music. The two groups were followed from their first treatment to their last day of radiation therapy. Data was collected via paper and pencil questionnaires for the dependent variables: anxiety, claustrophobia, and nausea. Since the treatment room was very small, the patients' preferred music was played on an Ipod connected to speakers through the application, Pandora, by the radiation therapist during each patient's treatments. *Results:* The results indicate that more than half of patients who listened to music during their radiation treatments showed lower levels of anxiety and claustrophobia than the control group. The researchers recorded qualitative comments that the patients made before and after treatments, which provided additional information concerning their experience. *Conclusion:* The results of this study may be of use to music therapy professionals that work with cancer patients undergoing radiation. In addition, no music therapy studies were found that specifically investigate the effects of patient preferred listening on the claustrophobia of cancer patients.

Multiple Muscle Stimulation to Enhance Health

Zoe Yurchuck, CURO Research Assistant
Rebecca Baltenberger
Dr. Kevin McCully, Kinesiology, College of Education

Introduction: Cardiovascular disease is the leading cause of death for patients with spinal cord injury (SCI) and other neurological diseases such as multiple sclerosis which can be attributed to the lack of physical activity. Neuromuscular electrical stimulation (NMES) could provide a cost-effective method of reducing the health risks associated with SCI and MS as it has been shown to increase skeletal muscle mass and improve mitochondrial capacity in these populations. *Methods:* Eight healthy individuals aged 19-21 completed a single 30 minute session of NMES. Electrical stimulation was applied to eight lower extremity muscles at a constant intensity during the protocol. Additionally, two participants also completed a second session which applied electrical stimulation at incremental increases of intensity to the same muscle groups throughout the duration of the protocol. Oxygen consumption, metabolic equivalents, ventilation, respiratory exchange ratio, heart rate, RPE, and pain were obtained during the duration of both protocols. *Results:* Oxygen consumption (VO2) and ventilation increased an average of 33% ($P<0.001$) during the 30 minutes session of NMES. Heart rate increased an average of 13% ($P=0.006$) and was highly variable. RER was inconsistent among subjects ($P=0.43$). *Conclusion:* Although an increase in oxygen consumption was observed during each session, the magnitude of the metabolic response was not enough to provide physiological benefits that could increase health. Therefore, future studies could use a treatment consisting of progressive intensities or different electrode placement in order to achieve the desired benefits while maintaining an acceptable level of comfort.

Time to Extinction in Deteriorating Environments

Katherine Zarada, CURO Research Assistant, CURO Graduation Distinction
Dr. John Drake, Odum School of Ecology

Theoretical models have failed to examine the effects of environmental deterioration on the distribution and delay of extinction times for populations despite the fact that environmental deterioration is currently a major threat to population persistence. We used computer models and simulations in the program R to show that the effects of deterioration on population dynamics affect both the changes in distribution and the delay between deterministic and realized extinction. We created three models to represent a decrease in birth rate, an increase in death rate, and a change in both rates due to deterioration. Each model ran for 1000 simulations with starting parameters representing the life histories of two organisms and initial carrying capacities of either 500 or 2000. While the distribution changes between carrying capacities and organisms were not significant, the differences between the models indicate the possibility for a large variation in extinction predictions if the differing effects of deterioration on the birth and death rates are not taken into consideration. The discrepancy in distributional changes is enhanced through the delay in extinction time, which varied from 10 to 80 years depending on the model. These delay and distribution variations allow for inexactitudes to be present in time to extinction predictions. Knowledge of the effects of deterioration and the inclusion of delay can help prevent such inaccuracies in future predictions of time to extinction for populations.

