

THE UNIVERSITY OF GEORGIA  
CENTER FOR UNDERGRADUATE RESEARCH OPPORTUNITIES



2011

# *CURO*

*Symposium*

Program and Abstracts

CURO Office  
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Athens, GA 30602  
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<http://www.curo.uga.edu>

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## *CURO 2012 Symposium Call for Abstracts*

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The annual CURO Symposium provides a forum for undergraduates from all disciplines to present original research and creative works sponsored by faculty members. The Symposium highlights excellence in undergraduate researcher in the state of Georgia and promotes communication and cooperation between faculty and students.

Undergraduate researchers from all public and private higher education institutions in Georgia, and at various stages of the research process, are encouraged to submit abstracts for presentation.

Students may choose to present in one or more of the following formats: Oral, Poster or Thesis Roundtable.

Papers on work being presented at the CURO Symposium submitted by February 21, 2012\* will be considered for **Best Paper Awards** in the categories of arts, biological sciences, civic responsibility focus, humanities, international focus, physical sciences and social sciences. Maximum length is 12 pages, double spaced, excluding references and appendices.

### **Abstract Criteria:**

- **Abstract must be no more than 250 words and free of spelling and grammatical errors.**
- Abstracts must contain a thesis or problem statement, description of methods, statement of anticipated findings and a statement of the significance of the research. Abstract must represent ethical and responsible research.
- Abstracts must accurately reflect the extent of the undergraduate student's involvement in development of the research design and execution of the project. Research presented at the Symposium should go beyond work completed for a class paper or project.
- Abstract must be accompanied by a letter of support from the supervising faculty mentor **from the presenter's home institution.**

### **Submission Process:**

- Undergraduates should submit an abstract on-line no later than midnight **January 27, 2012\***. **Only abstracts limited to 250 words and free of spelling and grammatical errors will be accepted. Abstracts that do not adhere to stated criteria will not be considered.**
- The sponsoring faculty member must submit a brief supporting letter on-line by midnight **February 3, 2012\***. The letter denotes the faculty member's support of the research abstract being published in the Book of Abstracts.
- Group research projects should be submitted with one application and one letter of faculty support.
- All abstracts will receive graduate student review and feedback.
- **Accepted participants will be notified by February 17, 2012\***, and their abstracts will be published in the CURO 2012 Symposium Book of Abstracts.

\* All dates are subject to change as dictated by the academic calendar.

The annual CURO Symposium is free and open to the public, and all interested faculty and students are encouraged to attend. For more information, contact Center for Undergraduate Research Opportunities at [curo@uga.edu](mailto:curo@uga.edu) or (706) 542-5871



## CALL FOR SUBMISSIONS

The Journal for Undergraduate Research Opportunities publishes original research papers in the areas of humanities, social sciences, and policy as well as art-related content. **You must present your work at the annual CURO Symposium to be eligible for publication.** Submissions are accepted throughout spring semester at <http://www.uga.edu/juro/>.

The following general format should be adhered to as closely as possible. The cover page should include the student researcher's name, major, year of anticipated graduation, faculty advisor's name, and institution attended. This information should be followed immediately by the abstract. The research article itself may be organized into the following sections: introduction, methods, findings, conclusion, and references.

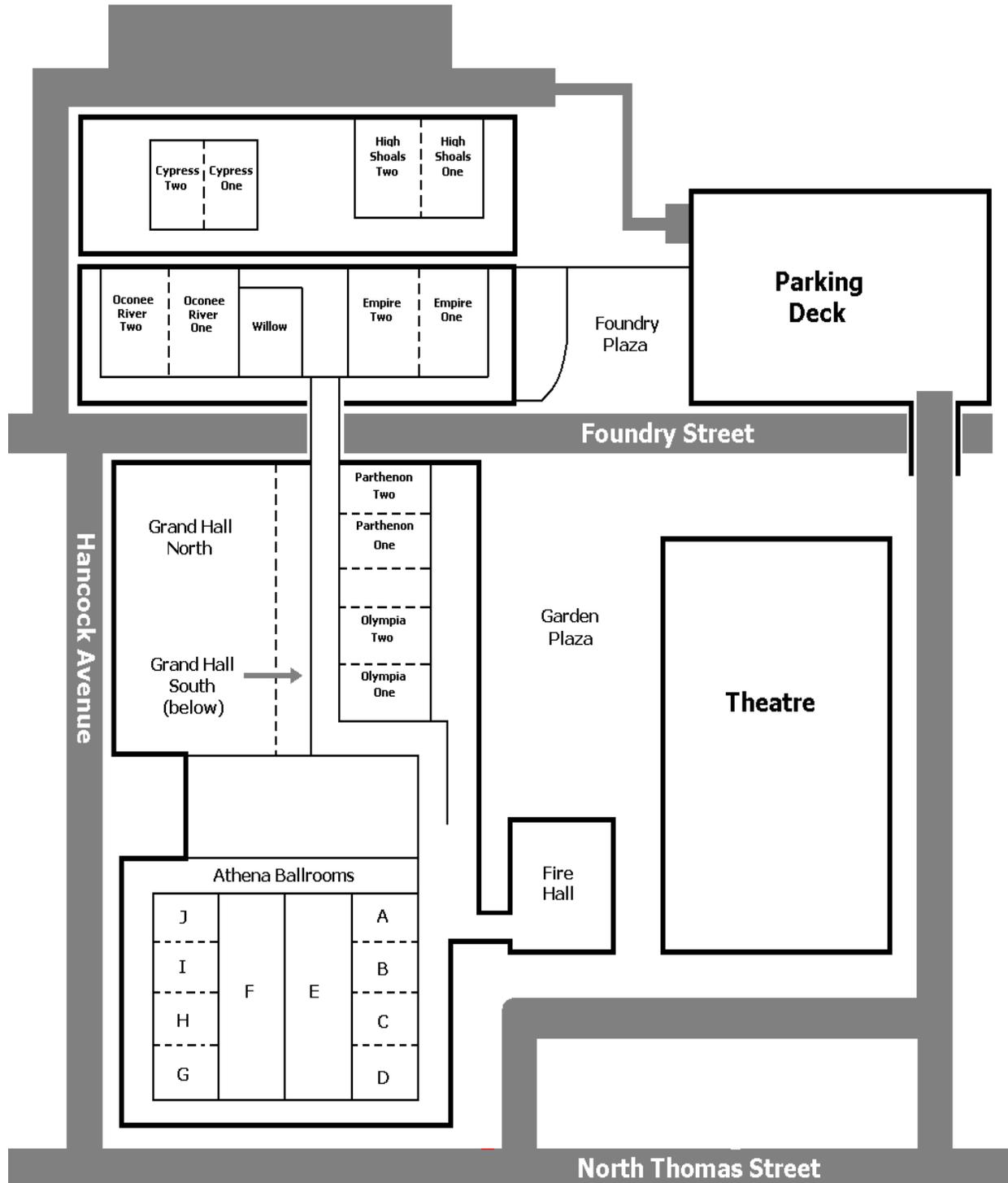
Additionally, work submitted to JURU@GA must adhere to the following guidelines:

1. Maximum length is 30 pages, double-spaced. Theses can be shortened to comprise the central idea of the research in order to be eligible for publication in the journal.
2. All submissions are submitted in English unless other arrangements are made.
3. All work must be submitted with an abstract no longer than 250 words. The abstract should provide a background sufficient to establish a context for understanding the research, summarize the research article itself, and highlight the major results.
4. References should be organized according to the standard format for the individual discipline the research topic falls under, e.g. Modern Language Association, Council of Biology Editors, American Psychological Association, or Chicago style format.
5. Work must be fully represented in digital form (preferably a Microsoft Word document for papers) and emailed to [juro@uga.edu](mailto:juro@uga.edu).
6. All submissions must be accompanied by a completed Submission and Faculty Advisor Approval Form found on the website at <http://www.uga.edu/juro/>.

Submissions will be evaluated according to criteria established by the editorial staff of the journal. Incoming research will be reviewed first by JURU@GA's content editors and other staff members. Prospective publications are subject to the approval of the journal's Editor-in-Chief. Upon completion of the review, the author may expect to receive either a notification of acceptance, acceptance with revisions, or a rejection of submission. Any questions about the submission process or the journal itself should be directed to [juro@uga.edu](mailto:juro@uga.edu). JURU@GA wishes you the best of luck with your CURO Symposium presentation and looks forward to reviewing the finished product of your hard work.

**Contact JURU at [JURO@uga.edu](mailto:juro@uga.edu) or visit our website at <http://www.uga.edu/juro/>**

# Classic Center Facility Layout



# Symposium At-A-Glance

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## Monday, April 4, 2011

<b>Begin registration of presenters; students hang up posters</b> Classic Center, Lobby	<b>8:30 a.m.</b>
<b>Concurrent Oral Sessions</b> Classic Center, Athena Breakout Rooms A, B, C, D, G, H, J	<b>10:10 a.m.</b>
<b>Thesis Roundtable Session</b> Classic Center, Parthenon Room	<b>10:10 a.m.</b>
<b>Concurrent Oral Sessions</b> Classic Center, Athena Breakout Rooms A, B, C, D, G, H, J	<b>11:15 a.m.</b>
<b>Thesis Roundtable Session</b> Classic Center, Parthenon Room	<b>11:15 a.m.</b>
<b>Concurrent Oral Sessions</b> Classic Center, Athena Breakout Rooms A, B, C, D, G, H, J	<b>12:20 p.m.</b>
<b>Concurrent Oral Sessions</b> Classic Center, Athena Breakout Rooms A, B, D, G, H, J	<b>1:25 p.m.</b>
<b>Concurrent Oral Sessions</b> Classic Center, Athena Breakout Rooms A, B, C, D, G, H, J	<b>2:30 p.m.</b>
<b>General Session</b> Classic Center, Athena Ballroom E	<b>4:00 p.m.</b> <b>Dr. David S. Williams</b> Associate Provost and Director, Honors Program
<b>Remarks</b>	<b>Professor Jere W. Morehead</b> Senior Vice President for Academic Affairs and Provost
<b>Excellence in Undergraduate Research Mentoring Awards</b>	<b>Dr. David C. Lee</b> Vice President for Research
<b>Best Paper and UGA Libraries Research Awards</b>	<b>Dr. Laura Jolly</b> Vice President for Instruction <b>Ms. Deborah Dietzler</b> Executive Director, Alumni Association <b>Ms. Caroline Barratt</b> Director, Miller Learning Center Library Commons
<b>Introduction of Keynote Speaker</b>	<b>Ms. Sheena Zhang</b> Foundation Fellow '11, Ecology, Biology and Sustainable Design in the Built Environment
<b>Keynote Address: <i>Doing Science in the Face of a National Emergency</i></b>	<b>Dr. Samantha Joye</b> Professor, Department of Marine Sciences Director, Center for Integrative Conservation Research
<b>Poster Session, Science as Art &amp; Reception</b> Classic Center, Grand Hall South (downstairs)	<b>5:00 p.m.</b>

## Program

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**Monday, April 4, 2011**

### **Concurrent Oral Sessions**

Classic Center, Athena Breakout Rooms A, B, C, D, G, H, J

#### **10:10 – 11:00 a.m. First Concurrent Session**

<b>Room A</b>	<b>JoyEllen Freeman</b> Faculty Mentor	The Message Behind the Music: Blind Tom's Response to Nineteenth Century Views on Race Dr. Barbara McCaskill, Department of English
	<b>Isha Ghodke</b> Faculty Mentor	Representations of Children and Childhood in Jurek Becker's Holocaust Novel <i>Jakob der Lügner</i> Dr. Martin Kagel, Department of Germanic & Slavic Studies
	<b>C.T. Bailey</b> Faculty Mentor	Kanji and the A-curve Dr. William Kretzschmar, Department of English
<b>Room B</b>	<b>Rachel Perez</b> Faculty Mentor	Oil Palm Proliferation in Latin America Dr. J. Peter Brosius, Department of Anthropology
	<b>Hank Schwartz</b> Faculty Mentor	Reducing Water Usage by Repowering Plants in Georgia Dr. Laurie Fowler, Odum School of Ecology
<b>Room C</b>	<b>Abby Wong</b> Faculty Mentor	Increasing Enrollment of Eligible Children in Georgia's Medicaid and CHIP Programs Dr. Angela Fertig, Department of Public Administration & Policy
	<b>Tiffany Hu</b> Faculty Mentor	Mandating a Federal Excise Tax on Caloric Sweetened Beverages in the U.S. Dr. Angela Fertig, Department of Public Administration & Policy
	<b>Ammarah Mahmud</b> Faculty Mentor	Revisiting U.S. Procurement of Non-Emergency Food Aid Dr. Maria Navarro, Department of Agricultural Leadership, Education & Communication
<b>Room D</b>	<b>Pranav Kaushish</b> Faculty Mentor	Y-Linked Variation and Senescence in <i>Drosophila melanogaster</i> : Starvation Resistance Dr. Daniel Promislow, Department of Genetics
	<b>Michael Bray</b> Faculty Mentor	Genetic Analysis of Pigmentation in <i>Drosophila tenebrosa</i> Dr. Kelly Dyer, Department of Genetics
	<b>Krelin Naidu</b> Faculty Mentor	Epigenetic Effects of Bromate on p21 and Histone-2AX Expression in HEK293 Cells Dr. Brian Cummings, Department of Pharmaceutical & Biomedical Sciences

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<b>Room G</b>	<b>Ashley Bartlett</b>	The Elements of Chinese Grand Strategy: Applying a New Analytical Approach
	Faculty Mentor	Dr. Brock Tessman, Department of International Affairs
	<b>Chad Peltier</b>	Cognitive X's and O's: First Steps in the Resolution to the Offensive-Defensive Realist Debate
	Faculty Mentor	Dr. Jeff Berejikian, Department of International Affairs
	<b>Edward Wells, Jr.</b>	Grand Strategy as it Pertains to the Korean Peninsula
	Faculty Mentor	Dr. Brock Tessman, Department of International Affairs
<b>Room H</b>	<b>Tony Pelli,</b>	Battling With Bytes: A Cybersecurity Doctrine for the United States
	<b>Katherine Arnold,</b>	
	<b>Yuliya Bila,</b>	
	<b>Rohan Mukhopadhyay,</b>	
	<b>Shyam Shanker,</b>	
	<b>Patrick Smith,</b>	
	<b>Seth Taylor</b>	
	Faculty Mentor	Dr. Dan Everett, Department of Computer Science
	<b>Lauren Howard</b>	Thwarting Radiological Terrorism: Policies for Regulating the Security of High-Risk Radioactive Sources
	Faculty Mentor	Dr. Dmitriy Nikonov, Center for International Trade & Security
	<b>Archil Japardize</b>	Security Contractors: The Future of Peacekeeping?
	Faculty Mentor	Dr. Fred Manget, School of Law
<b>Room J</b>	<b>Daniel Cellucci</b>	First-Principles Investigations of Oxygen Vacancies on SnO <sub>2</sub> Nanofilms
	Faculty Mentor	Dr. Steven Lewis, Department of Physics & Astronomy
	<b>Whitney Ingram</b>	Surface Plasmon Resonance Enhancement by an Electrostatic Sampling Device
	Faculty Mentor	Dr. Yiping Zhao, Department of Physics & Astronomy

### **10:10 – 11:00 a.m. First Thesis Roundtable Session**

Classic Center, Parthenon Room

<b>Table 1</b>	<b>Tatum Mortimer</b>	Epidemiology of Equine <i>Staphylococcus aureus</i> in Georgia and Kentucky from 1995-2003
	Faculty Mentor	Dr. Susan Sanchez, College of Veterinary Medicine
	<b>Muktha Natrajan</b>	The Effects of Manganese on Human Neural Stem Cell Cultures
	Faculty Mentor	Dr. Steven Stice, Department of Animal & Dairy Science
	<b>Malavika Rajeev</b>	The Effect of Parasite Infection on Monarch Butterfly Mating Behavior
	Faculty Mentor	Dr. Sonia Altizer, Odum School of Ecology

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	<b>Anna White</b>	Clinico-pathological Characterization of Newly Isolated Newcastle Disease Viruses from Dominican Republic, Belize and Peru
	Faculty Mentor	Dr. Corrie Brown, College of Veterinary Medicine
<b>Table 2</b>	<b>Mary Burriss</b>	Characterization of <i>C. elegans</i> Insulin-degrading Enzyme
	Faculty Mentor	Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
	<b>Edward Lilla</b>	Rce1 Membrane Topology
	Faculty Mentor	Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
	<b>Alexander Sevy</b>	Ty1 Element Antisense RNA Activity from Natural Saccharomyces Isolates
	Faculty Mentors	Dr. David Garfinkel, Department of Biochemistry & Molecular Biology
<b>Table 3</b>	<b>Ryan Jordan</b>	Children's Directional Understanding of Arrows
	Faculty Mentor	Dr. Janet Frick, Department of Psychology
	<b>Cody Nichol</b>	Emotion Regulation in Children: Implications for Affect and Childhood Psychopathology
	Faculty Mentor	Dr. Cynthia Suveg, Department of Psychology
	<b>Rebecca Parker</b>	Evaluation on Blood Flow Velocity and Arterial Diameter Produced by Compression Therapy
	Faculty Mentor	Dr. Kevin McCully, Department of Kinesiology
	<b>Sarah Thorne</b>	The Effects of Lutein and Zeaxanthin Status and Macular Pigment Optical Density on Neural Efficiency
	Faculty Mentor	Dr. Lisa Renzi, Department of Psychology
<b>Table 4</b>	<b>Emily First</b>	Mineral Probes of Magmatic Processes at Valles Caldera, Northern New Mexico
	Faculty Mentor	Dr. Michael Roden, Department of Geology
	<b>Anisha Hegde</b>	The Boom That Saved the Day
	Faculty Mentor	Dr. Leara Rhodes, Grady College of Journalism & Mass Communications
	<b>Sheena Zhang</b>	An Analysis of Green Buildings: Comparing Tsinghua University's Sino-Italian Ecological and Energy-Efficient Building and UGA's Odum School of Ecology Building
	Faculty Mentor	Dr. Laurie Fowler, Odum School of Ecology

## Program

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### 11:15 – 12:05 p.m. Second Concurrent Session

Classic Center, Athena Breakout Rooms A, B, C, D, G, H, J

<b>Room A</b>	<b>Malin Dartnell</b>	Where the Pavement Ends: An Evaluation of the Urban Heat Island Effect in Metropolitan Atlanta
	Faculty Mentor	Dr. Jenna Jambeck, Department of Biological & Agricultural Engineering
	<b>Katherine Riccione, Ryan Boelter, Tina Carson, Chase Mooney</b>	Design of a Computed Tomography Scanner with Components from an Existing DEXA Machine
	Faculty Mentor	Dr. Mark Haidekker, Department of Biological & Agricultural Engineering
	<b>Pranay Udutha</b>	Preserving Georgia's Waterways: Tackling Interbasin Transfer in Georgia
	Faculty Mentor	Dr. Laurie Fowler, Odum School of Ecology
<b>Room B</b>	<b>Katie Branscomb</b>	The Political Economy of the Textile Industry in Bangladesh
	Faculty Mentor	Dr. Santanu Chatterjee, Department of Economics
	<b>Meredith Jones</b>	Worse Before It Gets Better? Or Just Worse?
	Faculty Mentor	Dr. Santanu Chatterjee, Department of Economics
	<b>Munir Winkel</b>	Smart Moves: Avoiding Common Investing Mistakes
	Faculty Mentor	Dr. Swarn Chatterjee, Department of Housing & Consumer Economics
<b>Room C</b>	<b>Katherine Black</b>	Differences in Functional Movement Screen Scores Between Female Soccer Players That Were Injured vs. Uninjured
	Faculty Mentor	Dr. Cathleen Brown, Department of Kinesiology
	<b>Jenny Brickman</b>	Effects of Medial-Wedge Orthotics on Knee Frontal Plane Moments in Individuals with Valgus Knee Alignment and Lateral-Compartment Osteoarthritis
	Faculty Mentor	Dr. Cathleen Brown, Department of Kinesiology
<b>Room D</b>	<b>Ebony Caldwell</b>	Influences on the Outlook of the Post-college Educational Opportunities and Choices of Undergraduate Science Majors
	Faculty Mentors	Dr. Monica Gaughan, Department of Health Policy & Management
	<b>Agni Chandora</b>	U.S. Primary Care Physicians: A Dying Breed
	Faculty Mentor	Dr. Monica Gaughan, Department of Health Policy & Management
	<b>Osama Hashmi</b>	Creating the Physician of the Future: Addressing the Health Needs of Rural Georgia Communities
	Faculty Mentor	Dr. Monica Gaughan, Department of Health Policy & Management