Analysis of Cortex and Pith Size Contribution to Fruit Size in Different Apple Cultivars

Mark Zenoble, CURO Research Assistant
Dr. Anish Malladi, Horticulture, College of Agricultural & Environmental Sciences

Apple fruit consists of the economically important fleshy cortex and a generally inedible pith/core, which can constitute a significant volume of the fruit. The relationship between core and cortex size among different cultivars is unknown. This study's objective is to determine the variation in core to cortex size ratios across apple cultivars. This knowledge could be applied to develop cultivars with more edible flesh. Thirty cultivars were used in this study. Fruit weight, length and diameter were measured using approximately 16 fruit from each cultivar. Half of the fruit from each cultivar were sliced longitudinally and the rest vertically to obtain sections of the core and cortex areas. These sections were scanned using a high resolution flatbed scanner. ImageJ software was used to determine the core and cortex sizes across the cultivars. Although the exterior area of the fruit section could be readily measured from the images, inversing the image was required to better visualize the vascular tissues that form the core boundary. Precise measurement of the dimensions of each of the components within the fruit is currently being performed. It is expected that significant variation in the core to cortex size ratios will be observed across the 30 cultivars. This would suggest that the growth of the core and the cortex tissues of the fruit are independently regulated. Such information can be applied to increase the size of the cortex region of the fruit, resulting in more of the edible part of the fruit.

Index

A

Abere, Belema, 20, 34
Abraham, Amanda, 93
Adang, Michael, 139
Aft, Carson, 10, 18, 26, 34, 126
Aggrey, Sammy, 141
Aguanta, Bryan, 14, 34
Aguilera, Vanessa, 30, 35
Ali, Zil, 14, 35
Alvarado, Claudia, 17, 36
Alvis, Courtney, 20, 36
Amosu, Seyi, 23, 28, 37
Anderson, Alex Kojo, 120
Angoyar, Andrew, 10, 18, 126
Anthony, Bryant, 22, 38
Arnold, Jonathan, 6, 60
Ashkeboussi, Alexander, 22, 38
Astarita, Jayme, 23, 38
Augustine, Danielle, 25, 39
Avci, Fikri, 134
Azain, Michael, 63

B

Bahraini, Anoosh, 15, 39
Bailey, Darrian, 21, 67
Baldree, Rhianna, 24, 45
Baltenberger, Rebecca, 23, 201
Banga, Manisha, 30, 40
Barnard, Malcolm, 19, 33, 40
Barnes, Brad, 96
Barnes, Robert, 18, 41
Barrow, Kaitlyn, 21, 143
Barzeva, Stefania, 22, 30, 41
Baxter, Mary, 19, 42
Baxter, Samuel, 12, 43
Beck, Kaitlyn, 30, 43
Beedle, Aaron, 154, 180
Belongilot, Chederli, 16, 43
Ben Shitrit, Lihi, 90
Bennett, Brett, 7, 10, 44
Benson, Mckenzie, 24, 31, 44, 154
Bergmann, Carl, 4, 71, 131
Bergmann, Margaret, 24, 45
Bermudez, J. Maria, 37
Berry, Stephen, 65
Bharadwaj, Sundar, 87
Bhatti, Dionnet, 11, 45
Biddle, Michael, 32, 46
Birch, Leann, 80
Bisel, Nicole, 13, 46
Bishop, Jessica, 151
Black, Marsha, 83
Blount, Ronald, 76, 79, 177
Bobilev, Anastasia, 88
Boggs, Holly, 30, 47
Bond, Charles, 28, 47
Borg, Zach, 24, 47
Bornstein, Jerica, 8, 48
Borrelli, Carley, 22, 48
Brown Crowell, Cathleen, 82, 95, 169
Brown, Leah, 17, 29, 49
Brown, Tifara, 29, 49
Buck, Brent, 8, 50
Buckley, Peter, 88
Bullock, Charles, 101, 103, 117, 137
Burke, Gaelen, 125, 169
Byers, Jeb, 4, 62, 130, 151
Byrd, Charles, 146

C

Cai, Liming, 36
Calabria, Jon, 176
Callands, Tamora, 101, 138
Callaway, Catherine, 11, 195
Calloway, Trace, 27, 50
Cann, Jesse, 27, 50
Cannon, Megan, 32, 51
Cao, Samantha, 18, 103
Caplan, Leah, 15, 51