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<b>Room G</b>	<b>Anastasia Couvaras</b> Faculty Mentor	Perceived Barriers and Medication Adherence in Adolescents Dr. Ronald Blount, Department of Psychology
	<b>Hannah Machemehl</b> Faculty Mentor	Developmental Changes in Human Infants' Strategies for Recognizing Human and Animal Faces Dr. Janet Frick, Department of Psychology
	<b>Cody Nichol</b> Faculty Mentor	Emotion Regulation in Children: Implications for Affect and Childhood Psychopathology Dr. Cynthia Suveg, Department of Psychology
<b>Room H</b>	<b>Vanessa Hanvey</b> Faculty Mentor	Spatial and Temporal Analysis of the Ceramics and Lithics at the Burnt Village, 9TP9 Dr. J. Mark Williams, Department of Anthropology
	<b>Bryn Murphy</b> Faculty Mentor	“Cuando uno toma el agua del Tambopata...”: Migration and the Urban Environment in Madre de Diós, Peru Dr. J. Peter Brosius, Department of Anthropology
	<b>Rebecca Stein</b> Faculty Mentor	How Leadership Makes a Difference: The Predictive Role of Managerial Leadership Competencies in a Multi-National Company Dr. Karl Kuhnert, Department of Psychology
<b>Room J</b>	<b>Jessica Holmes</b> Faculty Mentor	Isolation and Characterization of Polyomavirus Middle T (PyVT) Mammary Cancer Stem/Progenitor Cells Dr. Michael Pierce, Department of Biochemistry & Molecular Biology
	<b>Rachel Johnson</b> Faculty Mentor	<i>Plasmodium falciparum</i> : Expression of the DBL3x region of VAR2CSA Dr. David Peterson, Department of Infectious Diseases
	<b>Emily Peng</b> Faculty Mentor	A Flow Cytometry-Based Method of Glycosylation Profiling Dr. Robert Woods, Department of Biochemistry & Molecular Biology

### **11:15 – 12:05 p.m. Second Thesis Roundtable Session**

Classic Center, Parthenon Room

<b>Table 1</b>	<b>Dillon Horne</b> Faculty Mentor	Symbolization and Religious Thought Dr. Thomas Cerbu, Department of Comparative Literature
	<b>Caleb Moreno</b> Faculty Mentor	Orpheus in Opera Dr. Dorothea Link, Hugh Hodgson School of Music
<b>Table 2</b>	<b>Ashley Bartlett</b> Faculty Mentor	Democracy Blinded: a Study of the Afghanistan and Iraq Wars, 2001-2008 Dr. John Morrow, Department of History

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	<b>James Herman</b> Faculty Mentor	John Lloyd Stephens and Mesoamerican Orientalism Dr. John Short, Department of History
	<b>Justin Leef</b> Faculty Mentor	Salient Issues as Forces for Change in the Peach State: Bioscience and Research Meet Deep South Politics Dr. Charles Bullock, Department of Political Science
<b>Table 3</b>	<b>Anna Legostaev</b> Faculty Mentor	An Analysis of Two Great Russian Poets and a Discussion of their Ties to Russia's History and its People Dr. Elena Krasnostchekova, Department of Germanic & Slavic Studies
	<b>Matthew Sellers</b> Faculty Mentor	Every Man a King: Robert Penn Warren, Populism and Contemporary American Politics Dr. Hugh Ruppensburg, Department of English
	<b>Laura Wynn</b> Faculty Mentor	Representations of the East German Secret Police in Contemporary German Literature Dr. Martin Kagel, Department of Germanic & Slavic Languages
<b>Table 4</b>	<b>Melissa Brown</b> Faculty Mentor	Black Stereotypes in Reality Television and the Reinforcement of Prejudiced Attitudes Dr. Leonard Martin, Department of Psychology
	<b>Ah Hyun Jun</b> Faculty Mentor	Characterization of Disease Causing Mutations of hENT3 Dr. Rajgopal Govindarajan, Department of Pharmaceutical & Biomedical Sciences
	<b>Trenton Mize</b> Faculty Mentor	Legitimacy and Status in Mixed-Gender Task Groups Dr. Dawn Robinson, Department of Sociology
	<b>Raha Sabet</b> Faculty Mentor	Attuning to Positive Social Cues as an Effortful Process for Socially Anxious Individuals Dr. Michelle vanDellen, Department of Psychology

### **12:20 – 1:10 p.m. Third Concurrent Session**

Classic Center, Athena Breakout Rooms A, B, C, D, G, H, J

<b>Room A</b>	<b>Joshua Barnett</b> Faculty Mentor	Tri-state Water 'War': Media Frames and Weighing What is Best for the Apalachicola-Chattahoochee-Flint River Basin Dr. David Radcliffe, Department of Crop & Soil Sciences
	<b>Tatum Mortimer</b> Faculty Mentor	Epidemiology of Equine <i>Staphylococcus aureus</i> in Georgia and Kentucky from 1995-2003 Dr. Susan Sanchez, College of Veterinary Medicine
<b>Room B</b>	<b>John Gaudet</b> Faculty Mentor	Studying Human Seizures Using Zebrafish as a Model Dr. James Lauderdale, Department of Cellular Biology

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	<b>Camille Gregory</b> Faculty Mentor	Investigation of the Protein Content of Hirano Bodies Dr. Marcus Fechheimer, Department of Cellular Biology
	<b>Jay Patel</b> Faculty Mentor	Characterization of Striated Fiber Assemblins in <i>T. gondii</i> Dr. Boris Striepen, Department of Cellular Biology
<b>Room C</b>	<b>Caitlin Cassidy</b> Faculty Mentor	The Art of Persuasion: How Small Business Owners Use Speech to Market Products in Roswell, GA Dr. William Kretzschmar, Department of English
	<b>Tyler Williamson</b> Faculty Mentor	Business Model Generation and Energy Informatics Dr. Rick Watson, Department of Management Information Systems
<b>Room D</b>	<b>Elodie Huguet</b> Faculty Mentor	Effects of Steel and Aluminum Shoes on Forelimb Action in Stock Horses Dr. Kylee Duberstein, Department of Animal & Dairy Science
	<b>Jonathan Jones</b> Faculty Mentor	Renewable Energy-Powered Bulk Milk Cooling for Smallholder Dairy Farmers Dr. William Kisaalita, Department of Biological & Agricultural Engineering
	<b>Waring Tribble</b> Faculty Mentor	Cuticular Pheromones and Fire Ant Queens: Smells Like Mom Dr. Ken Ross, Department of Entomology
<b>Room G</b>	<b>Jessica Alcorn</b> Faculty Mentor	The Validity of the News Marketing Hypothesis Dr. Audrey Haynes, Department of Political Science
	<b>Dana Higgins</b> Faculty Mentor	Risk-taking in Midterm Elections Dr. Charles Bullock, Department of Political Science
	<b>Justin Leef</b> Faculty Mentor	Salient Issues as Forces for Change in the Peach State: Bioscience and Research Meet Deep South Politics Dr. Charles Bullock, Department of Political Science
<b>Room H</b>	<b>Mary Golden</b> Faculty Mentor	An Analysis and Application of Foreign Language Education Methodology Dr. Victoria Hasko, Department of Language & Literacy Education
	<b>Matthew Seitz</b> Faculty Mentor	A Cold Calculus: Spending in K-12 Education Dr. Catherine Sielke, Department of Lifelong Education, Administration & Policy
	<b>Taylor Whelchel</b> Faculty Mentor	Academic Relevancy in the College Classroom Dr. Christopher Pisarik, Division of Academic Enhancement
<b>Room J</b>	<b>Dina Abdulhadi</b> Faculty Mentor	Deep Horizon: the Politicization of Science Dr. Leara Rhodes, Grady College of Journalism & Mass Communications

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**Rebecca Arnall** The Influence of Soren Kierkegaard on the Work of Walker Percy  
Faculty Mentor Dr. Hugh Ruppensburg, Department of English

**Anisha Hegde** The Boom That Saved the Day  
Faculty Mentor Dr. Leara Rhodes, Grady College of Journalism & Mass Communications

### **1:25 – 2:15 p.m. Fourth Concurrent Session**

Classic Center, Athena Breakout Rooms A, B, D, G, H, J

**Room A**      **Khalil Farah** Delegates' Personal Interests and their Influence on Crafting Congressional Qualifications at the Constitutional Convention  
Faculty Mentor Dr. Keith Dougherty, Department of Political Science

**Nathaniel Ament-Stone** Campaign Finance and Vote Outcomes in U.S. House Primary Elections  
Faculty Mentor Dr. Jamie Carson, Department of Political Science

**David Mapp** The Effects of Negative Political Campaign Advertising  
Faculty Mentor Dr. James Bason, Survey Research Center

**Room B**      **Kathryn Clifford, Sophie Winkler** The EEOC and the Federal Court of Appeals  
Faculty Mentor Dr. Scott Ainsworth, Department of Political Science

**Camille Gregory** Screening for Domestic Violence in Divorce Mediation  
Faculty Mentor Prof. Raye Rawls, The Fanning Institute

**Christen Hammock** Without Anchors: Standardizing Child Placement After Deportation  
Faculty Mentor Dr. Larry Nackerud, School of Social Work

**Room D**      **Jason Bowman** Analysis of the Inter-Rater Reliability of the Functional Movement Screen  
Faculty Mentor Dr. Cathleen Brown, Department of Kinesiology

**Melesse Nune** LysR-type Transcriptional Regulators  
Faculty Mentor Dr. Cory Momany, Department of Pharmaceutical & Biomedical Sciences

**Room G**      **Alyson Dankner** A Culture Identified by Canines: How Dogs Have Become an Integral Part of the American Public Self  
Faculty Mentor Dr. Katalin Medvedev, Department of Textiles, Merchandising & Interiors

**Christine Fekete** Traditional Textiles through a Modern Lens  
Faculty Mentor Prof. Jennifer Crenshaw, Lamar Dodd School of Art

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	<b>Shelly Hagigi</b> Faculty Mentor	Bedouin Dress: A Means of Cultural Continuity and Change Dr. Katalin Medvedev, Department of Textiles, Merchandising & Interiors
<b>Room H</b>	<b>Ryan Prior</b>  Faculty Mentor	Witch-Doctoring Tolstoy: Applying Traditional Healing Philosophies to <i>The Death of Ivan Ilych</i> Dr. Katarzyna Jerzak, Department of Comparative Literature
	<b>Jennifer Skinner</b> Faculty Mentor	Italian Futurists and Fascism Dr. Nell Andrew, Lamar Dodd School of Art
<b>Room J</b>	<b>Tyler Bugg</b> Faculty Mentor	Geographies of Expression: the Arts within Space and Scale Dr. Amy Trauger, Department of Geography
	<b>Daniel Cellucci</b> Faculty Mentor	Remote Sensing as a Generative Tool in the Creation of Fine Art Dr. Ralph Brown, Lamar Dodd School of Art
	<b>Brittany Norman</b> Faculty Mentor	Dust and Breath - Works of Art and Technology Dr. Martijn Van Wagtenonk, Lamar Dodd School of Art

### 2:30 – 3:45 p.m. Fifth Concurrent Session

Classic Center, Athena Breakout Rooms A, B, C, D, G, H, J

<b>Room A</b>	<b>Lisa Baer,</b> <b>Kacie Caudle,</b> <b>Robert Gentry</b> Faculty Mentor	The Relationship Between Personal Beliefs and Family Values in International College Students from a Hungarian University  Dr. Tsu-Ming Chiang, Department of Psychological Science, Georgia College & State University
	<b>Robert Daniel</b> Faculty Mentor	Friends of Convenience Dr. Michelle vanDellen, Department of Psychology
	<b>Mona Malacane</b> Faculty Mentor	The Influence of Popular Adolescent Television Programs Dr. Leonard Martin, Department of Psychology
<b>Room B</b>	<b>Virginia Broyles</b> Faculty Mentor	Nice to Have: Expression and Movement through Film Dr. Bala Sarasvati, Department of Dance
	<b>Joanna Reising</b>  Faculty Mentor	<i>Victory Over the Sun</i> : The Russian Futurist Transcendence over Materiality Dr. Nell Andrew, Lamar Dodd School of Art
<b>Room C</b>	<b>Debashis Ghose</b>  Faculty Mentor	Stability Analysis of the Inhibitor Resistant Phenotype of AJP50 in Biomass Fermentations Dr. Joy Doran Peterson, Department of Microbiology

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	<b>Courtney Ralston</b>	Kinetic, Temperature Dependent and Structural Analyses Of YqhD, an Escherichia coli NADPH Dependent Oxidoreductase Enzyme
	Faculty Mentor	Dr. William Lanzilotta, Department of Biochemistry & Molecular Biology
<b>Room D</b>	<b>Christina Azahar</b>	Music Pedagogy in Latin America: A Case Study of El Sistema Venezuela and its International Expansion
	Faculty Mentor	Dr. Susan Thomas, Hugh Hodgson School of Music
	<b>Smitha Ganeshan</b>	Ready for Disaster
	Faculty Mentor	Dr. David Williams, Honors Program
	<b>Matthew Passarello</b>	Pronunciation of Word-Final [ə] by Older Male Speakers from the South of France
	Faculty Mentor	Dr. Diana Ranson, Department of Romance Languages
<b>Room G</b>	<b>Melissa Brown</b>	Black Stereotypes in Reality Television and the Reinforcement of Prejudiced Attitudes
	Faculty Mentor	Dr. Leonard Martin, Department of Psychology
	<b>Daniel Smith</b>	In the Image of the Artist
	Faculty Mentor	Dr. Asen Kirin, Lamar Dodd School of Art
	<b>Jacob Young</b>	Exploring the Life and Techique of Michael Chekhov
	Faculty Mentor	Prof. George Contini, Department of Theatre & Film Studies
<b>Room H</b>	<b>Sylvia Shin</b>	The Evolution of Aging in <i>Saccharomyces cerevisiae</i>
	Faculty Mentor	Dr. David Hall, Department of Genetics
	<b>Stephen Thompson</b>	Intramolecular Friedel-Crafts Cyclization with Arylsilanes
	Faculty Mentor	Dr. George Majetich, Department of Chemistry
<b>Room J</b>	<b>Tierney O'Sullivan</b>	Investigating Early Warning Signals and Critical Slowing Down in Changing Environments
	Faculty Mentor	Dr. John Drake, Odum School of Ecology
	<b>John Rodriguez</b>	Improving the Claims-Making Process in Context to the 2010 Deepwater Horizon Oil Spill
	Faculty Mentor	Dr. Leara Rhodes, Grady College of Journalism & Mass Communications
	<b>Theresa Stratmann</b>	Changing Environments: Effect on Extinction Time and Distribution
	Faculty Mentor	Dr. John Drake, Odum School of Ecology
	<b>Sheena Zhang</b>	An Analysis of Green Buildings: Comparing Tsinghua University's Sino-Italian Ecological and Energy-Efficient Building and UGA's Odum School of Ecology Building
	Faculty Mentor	Dr. Laurie Fowler, Odum School of Ecology

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### 4:00 p.m. General Session

Classic Center, Athena Ballroom E

#### Introductions

Dr. David S. Williams, Associate Provost and Director, Honors Program

#### Remarks

Professor Jere W. Morehead, Senior Vice President for Academic Affairs and Provost

#### Excellence in Undergraduate Research Mentoring Awards

Dr. David C. Lee, Vice President for Research

#### Best Paper and UGA Libraries Research Award

Dr. Laura Jolly, Vice President for Instruction  
Ms. Deborah Dietzler, Executive Director, Alumni Association  
Ms. Caroline Barratt, Director, Miller Learning Center Library Commons

#### Introduction of Keynote Speaker

Ms. Shenna Zhang, Foundation Fellow '11, Ecology, Biology And Sustainable Design in the Built Environment

#### Keynote Address: *Doing Science in the Face of a National Emergency*

Dr. Samantha Joye, Department of Marine Sciences

### 5:00 p.m. *Science as Art*\*

Classic Center, Grand Hall South (downstairs)

Science as Art **Miles Keeney-Ritchie** Extracting Power from Induced Airstreams on Expressways  
Poster #45

Faculty Mentor

Dr. John Schramski, Department of Biological & Agricultural Engineering

\**Science as Art* is the presentation of images or data gathered during the research process that demonstrate artistic principles such as balance, contrast, proportion, harmony and value. Mr. Keeney-Ritchie's submission was selected for the CURO 2011 Symposium *Science as Art* Award.

### 5:00 p.m. Poster Presentations

Classic Center, Grand Hall South (downstairs)

Poster #1	<b>Anuj Shukla</b>	Human Embryonic Stem Cell Derived Neurons as Biosensors for Neurotoxins
	Faculty Mentor	Dr. Steven Stice, Department of Animal & Dairy Science
Poster #2	<b>Garrett Casale</b>	Role of the Telomere Binding Protein TPP1 in Recruitment of Telomerase to Telomeres in Human Cancer Cells
	Faculty Mentor	Dr. Michael Terns, Department of Biochemistry & Molecular Biology
Poster #3	<b>Rachel Appelbaum</b>	An RNA-Protein Complex of a Prokaryotic Immune System
	Faculty Mentor	Dr. Michael Terns, Department of Biochemistry & Molecular Biology

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Poster #4	<b>Carla Rutherford</b> Faculty Mentor	Morphological Changes Accompanying Killing of <i>Trypanosoma brucei brucei</i> by Human Serum Dr. Stephen Hajduk, Department of Biochemistry & Molecular Biology
Poster #5	<b>Alexander Sevy</b> Faculty Mentor	Ty1 Element Antisense RNA Activity from Natural Saccharomyces Isolates Dr. David Garfinkel, Department of Biochemistry & Molecular Biology
Poster #6	<b>Samar Aldrugh</b> Faculty Mentor	Exploring the Effect of Cysteine Mutations on Rce1p Substrate Recognition and Enzyme Efficiency Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
Poster #7	<b>Daniel Hess</b> Faculty Mentor	Directed Differentiation of Human Embryonic Stem Cells to Mesoderm Lineages Dr. Stephen Dalton and Dr. David Reynolds, Department of Biochemistry & Molecular Biology
Poster #8	<b>Byron Crowe</b> Faculty Mentor	Efficacy of Alternative and Combinatorial Drug Therapies in the Treatment of <i>Trypanosoma Cruzi</i> Infection Dr. Rick Tarleton, Department of Cellular Biology
Poster #9	<b>Jeffrey Tran</b> Faculty Mentor	The Role of Indoleamine 2,3-Deoxygenase in CD8 T Responses to Influenza Infection Dr. Kimberly Klonowski, Department of Cellular Biology
Poster #10	<b>David Liddle</b> Faculty Mentor	Polysialylation Changes During Human Stem Cell Development Dr. Michael Pierce, Department of Biochemistry & Molecular Biology
Poster #11	<b>Sarah-Bianca Dolisca</b> Faculty Mentor	Effects of N-Acetylglucosaminyltransferase Expression Levels on Colorectal Adenoma Progression Dr. Michael Pierce, Department of Biochemistry & Molecular Biology
Poster #12	<b>Shanterian Hester</b> Faculty Mentor	Exercising Glycoproteomics to Develop New Methodologies for the Detection of Early Breast Cancer Dr. Michael Pierce, Department of Biochemistry & Molecular Biology
Poster #13	<b>Melanie Fratto</b> Faculty Mentor	Do Black-Furred Animals Compensate for High Solar Absorption with Smaller Hairs? A Test with a Polymorphic Squirrel Species Dr. Andrew Davis, Odum School of Ecology
Poster #14	<b>Malavika Rajeev</b> Faculty Mentor	The Effect of Parasite Infection on Monarch Butterfly Mating Behavior Dr. Sonia Altizer, Odum School of Ecology

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Poster #15	<b>Samuel Willis</b> Faculty Mentor	Diversity of Orchid Fungal Symbionts in Estonian Mine Tailings Dr. Richard Shefferson, Odum School of Ecology
Poster #16	<b>Stenka Vulova</b> Faculty Mentor	Nutrient Enrichment Effects on Detrital Food Resources in Streams: Implications for Microbes and Consumers Dr. Amy Rosemond, Odum School of Ecology
Poster #17	<b>Rebecca Risser</b> Faculty Mentor	Effects of <i>Ligustrum sinense</i> Presence and Removal on Nitrogen Mineralization Rates Dr. Paul Hendrix, Odum School of Ecology
Poster #18	<b>Courtney Allen</b> Faculty Mentor	Salamander Trophic Position and Diet Diversity in Southern Appalachian Headwater Streams Dr. Amy Rosemond, Odum School of Ecology
Poster #19	<b>Waring Tribble</b> Faculty Mentor	Cuticular Pheromones and Fire Ant Queens: Smells Like Mom Dr. Ken Ross, Department of Entomology
Poster #20	<b>Georgianna Mann</b> Faculty Mentor	<i>Bufo marinus</i> Pathogen and Parasite Analysis as a Model for Ecosystem Change Dr. Sonia Hernandez, Warnell School of Forestry & Natural Resources
Poster #21	<b>Erin Giglio</b> Faculty Mentor	Sensory Systems in <i>Drosophila</i> Courtship Dr. Kelly Dyer, Department of Genetics
Poster #22	<b>Zijing Guo</b> Faculty Mentor	Telomere Recombination in Wild Type Yeast Cells Dr. Michael McEachern, Department of Genetics
Poster #23	<b>Rakia Nasir</b> Faculty Mentor	Analysis of rRNA Maturation in <i>Escherichia coli</i> Dr. Sidney Kushner, Department of Genetics
Poster #24	<b>Anisha Hegde</b> Faculty Mentor	Medical Therapies and Clinical Characteristics among Patients with Duchenne and Becker Muscular Dystrophy Dr. Michael Terns, Department of Biochemistry & Molecular Biology
Poster #25	<b>Erica Gibson</b> Faculty Mentor	How Effective Are “Fuzzies” as a Tool for Developing a Holistic Understanding of Basic Genetic Principles? Dr. Eve Wurtele, Department of Genetics, Development & Cell Biology, Iowa State University
Poster #26	<b>Akanksha Rajeurs</b> Faculty Mentor	Development of a System for Targeted Mutagenesis in <i>Mycobacterium Tuberculosis</i> Dr. Russell Karls, Department of Infectious Diseases
Poster #27	<b>Elena James</b> Faculty Mentor	Development of a Plasmid to Detect Cobalamin Transport Mutants in <i>Mycobacteria Tuberculosis</i> Dr. Russell Karls, Department of Infectious Diseases