Index

Carlson, Marla, 109
Carter, Nathan, 37
Cates, Kitra, 16, 52
Cetindag, Timur, 32, 52
Chang, Pei-Ying, 16, 53
Chang, Shu-Mei, 53, 197
Chang, Sue, 116
Chapman, Susannah, 195
Chen, Angel, 10, 53
Chen, Anne, 11, 54
Chen, Jiacheng, 26, 54
Cheng, Michael, 15, 55
Chepyator-Thomson, Jepkorir Rose, 105
Cherkinsky, Alexander, 72
Chilton, Zachary, 19, 55
Chitwood, Ryan, 19, 55
Church, Alia, 23, 76
Clark Lewis, Denise, 39, 66
Clark, Erin, 20, 56
Clark, Kathryn, 16, 56
Clark, Malissa, 187
Clay, K. Chad, 147
Clayton, Jasmine, 25, 57
Clementz, Brett, 88
Cline, Mason, 55
Coe, Erica, 21, 57
Coger, Derek, 21, 58
Cole, Alex, 32, 85
Coleman, Caroline, 31, 58
Conley, Aaron, 12, 59
Connelly, Scott, 110
Cooper, Robert, 55
Coppiano, Joseph, 7, 11, 59
Cordeiro, Ciro, 196
Cornwell, Christopher, 54
Cotwright, Caree, 70
Coverdill, James, 50
Covich, Alan, 144, 145
Cowart, Clayton, 22, 60
Cray, Paul, 12, 123
Cude, Brenda, 113, 124, 157
Cummings, Brian, 5, 143, 168
Cunningham, Sarah, 16, 60

D

D'Amico, Mackin, 12, 22, 122
Daniel, Haley, 18, 60
Daugherty, Tyler, 32, 61
Dave, Aashka, 31, 61
Davidson, Amber, 24, 28, 61, 62
Davis, Andy, 170
Davis, Benjamin, 196
Davis, Kaleigh, 29, 62
Dawe, Kelly, 91, 190
Dawson, Sarah, 21, 63
de La Serre, Claire, 111, 190, 194
De Mille, Carson, 13, 62
Deleveaux, Anquilla, 17, 64
Dennison, Lauren, 11, 64
Desher, Kaley, 16, 65
DeVelvis, Melissa, 10, 65
Dhar, Shanta, 105, 166
Dickens, Jonathan, 8, 66
DiStefano, Jacqueline, 25, 66
Docampo, Roberto, 196
Dodd, Molly, 31, 67
Donovan, Lisa, 56, 97, 128, 149, 166
Dooly, Justin, 21, 67
Doran-Peterson, Joy, 49
Dowd, John, 162
Downs, Diana, 74
Drake, Brian, 44
Drake, John, 4, 202
Driggers, Jonah, 32, 68
Duberstein, Kylee, 180
Duff, Stephanie, 17, 68
Dumrongkulraksa, Justin, 30, 68
Dunne, Ian, 18, 69
Dupuy, John, 19, 69
Durham, Stephan, 172

Index

Dye, Kathryn, 53
Dyer, Elizabeth, 19, 70
Dyer, Kelly, 56, 72, 84

E

Eaket, Chris, 152
Eaton, Cyd, 76, 79, 177
Eckhardt, Laura, 21, 70
Edwards, Emily, 23, 71
Egbosiuba, Linda, 16, 71
Eggenschwiler, Jonathan, 174
Ehlinger, Rachel, 33, 72
Eiteman, Mark, 41
English, Randall, 16, 72
Escalera, Cristian, 10, 72
Ethridge, Christina, 8, 73
Evans, Ellen, 38, 196
Evans, Jonathan, 43, 50
Evans, Sarah, 15, 73
Ewen, Heidi, 148
Ewulonu, Nneka, 9, 121

F

Farley, Kristen, 29, 74
Farmer, Mark, 53, 115
Farr, Nathan, 32, 74
Fechheimer, Marcus, 6, 129
Fernandez, Giselle, 28, 75
Fialkowski, Allison, 22, 27, 75
Filipov, Nick, 190
Flanigan, Kelsie, 8, 11, 22, 76, 79, 177
Fok, Mable, 97
Ford, Alyssa, 23, 76
Foutz, Tim, 60
Fragaszy, Dorothy, 45, 99, 145
Frankham-Smith, Sophie, 24, 77
Freeman, Mary, 151
Frick, Janet, 143

G

Gaertig, Jacek, 39
Gaines, Rebecca, 24, 31, 44, 154
Ganem, Natasha, 132
Ganeshan, Shreya, 32, 77
Gast, David, 75
Gay, David, 92, 178
Gendreau, Julian, 20, 78
German, Laura, 158
Giannotti, Jessica, 22, 78
Glover, Victoria, 12, 79
Goldman, Charlotte, 8, 11, 22, 76, 79, 177
Goldstein, Randi, 20, 80
Gonzalez, Delmaries, 10, 80
Goodhue, Carver, 28, 81
Gottdenker, Nicole, 194
Gottilla, Thomas, 20, 81
Green, Gary, 153
Green, Morgan, 10, 82
Griffin, Patrick, 16, 82
Grommersch, Bryan, 18, 83
Guo, Tai, 199
Gutierrez-Colina, Ana, 76, 79, 177

H

Hahn, Michael, 142, 175
Haidekker, Mark, 132
Hajduk, Stephen, 64
Hallow, K. Melissa, 186
Hamilton, James, 88, 129
Hamilton, Kelsey, 24, 62
Hamilton, Madison, 19, 83
Hamm, Connor, 26, 30, 83, 84
Han, Joan, 11, 84
Hanlin, Spencer, 9, 85
Hardigree, Dennis, 32, 85
Hardister, Elizabeth, 9, 85
Hardister, Jennifer, 14, 86
Hargrove, Kayla, 27, 86, 198

Index

Harklau, Linda, 166
Harn, Donald, 190
Harris, Curtis, 85
Harris, Elizabeth, 21, 87
Harris, Mallory, 9, 121
Harris, Samantha, 10, 87
Harrison, Mark, 34
Hart, Rachael, 9, 88
Harvey, Chelsea, 24, 88
Hatt, Joanna, 55
Hausman, Dorothy, 36, 150
Haviland, Courtney, 31, 89
Hawkins, Billy, 122
Hayrynen, Lauren, 88
Heath, Amy, 192
Hebbale, Chetan, 17, 89
Hedaya, Alexander, 27, 90
Hedges, Sarah, 31, 90
Henry, Kristin, 31, 91
Hodges, Amy, 17, 91
Hoffman, Brian, 47, 62, 85, 156
Hofmeister, Erik, 4, 86, 164, 198, 199
Hogan, Katherine, 13, 91
Hohman, Frederick, 31, 92
Hollander, Barry, 59
Hollander, Erin, 28, 30, 92, 93
Holmes, Philip, 45, 74
Hooks, Shelley, 101
Hoover, Timothy, 5, 6, 163
Hopper, Jackson, 31, 93
Hornak, Lawrence, 118
Hostetter, Kirstie, 26, 94
Howe, Chad, 136
Howell, Nathan, 14, 94
Howerth, Elizabeth, 100
Hsieh, Katherine, 23, 95
Hu, Jesse, 15, 95
Hudgens-Haney, Matthew, 88
Hunt, Brendan, 171
Hunt-Hurst, Patricia, 5, 67
Huynh, Heather, 12, 96

I

Ikebudu, Stacey, 14, 96

J

Jackson, Caroline, 10, 97
James, Aneek, 31, 97
Jamshad, Amna, 20, 97
Jean, Kharine, 32, 98
Jenkins, Nathan, 122
Jenkinson, Tiffany, 27, 98
Jennings, Melissa, 14, 99
Johnsen, Kyle, 38
Johnson, Corey, 116
Johnston, Thomas, 24, 99
Jones, Susan, 13, 100
Jones, Travis, 25, 100
Jones, Zachary, 8, 101
Jordan, Taylor, 25, 101
Joshi, Mugdha, 15, 101
Joshi, Piyush, 11, 102