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Poster #28	<b>Oluremi Ojo</b> Faculty Mentor	Expression of the DBL3x Domain of VAR2CSA in <i>E. coli</i> Dr. David Peterson, Department of Infectious Diseases
Poster #29	<b>Jenna Adair</b> Faculty Mentor	Virulence Associated Protein A is the Only Vap-Family Member Required for Virulence in the Intracellular Actinomycete Pathogen <i>Rhodococcus equi</i> Dr. Mary Hondalus, Department of Infectious Diseases
Poster #30	<b>Elizabeth May</b> Faculty Mentor	Assessment of 5-Aminolevulinate Acid Synthase Expression & Purification Methods Dr. Harry Dailey, Department of Biochemistry & Molecular Biology
Poster #31	<b>Lauren McLeod</b> Faculty Mentor	<i>Zot</i> as a Potential Virulence Factor for <i>Neisseria meningitidis</i> Dr. Anna Karls, Department of Microbiology
Poster #32	<b>Debashis Ghose</b> Faculty Mentor	Stability Analysis of the Inhibitor Resistant Phenotype of AJP50 in Biomass Fermentations Dr. Joy Doran Peterson, Department of Microbiology
Poster #33	<b>Aisha Mahmood</b> Faculty Mentor	Membrane Topologies of <i>E. coli</i> HemH and HemG Biosynthetic protein studies using Alkaline Phosphatase Fusions Dr. Harry Dailey, Department of Microbiology
Poster #34	<b>Lauren Sullivan</b> Faculty Mentor	Presence of Newcastle Disease Through Immunohistochemistry in Tissues of Chickens Diagnosed with the Disease in the Field Dr. Corrie Brown, College of Veterinary Medicine
Poster #35	<b>Anna White</b> Faculty Mentor	Clinico-pathological Characterization of Newly Isolated Newcastle Disease Viruses from Dominican Republic, Belize and Peru Dr. Corrie Brown, College of Veterinary Medicine
Poster #36	<b>Vinh Dong</b> Faculty Mentor	A Sensitive Approach in Evaluating the PBP (Penicillin Binding Protein) Binding Specificity of Penicillins using Activity Based Protein Profiling Dr. Timothy Long, Department of Pharmaceutical & Biomedical Science
Poster #37	<b>Song Kue</b> Faculty Mentor	Comparing the Effects of the Ras Inhibitor Manumycin A with Novel Ras Converting Enzyme 1 Inhibitors Dr. Shelley Hooks, Department of Pharmaceutical & Biomedical Science
Poster #38	<b>Bhavi Patel</b> Faculty Mentor	The Role of Histidines in pH Dependence of Human Equilibrative Nucleoside Transporter 3 Dr. Rajgopal Govindarajan, Department of Pharmaceutical & Biomedical Science

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Poster #39	<b>Alexandre Matte Santos</b> Faculty Mentor	Study of the Genetic Diversity of Isolated <i>Veratrum woodii</i> Populations in Georgia using AFLPs Dr. Wendy Zomlefer, Department of Plant Biology
Poster #40	<b>Katherine Perofsky</b> Faculty Mentor	The Use of PCR Assays to Determine the Extent of Zones of Hybridization of <i>Culex Pipiens Quinquefasciatus</i> and <i>Culex Pipiens Pipiens</i> in Georgia Dr. Daniel Mead, Department of Population Health
Poster #41	<b>Grant Perry</b> Faculty Mentor	Expression of Heat Shock Proteins 27 & 72 in Canine Intracranial Meningiomas Dr. Simon Platt, College of Veterinary Medicine
Poster #42	<b>Asaph Levy</b> Faculty Mentor	Kynureninase and Its Affect on Late Onset Diseases Dr. Robert Phillips, Department of Chemistry
Poster #43	<b>Jessica Fazio</b> Faculty Mentor	Luche Reduction Dr. Richard Hubbard, Department of Chemistry
Poster #44	<b>Victoria DeLeo</b> Faculty Mentor	Intron Loss and Gain in the Br2/Dw3 Gene across Grass Subfamilies Dr. Katrien Devos, Department of Crop & Soil Sciences
Poster #45	<b>Miles Keeney-Ritchie</b> Faculty Mentor	Extracting Power from Vehicle Induced Airstreams on Expressways Dr. John Schramski, Department of Biological & Agricultural Engineering
Poster #46	<b>Erin Roberts</b> Faculty Mentor	Using Fluorescence to Identify Insect Damage to Cotton Bolls Dr. Mark Haidekker, Department of Biological & Agricultural Engineering
Poster #47	<b>Katherine Riccione, Ryan Boelter, Tina Carson, Chase Mooney</b> Faculty Mentor	Design of a Computed Tomography Scanner with Components from an Existing DEXA Machine Dr. Mark Haidekker, Department of Biological & Agricultural Engineering
Poster #48	<b>Akil Piggott</b> Faculty Mentor	Women with Naturally Bright Red Hair Report Higher Pain in Response to Thermal Stimuli and Reduced Pain in Response to a Mild Muscle Injury Compared to Dark-Haired Women Dr. Pat O'Connor, Department of Exercise Science
Poster #49	<b>Allegra Yeley</b> Faculty Mentor	Sanctity as a Means of Conservation: Tongariro National Park, New Zealand Dr. Fausto Sarmiento, Department of Geography
Poster #50	<b>Emily First</b> Faculty Mentor	Mineral Probes of Magmatic Processes at Valles Caldera, Northern New Mexico Dr. Michael Roden, Department of Geology

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Poster #51	<b>Ashleigh Gainer</b> Faculty Mentors	The Biogeochemistry of Hammock Groundwater Dr. Samantha Joye, Department of Marine Sciences
Poster #52	<b>Caroline West</b> Faculty Mentor	Breastfeeding Practices among Hispanic Women in Athens Dr. Susan Tanner, Department of Anthropology
Poster #53	<b>Laura O'Neill</b> Faculty Mentor	The Effect of N-Back Stimuli Type on Performance Dr. Rebecca S. Marshall, Department of Communication Sciences & Special Education
Poster #54	<b>Ai Taniguchi</b> Faculty Mentor	Linguistic and Musical Coherence Dr. Paula Schwanenflugel, Department of Educational Psychology & Instructional Technology
Poster #55	<b>Amarachi Anukam</b> Faculty Mentor	Healthy Teens: a Longitudinal Study of 'At Risk' Secondary Students Dr. Pamela Orpinas, Department of Health Promotion & Behavior
Poster #56	<b>Eric Ekwueme</b> Faculty Mentor	The Use of Twitter by University of Georgia Student Organizations and Their Members Dr. Brenda Cude, Department of Housing & Consumer Economics
Poster #57	<b>Ashley Bartlett</b> Faculty Mentor	The Elements of Chinese Grand Strategy: Applying a New Analytical Approach Dr. Brock Tessman, Department of International Affairs
Poster #58	<b>Courtney Witt</b> Faculty Mentor	Sexual Attitudes, Media Use and Norms: Assessing Favorably to Sexually Explicit Media and Exposure Effects on Norm Distortion Dr. Tom Reichert, Department of Advertising and Public Relations
Poster #59	<b>Archil Japardize</b> Faculty Mentor	Security Contractors: The Future of Peacekeeping? Dr. Fred Manget, School of Law
Poster #60	<b>Cody Nichol</b> Faculty Mentor	Emotion Regulation in Children: Implications for Affect and Childhood Psychopathology Dr. Cynthia Suveg, Department of Psychology
Poster #61	<b>Litty Varghese</b> Faculty Mentor	Measurements of Inhibition: The Relation between the Eriksen Flanker Task and the Stop Signal Task Dr. Jennifer McDowell, Department of Psychology
Poster #62	<b>Lindsay Briggs</b> Faculty Mentor	Sex Differences in the Mechanisms Underlying Facial Expression Recognition: Effects of Cognitive Load and Facial Mimicry on Facial Expression Recognition Dr. Janet Frick, Department of Psychology

## *Program*

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Poster #63	<b>Laura Smart</b> Faculty Mentor	Dialectical Behavior Therapy and Distraction: Using the Cold Pressor Task to Determine Efficacy Dr. Rheeda Walker-Obasi, Department of Psychology
Poster #64	<b>Madison Asef</b> Faculty Mentor	Lutein and Zeaxanthin Availability in Bodily Tissues Dr. Billy Hammond, Department of Psychology
Poster #65	<b>Vivien Tsou</b> Faculty Mentor	“I’ve got the rhythm, she’s got the blues.” Relations between Temperament, Maternal Stress and the Development of a Sleep-Wake Rhythm in Infancy Dr. Anne Shaffer, Department of Psychology
Poster #66	<b>Kristen Cerny, Julia Taylor</b> Faculty Mentor	Assessing Baseline Characteristics of Mother-Child Dyads Participating in the AFFECT (A Family Focused Emotion Communication Training) Pilot Study Dr. Anne Shaffer, Department of Psychology
Poster #67	<b>Quincy Zhong</b> Faculty Mentor	Glare Disability, Photostress Recovery and Chromatic Contrast in Relation to Retinal Lutein and Zeaxanthin Dr. Billy Hammond, Department of Psychology

## *Excellence in Undergraduate Research Mentoring Awards*

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The Office of the Senior Vice President for Academic Affairs and Provost and the Honors Program established the Excellence in Undergraduate Research Mentoring Award in 2001. This award recognizes faculty, departments, and programs devoted to outstanding research mentorship of undergraduate students.

Awards will be presented at the General Session of the CURO 2011 Symposium on Monday, April 4, 2011 at 4:00 p.m. in the Classic Center, Athena Ballroom E.