K

Kagel, Martin, 119
Kalia, Megha, 14, 102
Kane, Andrew, 18, 103
Kannan, Natarajan, 135
Kanso, Daniel, 8, 103
Kaplan, Ray, 91, 188
Kapoor, Suraj, 9, 104
Karls, Anna, 5, 64, 108, 139
Karls, Russell, 155, 173
Karumbaiah, Lohitash, 46, 124
Kelley, Mary Catherine, 24, 31, 44, 154
Kelley, Megan, 30, 104
Kennedy, Eileen, 117
Kennedy, Jacob, 10, 105
Kennedy, Roy, 201

Kennedy, Samuel, 15, 105
Khalid, Hammad, 15, 106
Khan, Maha, 16, 106
Kil, Christine, 10, 107
Kim, Christian, 14, 107
Kimsey, Justin, 17, 108
Kipreos, Edward, 159
Klein, Catherine, 32, 108
Klevesahl, Hannah, 28, 109
Koch, Allison, 8, 19, 109, 110
Kong, Fanbin, 148
Kors, Stephanie, 22, 110
Kramer, Adam, 8, 111
Krause, Duncan, 6, 127, 142
Krieger, Madison, 31, 111
Krishna, Saritha, 190
Kuhnert, Karl, 44, 61, 132, 154, 181
Kumareswaran, Mitra, 23, 27, 112
Kure, Eric, 23, 113
Kushner, Sidney, 5, 181
Kutchesfahani, Sara, 183, 192

L

Lacy, Kip, 16, 113
LaGatta, Monica, 173
LaMotte, Julia, 76, 79, 177
Landes, Benjamin, 12, 113
Landry, Craig, 94
Lane, Paige, 17, 114
Lane, Sarah, 7, 9, 25, 114
Lanier, Jeffery, 16, 115
Lanier, Rebecca, 22, 115
Lanzilotta, William, 104
Lawton, Christopher, 136
Leandro, Jose, 25, 116
Ledesma, Kyle, 24, 31, 132, 181
Lee, Lyndon, 11, 116
Lee-Schoenfeld, Vera, 85
Leigh, Benjamin, 25, 116
Len-Rios, Maria, 57, 77
Lewis, Richard, 58, 63, 180
Lewis, Steven, 69
Li, Changying, 80
Liaw, Peter, 18, 117
Lilly, Alexandra, 8, 117
Lin, Jhih-Syuan, 187
Lindstrom, Jennifer, 163
Listyg, Benjamin, 24, 47
Little, Mallory, 28, 118
Locklin, Jason, 123
Lokanathan, Bhaskar, 18, 118
Lowe, Adam, 32, 156
Lowrey, Kelsey, 30, 119
Lukemire, Joshua, 24, 119
Lukowitz, Wolfgang, 78
Luthra, Noopur, 21, 143
Lynch, Michael, 179

M

Madhusudan, Mallika, 28, 146
Madonna, Anthony, 126, 138, 191
Maduka, Joy, 28, 120
Magnani, Loris, 6, 193
Malaney, Eric, 13, 120
Malladi, Anish, 202
Malmberg, Russell, 36
Maloney, Emily, 9, 22, 121
Maloney, Jillian, 12, 22, 122
Mancini, Jay, 115
Mandal, Abhyuday, 103, 177
Mani, Sudhagar, 47
Marshburn, Meagan, 23, 122
Martin, Andrew, 12, 123
Martinez-Uribe, Omar, 14, 123
Mason, Hannah, 13, 124
Mathews, Blake, 26, 124
Mauldin, Kathryn, 10, 124
Maurer, John, 5, 107
Mayfield, Johnathan, 12, 125
McBrearty, Thomas, 10, 18, 26, 125, 126