### *2011 Awards*

**Master Level Faculty Award**

Dr. Eric Stabb, Department of Microbiology

**Early Career Faculty Award**

Dr. John Drake, Odum School of Ecology

**Program Award**

Savannah River Ecology Laboratory

Dr. Kenneth McLeod, Interim Director

### *2010 Awards*

**Early Career Faculty Award**

Dr. John C. Maerz, Warnell School of Forestry & Natural Resources

### *2009 Awards*

**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 Awards*

**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 Awards*

**Master Level Faculty Award**

Dr. Timothy Hoover, Department of Microbiology

**Early Career Faculty Award**

Dr. Steven Stice, Department of Animal & Dairy Science

# *Excellence in Undergraduate Research Mentoring Awards*

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## *2006 Awards*

### **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 Awards*

### **Faculty Awards**

Dr. Gary Barrett, Odum School of Ecology

Dr. Sidney Kushner, Department of Genetics

### **Department Award**

Department of Cellular Biology

## *2004 Awards*

### **Faculty Award**

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

## *2003 Awards*

### **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 Awards*

### **Faculty Awards**

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

## *Excellence in Undergraduate Research Mentoring Awards*

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### **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 Awards*

#### **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

## *Thanks and Acknowledgements*

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### *Special Assistance Provided by:*

Ms. Whitney Ising	Student Worker, Center for Undergraduate Research Opportunities
Mr. Alex Knoblock	Student Worker, Center for Undergraduate Research Opportunities
Ms. Dorothé Otemann	Coordinator of External Affairs, Honors Program
Ms. Lindsay Salmon	Administrative Associate, Center for Undergraduate Research Opportunities

### *Graduate Student Reviewers for CURO 2011 Symposium*

Ms. Lisa Bolding	Department of English
Ms. Paulina Bounds	Department of English
Ms. Carol M. Britton-Laws	School of Social Work
Mr. Sean Buskirk	Department of Infectious Diseases
Mr. Phillip Callihan	Department of Pharmaceutical & Biomedical Sciences
Mr. Paul Carlsen	Department of Political Science
Ms. Ujjani Das	Department of Geography
Mr. Douglas Eudy	Institute of Plant Breeding, Genetics & Genomics
Ms. Andrea Fritts	Warnell School of Forestry & Natural Resources
Ms. Heather Gallivan	Department of Anthropology
Ms. Lisa Kanizay	Department of Plant Biology
Ms. Teneema Kuriakose	Department of Infectious Diseases
Ms. Jacquelyn Lee	School of Social Work
Ms. Ann MacFadyen	Department of Anthropology
Ms. Adrienne Madison	Department of Biological Engineering
Ms. Rachel Mahan	Warnell School of Forestry & Natural Resources
Ms. Cary McGinnis	Department of Pharmaceutical & Biomedical Sciences
Ms. Anna McKee	Warnell School of Forestry & Natural Resources
Mr. Jason Mock	Department of Pharmaceutical & Biomedical Sciences
Ms. Anne O'Brien	Department of Kinesiology
Ms. Crystal Phillips	Department of Microbiology
Mr. Graham Pickren	Department of Geography
Mr. David Porcaro	Department of Educational Psychology and Instructional Technology
Mr. Billy Pryor	Department of Kinesiology
Mr. Terrence Ryan	Department of Kinesiology
Ms. Barbara Shock	Warnell School of Forestry & Natural Resources
Mr. Zachary Smith	Department of History
Ms. Rachel Lynn Snyder	Department of Political Science
Ms. Amy Styer	Department of Biochemistry
Mr. Brian Vaccaro	Department of Chemistry
Mr. Alexander Vaughn	Department of Chemistry
Mr. B.J. Wimpey	Department of Computer Science

### *Faculty Reviewers for 2011 Best Paper Awards*

Prof. Mark Callahan	Lamar Dodd School of Art
Dr. Timothy Hoover	Department of Microbiology
Dr. Stacey Kolomer	School of Social Work
Dr. Fran Teague	Department of English
Dr. Kalpen Trivedi	Department of English

## *Thanks and Acknowledgements*

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### *Graduate Student Reviewers for 2011 Best Paper Awards*

Ms. Mollie Barnes	Department of English
Ms. Lisa Bolding	Department of English
Ms. Teneema Kuriakose	Department of Infectious Diseases
Ms. Jacquelyn Lee	School of Social Work
Ms. Cary McGinnis	Department of Pharmaceutical & Biomedical Science
Ms. Crystal Phillips	Department of Microbiology

### *Reviewers for 2011 Excellence in Undergraduate Research Mentoring Awards*

Dr. Brian Cummings	Associate Professor, Pharmaceutical & Biomedical Science, College of Pharmacy (2009 Early Career EURM)
Dr. Anna Karls	Associate Professor, Microbiology, Franklin College of Arts & Sciences (2009 Early Career EURM)
Dr. John Maerz	Associate Professor, Vertebrate Ecology, Warnell School of Forestry & Natural Resources (2010 Early Career EURM)
Dr. Walter Schmidt	Assistant Professor, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences (2008 Early Career EURM)

### *Reviewers for CURO 2011 Summer Research Fellowships*

Dr. Brian Cummings	Department of Pharmaceutical & Biomedical Sciences
Dr. Kevin McCully	Department of Kinesiology
Dr. Pamela Orpinas	Department of Health Promotion & Behavior
Dr. Cynthia Suveg	Department of Psychology
Dr. Susan Sanchez	College of Veterinary Medicine

### *2010-11 CURO Gateway Seminar Faculty*

Prof. Mark Callahan	Lamar Dodd School of Art
Dr. Christopher Cornwell	Department of Economics
Dr. John Dayton	Department of Lifelong Education, Administration & Policy
Dr. Marcus Fechheimer	Department of Cellular Biology
Dr. Erik Hofmeister	School of Veterinary Medicine
Dr. Katarzyna Jerzak	Department of Comparative Literature
Dr. William A. Kretzschmar	Department of English
Ms. Adrienne Madison	Department of Biological & Agricultural Engineering
Dr. John Maerz	Warnell School of Forestry & Natural Resources
Dr. John Maurer	Department of Microbiology
Dr. Jeffrey M. Netter	Department of Banking & Finance
Ms. Crystal Phillips	Department of Microbiology
Dr. Paul A. Schroeder	Department of Geology

### *CURO 2011 Symposium Thesis Roundtable Facilitators*

Ms. Maria de Rocher	Program Coordinator, Honors Program
Ms. Jessica Hunt	Scholarships Coordinator, Honors Program
Dr. Martin Rogers	Coordinator of Courses & Advising, Honors Program
Ms. Kelly Rosinger	Graduate Assistant, Center for Undergraduate Research Opportunities

### Deep Horizon: the Politicization of Science

Dina Abdulhadi, Roosevelt @ UGA  
Dr. Leara Rhodes, Grady College of Journalism  
& Mass Communications, University of Georgia

Up to this point, response to the Deepwater Horizon Oil Spill has mostly addressed economic impacts for Gulf residents. The Gulf Ecosystem Restoration Task Force aims to address issues of long-term environmental resiliency in the Gulf Region, including environmental issues, such as hypoxia, that existing before the spill. Which concerns are deemed important enough to address, however, depend on initial assessments of how the spill has changed Gulf ecosystems. The different hands involved in research--BP, Federal environmental agencies, and university researchers--have little coordination or collaboration. Estimates of oil persistence conflict; as of August 2010, FEMA stated that only 25 percent of the oil remained in the Gulf Ocean, while the Georgia Sea Grant estimated between 70 and 79 percent <sup>[1]</sup>. Disagreement over this foundational understanding and the effect of dispersant use will make future environmental policies insufficient in addressing human and ecosystem health; while Exxon ended cleanup after oil was no longer easily visible, NOAA discovered that "very little" of the original oil from Exxon Valdez had "disappeared" by 2007, almost 18 years after the spill <sup>[2]</sup>. By researching the role of science in creating policy with retrospect to Exxon Valdez, this study aims to outline potential strategies for standardizing research in order to prevent ideological or economic biases from preventing implementation of needed environmental protection measures.

1. University of Georgia. UGA Office of Public Affairs. *Report Concludes That Nearly 80 Percent of Oil from Gulf Spill Remains*. 16 Aug. 2010. Web. 25 Jan. 2011.  
<[http://www.uga.edu/news/artman/publish/100816\\_Sea\\_Grant.shtml](http://www.uga.edu/news/artman/publish/100816_Sea_Grant.shtml)>.

2. Weise, Elizabeth. "Damage of Exxon Valdez Endures." *USA Today*. 01 Feb. 2007. Web. 25 Jan. 2011.

<[http://www.usatoday.com/news/nation/2007-01-31-exxon-alaska\\_x.htm](http://www.usatoday.com/news/nation/2007-01-31-exxon-alaska_x.htm)>.

### Virulence Associated Protein A Is the Only Vap-family Member Required for Virulence in *Rhodococcus equi*

Jenna Adair  
Dr. Mary Hondalus, Department of Infectious  
Diseases, University of Georgia

*Rhodococcus equi* (*R. equi*) is a facultative intracellular pathogen of macrophages. It causes severe pneumonia in young foals, and has also emerged as an opportunistic pathogen in immunocompromised people. *R. equi* contains a virulence plasmid housing a pathogenicity island (PAI) upon which resides the novel *vap* gene family encoding the virulence-associated-proteins (Vaps ACDEFGHIX). The functions of the individual Vap proteins are unknown but studies have shown that the *vapA* gene is essential for virulence. Deletion of this gene abolishes the ability of *R. equi* to replicate within macrophages and to cause disease in a mouse infection model system. However, expression of *vapA* alone is not sufficient; additional PAI-encoded genes are required for manifestation of the full virulence phenotype. The focus of this study was to determine whether any of the related Vap protein family members are necessary for *R. equi* virulence. To address this question, a series of mutants with deletions of one or combinations of various *vap* genes were constructed via allelic exchange and their growth capacity in macrophages was analyzed by dilution plating of infected macrophage lysates. Results from intramacrophage growth assays showed that deletion of all the *vap* genes, with the exception of *vapA*, had no significant impact on the bacterium's ability to replicate in macrophages. These data suggest that *vapA* is the only *vap* protein absolutely essential for virulence.

### **The Validity of the News Marketing Hypothesis**

Jessica Alcorn, CURO Summer Fellow  
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Network news, introduced during the mid 20<sup>th</sup> century, was originally regarded as a prompt and parsimonious manner of learning about the most important events of the day—plain and simple-facts. However, as network news viewership increased, reaching high points in the 1980s and 1990s, so did the number of possible news sources—the traditional newspaper, cable news, the internet, and talk radio, to name a few. As a result, news networks were forced into a more competitive market. In order to retain viewers, network news stations began marketing their news to particular loyal subsets of the population. Using a coding system, we systematically examined the transcripts from Presidential debate commentary for three major television networks—FOX, CNN, and NBC. We exclusively analyzed the period from 1980 to 2009, as technology allowed for an increase in overall TV and news viewership during this time period. This study seeks to determine whether the materialization of various competing news sources has permitted each station to target a specific demographic and ideological viewpoint, thereby yielding the audience of each news source largely homogenous. We are still currently working on measuring the significance of the quantitative results gathered in this study. If the news marketing hypothesis were validated, a news viewer's perception of critical events could be considerably skewed according to the news outlet chosen.

### **Exploring the Effect of Cysteine Mutations on Rce1p Substrate Recognition and Enzyme Efficiency**

Samar Aldrugh, CURO Scholar  
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Uncontrolled cell proliferation and migration are common characteristics of malignancies. One causative factor is the aberrant constitutive activation of Ras GTPase proteins, which can

result in tumorigenesis. In fact, Ras point mutations are generally found in 20% to 30% of all human cancers, and higher incidences in specific tumors (e.g. pancreatic). Ras undergoes several post-translational modifications, including proteolysis by Rce1p, which cleaves within a C-terminal-CaaX motif found on precursors of Ras and other substrates, such as the a-factor yeast mating pheromone. Initially, it was proposed that Rce1p is a cysteine protease. A cysteine-less form of Rce1p, however, is functional *in vivo*, indicating that cysteines are not critical to the enzymatic activity of Rce1p. On the other hand, we have observed that cysteine-less Rce1p does not efficiently cleave short synthetic peptides based on Ras and a-factor *in vitro*, indicating a possible role for cysteines in substrate recognition. We hypothesize that Rce1p binds substrates in a dual mode via a CaaX proximal cysteine-dependent recognition element (PRE), and a CaaX distal cysteine-independent recognition element (DRE). We predict that WT Rce1p relies on both PRE and DRE for recognizing and cleaving its substrates, whereas cysteine-less Rce1p relies on DRE. This prediction is being evaluated with a series of *in vivo* reporters having modified recognition elements in combination with WT and cysteine-less Rce1p. We anticipate that our findings will better our understanding of Rce1p mechanism of action to effectively design inhibitors that can be used as anticancer drugs.

### **Salamander Trophic Position and Diet Diversity in Southern Appalachian Headwater Streams**

Courtney Allen  
Dr. Amy Rosemond, Odum School of Ecology, University of Georgia

Diet and life history data are important to understanding how organisms will respond to global environmental changes. Mobilization of nitrogen (N) and reductions in availability of phosphorous (P) globally are influencing organic matter processing in aquatic ecosystems. These changes in key food resources will influence production and distribution of top predators, such as stream salamanders. We investigated how salamander elemental body composition and diet varied with body size in non-impacted

streams. Through investigation of carbon (C), N and P content as well as isotopic signatures, we gathered baseline data on trophic position of black-bellied salamanders, *Desmognathus quadramaculatus*, ( $n = 10$ ) in five southern Appalachian headwater streams at the Coweeta Long-term Ecological Research (LTER) site. Additionally, through gut content analysis, we investigated the diet composition of the salamanders. Using linear regression, we measured declines in body C:N and C:P, and C and N isotopes of *D. quadramaculatus* with increasing body size. Although changes in N and P concentrations are expected with increasing body size in vertebrates due to potential diet shifts and bone growth, size-dependent isotope patterns were not explained by differences in diversity or composition of invertebrate prey items. Further examination of the composition of prey items in *D. quadramaculatus* guts may explain size-dependent declines in body C and N isotopes. Understanding baseline trophic dynamics in freshwater systems will allow us to quantify and predict the relative impacts of various ratios of N and P inputs, as well as other types of global change on headwater stream food webs.

### **Campaign Finance and Vote Outcomes in U.S. House Primary Elections**

Nathaniel Ament-Stone, Roosevelt @ UGA  
Dr. Jamie Carson, Department of Political Science, University of Georgia

Even as public confidence in Congress sits near all-time recorded lows—a recent CBS poll pegs congressional approval at 24 percent—retention rates for House incumbents remain historically high, with 94 percent (on average) of incumbents reelected, and all but 11 renominated in party primaries, in the past four election cycles. High retention rates, despite public disapproval, represent a loss to the public interests of competitive elections and responsive representation, and prompt the question of how to promote greater levels of effective electoral competition—that is, competition which, on average, lowers incumbent renomination rates and victory margins. Based on an examination of how campaign spending levels affect renomination rates in the House of

Representatives, this paper compares alternative campaign finance regulations to incentivize primary competition. Applying data from previous studies correlating campaign spending to election outcomes, this presentation compiles relevant political science research and incorporates recent election data and legislative history. Several possible alterations to campaign finance law are then compared based on their projected cost-effectiveness, political and administrative feasibility, and effects on free speech. The alternatives examined are a repeal of individual campaign contribution limits, a matching public subsidy scheme for primary challengers who raise a starting sum of \$25,000, and a lower (\$2,400 per primary election) limit on contributions from party or political action committees. The research concludes that the most effective policy, repealing individual contribution limits, is also the likeliest to withstand Supreme Court First Amendment review, though it faces challenges regarding political feasibility.

### **Healthy Teens: a Longitudinal Study of 'At Risk' Secondary Students**

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Healthy Teens is a longitudinal study of a cohort of students from Northeast Georgia who were surveyed yearly from grades six through twelve. The goal of Healthy Teens is to examine the developmental pathways that students follow during middle and high school—crucial stages in the journey to adulthood. In this study, we explored the relation between neighborhood environment and delinquent behavior. The sample consisted of 581 students (52.5% male, 45.4% Caucasian, 38.2% African American, 11.2% Latino, 1.2% Asian, and 4% Multiracial/Other). In sixth grade, students attended one of nine middle schools in NE Georgia, representing a diverse group of schools (urban/rural location, SES of students, racial diversity). Using an adapted version of the Neighborhood Observational Checklist, we collected data on physical characteristics of the neighborhoods of the last known address of Healthy Teens participants. Based on participant

self-reported data, we have identified three delinquency trajectories. We compared neighborhood characteristics, for example, condition of homes, police presence, type of housing, and graffiti, by delinquency categories. None of the neighborhood characteristics differed significantly by delinquency trajectory. The presentation will discuss the qualitative aspects of the students' resident communities and dropout rates for each trajectory. Through further analysis of data from the Healthy Teens study, we hope to understand how adolescent behaviors interact, so that strong prevention programs may be developed for youth, families, and schools. Such prevention programs will aim to help youth make healthy and non-violent choices.

### **An RNA-Protein Complex of a Prokaryotic Immune System**

Rachel Appelbaum, CURO Scholar  
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Recently, a small RNA-guided prokaryotic immune system was discovered that protects organisms from viruses, plasmids and other invaders. This immune system is called the CRISPR (Clustered, Regularly Interspaced Short Palindromic Repeat)-Cas (CRISPR-Associated) system and is composed of small RNAs from the CRISPR gene locus called prokaryotic silencing, or (psi)RNAs, and proteins from the Cas genes. The focus of this research is a specific psiRNA-Cas protein complex that was isolated in the Terns' lab and shown to function in psiRNA-guided destruction of invader RNA. The specific goals of this research include: (1) to reconstitute the RNA-protein complex and show that it binds psiRNA and cleaves target RNA; (2) to understand RNA-protein interactions within the complex; (3) to determine protein-protein interactions within the complex; and (4) to determine which proteins are required for function of the complex. The reconstitution of this RNA-protein complex from incubation of synthetic psiRNA with recombinant Cas proteins shows cleavage of a target RNA sequence, like it is in vivo activity. The results of protein co-expression assays (via simultaneous transformation of two plasmids with different

selection markers) indicate at least three instances of protein-protein interactions between two of the Cas proteins. RNA binding studies suggest that four of the six Cas proteins are critical for association with the psiRNA. All six of the Cas proteins are required for the RNA-protein complex to function efficiently. Understanding the molecular organization of this RNA-protein complex is vital in understanding the mechanism of prokaryotic defense against viruses and other potentially harmful mobile genetic elements.

### **The Influence of Soren Kierkegaard on the Work of Walker Percy**

Rebecca Arnall  
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University of Georgia

The existential movement, especially the writings of Christian existentialist Soren Kierkegaard, influenced the writings of Walker Percy, a philosophical novelist of the American South. In his works, Kierkegaard describes three stages through which he believes people move in their search to find their reason for existence, or the worth, significance, or authenticity they find in their lives. He calls these the aesthetic, ethical, and religious stages. According to Kierkegaard, not all people progress through all three stages. Some even regress, yet at any time they will reside in one of the three stages. After comparing the protagonists of Percy's fiction to Kierkegaard's stages as outlined in his books *Either/Or* (1843) and *Fear and Trembling* (1843), I have found that, following a sudden realization regarding the futility of their pursuits, each of Percy's protagonists follows a different path through Kierkegaard's stages in his search for meaning. This search is often colored by the loose brand of Catholicism practiced by Percy's protagonists, which often hinders them from reaching the religious stage. This research explores the influence of Kierkegaard's three stages on Percy's fiction, as he explores each protagonist's individual struggles and search for meaning. Understanding Kierkegaard's influence on Percy—especially on the struggles of his protagonists—enables an understanding of Kierkegaard's thought and of existentialism in general.

### **Lutein and Zeaxanthin Availability in Bodily Tissue**

Madison Asef

Dr. Billy Hammond, Department of Psychology,  
University of Georgia

Lutein and zeaxanthin are two carotenoids, found readily in green, leafy vegetables, known to deposit heavily in adipose tissue and in the retina, where they are referred to as macular pigment. Macular pigment has protective benefits against age-related macular degeneration by reducing the amount of oxidative stress in the retina. The level of macular pigment appears to vary among individuals according to percentage body fat. The purpose of this experiment is to evaluate the relation between macular pigment and body fat percentage and to potentially explain covariates of lutein absorption in the tissue after a dietary intervention. 86 subjects, between the ages of 18-40, completed measures of macular pigment optical density (MPOD) and body composition. Heterochromatic flicker photometry was used to determine MPOD and dual-energy X-ray absorptometry (DXA) scans assessed percentage body fat. Baseline data indicated an inverse relationship between body fat percentage and macular pigment ( $p < 0.05$ ). 63 subjects remain in the ongoing study, 10 of which have completed all measurements through the 12-month study. Visual analysis of the completed data suggests that the inverse relationship no longer exists, possibly due to other variables including sex, blood lipid values, body fat distribution, and serum response to lutein. Identifying the role of these covariates may contribute to an understanding of the competition hypothesis which states that adipose tissue and retinal tissue compete for absorption of lutein.

### **Non-Formal Music Education in Latin America: A Case Study of El Sistema Venezuela and Its International Expansion**

Christina Azahar, CURO Apprentice

Dr. Susan Thomas, Hugh Hodgson School of Music, University of Georgia

The Venezuelan music education program, El Sistema, is a groundbreaking youth orchestra system that demonstrates a praxis of Paolo

Freire's theory, the Pedagogy of the Oppressed. By utilizing music as a force of social change, El Sistema seeks to improve children's lives not simply through providing material resources, but also by changing students' perspectives on their identity and their responsibilities and rights as a citizen. This "re-humanizing" educational method is central to Freire's theory, and El Sistema has had immense success in developing not only knowledgeable citizens, but also great artists through a philosophical and spiritual approach to learning music. Because of this, it has grown from a small program in Venezuela into an international movement, and has served as a model for socially conscious music education programs in Latin America and across the world. El Sistema's expansion raises the following questions: How is El Sistema's pedagogy adapted to other societies? Why is it so effective in creating social change? Does the openly political ideology of El Sistema transfer along with its music pedagogy? To answer these questions, I will examine case studies of El Sistema-derived programs in both the United States and Colombia to determine how this pedagogy has been used for both structural and humanist reform. This will include reading interviews of students, teachers, and policy-makers, as well as reviewing scholarly literature on El Sistema and non-formal education in Latin America. Through this study I hope to demonstrate how music can both materially and humanistically improve society's well-being.