Index

McCaskill, Barbara, 49
McCully, Kevin, 76, 152, 156, 201
McDowell, Jennifer, 4, 51, 59, 88, 104, 112, 133
McEachern, Michael, 65
McKissick, Jordan, 25, 126
McMillan, Elizabeth, 19, 127
McWhorter Anderson, Alison, 17, 127
Medvedev, Katalin, 4, 157
Mehegan, Mary, 13, 128
Meile, Christof, 168
Meng, Juan, 71, 165, 173, 175
Mensa-Wilmot, Kojo, 34, 96
Milewski, Adam, 70
Miller, Benjamin, 10, 128
Miller, L. Stephen, 66, 98, 167
Milley, Jennifer, 28, 128
Minhas, Sandip, 8, 129
Mistry, Sapna, 24, 129
Mohanty, Bijoy, 181
Momany, Cory, 36, 114, 130, 137
Montgomery, Timothy, 7, 19, 130
Moore, Julie, 35, 98, 123, 160, 185
Moore, Kathryn, 17, 130
Moore, Kevin, 124
Moore, Patricia, 106
Moorthy, Ananya, 22, 131
Moraczewski, Jason, 30, 131
Moran, Mary Ann, 160
Morgan, Christopher, 24, 31, 132, 181
Morrison, Logan, 26, 132
Morrison, Richard, 164
Mowbray, Santana, 9, 132
Mudde, Cas, 172
Mueller, Kurt, 8, 133
Mullen, Jeffrey, 108
Muralidharan, Vasant, 94, 170
Murph, Mandi, 184
Murphy, Megan, 32, 133
Mustafa, Seema, 15, 134
Mustard, David, 148

N

Nagy, Tamas, 120, 135
Narayanan, Anish, 7, 15, 135
Navalkar, Nina, 13, 135
Nelson, Jason, 41
Nelson, Laura, 30, 136
Netter, Jeff, 34
Neuharth-Pritchett, Stacey, 121
Nguyen, Kim, 11, 136
Nguyen, Minh, 9, 25, 136
Nguyen, Tho, 61
Niakan, Cameron, 25, 137
Nickerson, Stephen, 89
Nune, Hanna, 17, 137
Nuttall, Mary Elizabeth, 25, 138

O

O'Brien, Kasey, 12, 138
Ochiobi, Onyinyechi, 31, 139
Odman, Selin, 17, 139
Oh, Susan, 21, 140
Okie, Whitney, 8, 141
Okoye, Ijeoma, 14, 141
Oldham, Matthew, 26, 141
Oliver, Kerry, 90
Oliver, William, 88
Olorunsola, Fatai, 16, 142
Oluwadare, Babajide, 26, 142
Orlando, Maria, 15, 143
Orlando, Ron, 111
Osborne, Mallory, 21, 143
Osborne, Meredith, 30, 144
Oshri, Assaf, 110
Owen, Jack, 19, 33, 144, 145
Owen, Joel, 24, 145
Owino, Simon, 173
Owsiak, Andrew, 4, 50, 159, 183

Index

P

Page-Karjian, Annie, 194
Pagnattaro, Marisa, 185
Paker, Meredith, 27, 28, 146
Palmer, Bailey, 28, 146
Palte, Eytan, 8, 147
Parish, Jack, 107
Park, Sora, 11, 147
Park, Sungwhan, 20, 148
Parker, David, 88
Parker, Davis, 29, 148
Parks, Jessica, 24, 148
Patel, Hiral, 10, 149
Patel, Kayla, 21, 143
Patel, Viral, 30, 149
Patterson, Meagan, 20, 150
Pattillo, Meryom, 20, 151
Paye, Bradley, 125
Pazdro, Robert, 57, 87, 141, 199
Peake, Andrew, 21, 151
Perry, Sarah, 29, 151
Peters, Kelly-ann, 23, 152
Petrovic, Sonja, 11, 152
Phelps, Rosemary, 79
Phillips, Tabitha, 19, 153
Pierce, Michael, 73
Platter, Charles, 158
Pollack, Paul, 93
Pontari, Laura, 28, 153
Porter, James, 40
Porto, Katelynn, 21, 143
Potter, Walter, 190
Power, Grace, 18, 153
Prestegard, James, 188
Pringle, Catherine, 176
Pugh, Steven, 24, 31, 44, 154

Q

Quinn, Frederick, 86, 173

R

Rajasekaran, Vedika, 17, 154
Rajeurs, Ashitha, 14, 155
Ramasamy, Ramaraja, 83
Rapoport, Marie, 24, 155
Ray, Caroline, 23, 27, 156
Reilly, Shelby, 32, 156
Renzi, Lisa, 144
Renzulli, Linda, 146
Reyna, Anthony, 29, 157
Reynolds, Lucille, 29, 157
Rhodes, Leara, 61
Rice, Jennifer, 68
Ridgeway, Elizabeth, 27, 158
Rivera, Paola, 26, 158
Robinson, Spencer, 16, 159
Robinson, William, 26, 159
Rojewski, Jay, 112
Roome, Kerryn, 14, 160
Rosemond, Amy, 186
Roth, Lazarus, 26, 160
Roth, Selena, 20, 160

S

Sabatini, Robert, 99, 102
Sabet, Sahar, 23, 161
Salguero, Tina, 43
Samaras, Athanasios, 160
Samowitz, Preston, 15, 161
Samuelson-Ruiz, Colby, 15, 162
Sanchez, Daniel, 10, 18, 126
Santoso, Sam, 20, 162
Savchenko, Lisa, 21, 163
Sayeski, Kristin, 140, 193
Schaffer, Scott, 17, 163
Schendowich, Lewis, 26, 164
Schmidt, Walter, 5, 55, 95, 162
Schmitz, Robert, 52, 82
Schramski, John, 184

Index

Schulz, Cordula, 43
Schuster, Richard, 114
Schwanenflugel, Paula, 67
Seamon, Amanda, 27, 164
Sellman, Kathryn, 31, 165
Semanie, Patrick, 9, 165
Shaffer, Anne, 35, 78
Shah, Rahul, 10, 20, 166
Shannon, Sarah, 167
Sharma, Nivita, 15, 166
Sharma, Shubam, 32, 167
Sharma, Suraj, 177, 182
Sheppard, Keller, 9, 167
Sheth, Sheela, 15, 168
Shi, Yimeng, 33, 168
Shockley, Marianne, 197
Shorter, Taj, 28, 169
Silk, Dan, 141
Simmonds, Tyler, 26, 169
Simon, Janice, 83
Simone, Jean, 74
Simons, Leslie Gordon, 38
Simpson, Kathy, 72, 113
Sims, Brandon, 14, 170
Sims, Stuart, 19, 170
Singh, Danish, 9, 171
Singh, Manjinder, 153
Singh, Rakesh, 191
Skira, Meghan, 77
Skowronski, Daniel, 12, 171
Smith, Cara, 12, 22, 122
Smith, Kristen, 24, 45
Smith, Matthew Lee, 60
Smith, Scott, 9, 172
Snipes, Alexandra, 25, 172
Song, Inseok, 52, 55
Soper, Steven, 97
Soviravong, Selena, 21, 143
Sparks, Margaret, 22, 173
Speakman, Jeff, 100
Speer, Jaclyn, 15, 173
Sriram, Karishma, 13, 174
Sriram, T. N., 177
Srivastava, Romik, 16, 174
Stancil, Phillip, 69, 127
Starai, Vincent, 68, 89
Steckenrider, Heather, 16, 175
Steet, Richard, 147
Steine, Mara, 23, 175
Stice, Steven, 5, 102, 174, 195
Stillion Southard, Belinda, 91
Stockert, Olivia, 9, 176
Stoker, David, 29, 176
Stokes, Zack, 18, 177
Stollman, Tyler, 8, 11, 22, 76, 79, 177
Strand, Michael, 113
Striepen, Boris, 133, 178
Stringham, Jim, 48
Stroud, John, 32, 178
Studstill, Caleb, 14, 178
Sulaiman, Zoheb, 22, 27, 178
Sultana, Mehreen, 18, 26, 179
Surminsky, Rachel, 30, 179
Suveg, Cynthia, 41
Sweet, Lawrence, 119, 155
Sweigart, Andrea, 131
Syed, Noreen, 17, 180
Sylvester, Jordan, 21, 180
Szymonik, Joanna, 23, 152

T

Talbot Brewer, Marin, 81
Tanner, Susan, 81, 109
Taylor, Lindsey, 11, 180
Teague, Fran, 75, 128, 182
Terns, Michael, 68, 92
Tessman, Brock, 47
Thawer, Fahim, 29, 181
Thomas, Parker, 24, 31, 132, 181
Thompson, Jennifer Jo, 178

Index

Tiarsmith, Elizabeth, 22, 78
Tiemeyer, Michael, 51, 106
Todd, Erin, 32, 182
Tolbert, Lauren, 26, 182
Touchton, Margaret, 30, 183
Trahan, Thomas, 26, 183
Tran, Sterling, 18, 184
Tripp, Ralph, 161
Trotti, Rebekah, 24, 31, 132, 181
Trunnell, Mathieu, 32, 184
Truong, Ha, 14, 185
Tucker, Samantha, 155
Tyre, Abby, 9, 185

U

Ullrich, Susanne, 46
Usher, Rachel, 28, 186

V

Van Brackle, Charles, 18, 186
vanDellen, Michelle, 48, 161, 189, 200
Vann, Haley, 11, 187
Varshney, Juhi, 24, 187
Vecchione, Rachel, 15, 188
Verma, Amitabh, 84
Vermillion, Emily, 29, 188
Viveiros, Maria, 118

W

Walker, Kelsie, 23, 189
Walker, Morgan, 29, 189
Wall, Emily, 7, 18, 190
Wallace, Eileen, 54
Weber, Matthew, 28, 190
Webster, Amy, 29, 190
Weger, Seth, 186
Weiss, Hannah, 12, 191
Welch, Lindsey, 69
Wells, Lance, 171
Wenzel, Maddison, 20, 191
West, Franklin, 58, 73, 128, 165
Whatley, Jane, 21, 192
Wheat, Patrick, 8, 192
White, James, 19, 193
White, Rosie, 21, 143
Whitehill King, Karen, 136
Whitenton, Jessy, 21, 193
Whitfield, Jordyn, 27, 194
Whitlock, Brittany, 8, 194
Wiegert, Craig, 179
Wilde, Susan, 153
Wilkes, Elizabeth, 9, 195
Wilkins, Elizabeth, 11, 195
Williams, John, 23, 196
Williams, Jonathan, 146
Williamson, Nolan, 18, 196
Windle, Brian, 14, 196
Wolf, Mavis, 20, 197
Wolkow, Benjamin, 40
Wood, James, 186
Woodson, Brock, 200
Wright, Audrey, 12, 197
Wuellner, Alyssa, 27, 29, 198

X

Xia, Tian, 41
Xu, Shibo, 29, 199

Y

Yabsley, Michael, 4, 189
Yang, Xiaoping, 148
Yoo, Sarah, 21, 199
Young, Courtni, 13, 199
Young, Jacob, 23, 200
Youngblood, Kathryn, 18, 200
Yun, Pomi, 27, 201
Yurchuck, Zoe, 23, 201

Z

Zarada, Katherine, 19, 202
Zenoble, Mark, 20, 202
Zhang, Qing, 126
Zheng, Y. George, 149
Zimeri, Anne Marie, 42
Zimmermann, Laura, 116

The Center for Undergraduate Research Opportunities
is grateful to the following sponsors
of the 2015 Symposium

The Office of the President

The Office of the Senior Vice President for Academic Affairs and Provost

The Office of the Vice President for Instruction

The Office of the Vice President for Research

The Alumni Association

The Honors Program

www.curo.uga.edu