### **The Relationship between Personal Beliefs and Family Values in International College Students from a Hungarian University**

Lisa Baer, Kacie Caudle & Robert Gentry

Dr. Tsu-Ming Chiang, Department of Psychological Science, Georgia College & State University

An individual's personal beliefs often reflect their family and cultural values. These beliefs may vary with socio-historical changes. However, limited research has been conducted to examine whether personal beliefs and ideologies change across generations in the Hungarian society because of the language barrier. Hungarian students are now taught basic understanding of the English language, which

makes it possible for data collection. This research aims to contrast the family core values of international students collected from a Hungarian University. Sixty-seven international students (Male = 13), with average ages of 23.6 for male and 21.61 for female participated in the study. This cross-cultural study in family values and parental beliefs is beneficial to increase awareness of culture's core beliefs and values. A survey was used to explore ethnic norms, parenting techniques, and future parenting techniques through quantitative and qualitative measures. Particular interests include comparisons between students' past experiences and future plans as prospective parents in permitted age to date, differences in bedtime and curfews, and parental involvement in daily life, etc. It is expected that participants' future plans are consistent with their parental beliefs in items that either they accepted or perceived as reasonable. Preliminary results, utilizing SPSS, revealed significant relationships between parental values and individual beliefs in group dating ( $r = .87, p = .01$ ), individual dating ( $r = .64, p = .01$ ), make up age ( $r = .53, p = .01$ ), sleepover ( $r = .69, p = .01$ ). More data and results will be shared at the CURO 2011 Symposium.

### **Frequency Distributions of Japanese Characters**

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The linguistics of speech is a new model of language study which gives pride of place to language in use (Kretzschmar 2009). Instead of relying on rules to describe language, it uses frequency information. One of its central findings, the A-curve, reveals that in a text there are a few very common linguistic items and many uncommon ones. Research has shown that variant vowel realizations and words both follow this distribution, but researchers have not addressed meaning-carrying items smaller than the word. To remedy this, my study examined kanji, Japanese characters that carry meaning and can be smaller than a word. First, I collected 70 interviews with Japanese musicians from the Internet. The data was subdivided into male and

female subsamples, and Wordsmith Tools was used to create a list of kanji frequencies for both. The subsample and total frequencies were then plotted using Open Office Calc. I found that kanji did form an A-curve, and that, furthermore, this A-curve exhibited the scaling property predicted by the linguistics of speech. This meant that though the A-curve was present at multiple levels of scale, the subsample frequencies did not reflect the frequencies in the data as a whole. These findings are significant because they support the linguistics of speech as a robust model of language and suggest that similar forces may operate across multiple levels of linguistic analysis. This challenges the common practice of separating areas like syntax, morphology (which studies word formation), and phonology (which studies speech sounds).

Kretzschmar, Jr., William. *The Linguistics of Speech*. Cambridge: Cambridge University Press, 2009. Print.

### **Tri-state Water 'War': Media Frames and Weighing What Is Best for the Apalachicola-Chattahoochee-Flint River Basin**

Joshua Barnett  
Dr. David Radcliffe, Department of Crop & Soil Sciences, University of Georgia

In the southern United States a modern-day environmental dispute is taking place. At the center of this controversy is the Apalachicola-Chattahoochee-Flint (ACF) river basin. The large river basin encompassing Alabama, Georgia, and Florida has spurred much economic and ecological strife as each state has lobbied for its own interests in this incredible water resource. Much attention has been focused on the "Tri-State Water War" by television and print media, and it is those media that have named the dispute in this way. Commentary on the dispute has likened it to "battles," "struggles," and "fights to the death." Indeed, it is a battle being waged in the courtrooms, on the editorial pages of local newspapers, and, recently, on the cinematic screen. Drawing from news stories in the *Atlanta Journal-Constitution* and case studies presented

in the recent documentary entitled “Chattahoochee: From Water War to Water Vision,” I answer the question, How has the war frame been, and continued to be, employed in news media to relate a particular understanding of the dispute? Moreover, based on this close textual analysis, I suggest that framing the dispute as a “war,” in fact, undermines the efforts of stakeholders to reach a resolution on the management of the ACF river basin. This study adds to our collective understanding of the Tri-State Water War, and concludes with suggestions for a more productive discourse surrounding the dispute.

### **Democracy Blinded: a Study of the Afghanistan and Iraq Wars, 2001-2008**

Ashley Bartlett, CURO Scholar

Dr. John Morrow, Department of History, University of Georgia

The terrorist attacks on September 11, 2001 led to the United States’ invasions of Afghanistan and Iraq. While many observers are concerned with the justness and conduct of the resulting conflicts, they often ignore a far more important question—how has the “war on the terror” affected the democratic principles of the United States? What can nearly ten years of war teach the U.S. about terrorism, warfare, and its own democracy? These conflicts in Afghanistan and Iraq began a new era for the United States. Iraq has cost the United States \$11 billion a month. Afghanistan has cost a total of \$190 billion. In the words of John Quincy Adams, America’s paranoia over the September 11 attacks made her “go abroad in search of monsters to destroy.” Preemptive war, the use of mercenaries and torture such as water boarding—these previously questionable ideas and methods became household words between 2001 and 2008. Have these wars had any effect on the democracy of the United States? This thesis suggests that a sense of urgency and fear of the unknown blinded American democracy. This fear and paranoia led to the compromise of America’s democratic ideals and institutions, as exemplified by the government infringing on civil liberties, Congress yielding legislative power to the President, and the United States renegeing on various international treaties. By

launching wars to destroy the terrorist threat and democratize an entire region of the globe, the United States may in fact be undermining democracy at home.

### **The Elements of Chinese Grand Strategy: Applying a New Analytical Approach**

Ashley Bartlett, CURO Scholar

Dr. Brock Tessman, Department of International Affairs, University of Georgia

Uncertainty about China’s long term intentions has generated anxiety among many western leaders, and has led to a deadlock among international relations scholars. Will China try to assert regional dominance in East Asia? How feasible (and advisable) is it for the United States to seek to stop or stall China’s meteoric rise and maintain unquestioned hegemony? In order to adequately answer these questions, one must better understand the origins and many facets of Chinese grand strategy. Through deeper appreciation of the basic way in which a country like China develops foreign policy goals and seeks to mobilize its resources in order to achieve them, one can better analyze past decisions and be better positioned to predict future behavior. This presentation will discuss China’s grand strategy from the beginning of Hu Jintao’s presidency in 2002 to the present. In order to do this, I will use a new analytical approach: a model for researching grand strategy. This model uses “elements” and “principles.” The elements consist of four separate categories: defense, diplomacy, resources/economics, and ideology. All four elements combined form a “principle,” a specific pillar to an actor’s grand strategy. Using this analysis, I determined China’s grand strategic principles: international institutions, modernization, resource security, and reunification. Together, these principles form China’s grand strategy: “partnership.” It is through the lens of “partnership” that the United States should interpret, and react to, the wide range of foreign policy behavior that is of increasing global importance.

### **Differences in Functional Movement Screen Scores Between Female Soccer Players That Were Injured vs. Uninjured.**

Katherine Black

Dr. Cathleen Brown, Department of Kinesiology, University of Georgia

Due to the contact nature of soccer, athletes are prone to numerous lower extremity injuries. Pre-season screenings may identify movement deficits exhibited by athletes that could be addressed with rehabilitation programs, thus reducing injury risk. Our objective was to determine if there was a significant difference between the number of lower extremity sprains sustained in female soccer players with higher functional movement screen (FMS) scores ( $>12$ ) when compared with female soccer players with lower FMS scores ( $\leq 12$ ). A score of 12 was previously established a clinically meaningful difference in performance. Members of a collegiate women's soccer team ( $n=31$ ) performed and were scored on the 7 components of the FMS in the spring or summer prior to their competitive fall season by trained FMS professionals. After the season, an injury report was obtained, and 8 joint injuries were catalogued regardless of contact or non-contact nature. An injury was defined by an athlete's complaint or injury that resulted in evaluation and treatment by an athletic trainer. Using a Pearson chi square-analysis, a significant difference in observed vs. expected joint injury counts ( $\chi^2 = 7.4$ ,  $p = .0075$ ) was found, with players scoring  $\leq 12$  experiencing more sprains than expected. These results indicate that soccer players with low FMS scores were most likely to suffer a joint injury during the season. Pre-season training should focus on improving muscular strength and neuromuscular control in order to increase FMS scores, which may lead to a reduced risk of injury during the season.

### **Analysis of the Inter-Rater Reliability of the Functional Movement Screen**

Jason Bowman, CURO Apprentice

Dr. Cathleen Brown, Department of Kinesiology, University of Georgia

The Functional Movement Screen (FMS) was recently developed to identify athletes at risk of

incurring injury. It consists of 7 movements assessing strength and range of motion deficits and asymmetries on a 1-3 scale. Current research on the sensitivity, validity, and inter-rater reliability of the FMS is limited, as is the difference in reliability between "expert" and "novice" raters. The purpose of this preliminary study was to assess novice inter-rater reliability on the 7 movement tests. Six undergraduates with limited background in the FMS were taught the scoring criteria for test. Videos of 5 participants completing the FMS movements were created. The 6 student raters then scored the videos following the guidelines on 3 separate occasions, and the inter-rater reliability was assessed using the generalized kappa statistic. The deep squat, shoulder mobility, and straight leg raise tests were all found to have generalized kappa statistics indicating moderate to strong inter-rater reliability that was better than chance (Kappa = .37-.60; Standard Error (SE) = .11-.16;  $p < .05$ ). However, the kappa statistic indicated poor reliability when scoring the hurdle step, in-line lunge, push-up and rotary stability tests where agreement was no better than chance (Kappa = .02-.46; SE = .12-.51;  $p > .05$ ). These low agreements may be due to scoring errors made by novice raters. Additionally, the kappa statistic is reduced if 1 class category dominates the rating, as happened with these data. Future studies should increase rater training, utilize more varied performance in class categories, and possibly apply different statistical procedures.

### **The Political Economy of the Textile Industry in Bangladesh**

Katie Branscomb

Dr. Santanu Chatterjee, Department of Economics, University of Georgia

Textiles have been Bangladesh's primary economic industry since before Bangladesh's independence in 1971. Beginning with jute production for the colonial shipping industry and transitioning to readymade garment production in recent years, fifteen million Bengalis currently depend on the textile industry for their livelihoods. In 1974, the Multi-Fibre Agreement exempted Bangladesh from the import quotas it placed on other countries. Based on the principles of the "infant-industry argument" the

special treatment was meant to give Bangladesh time to strengthen its textile industry before exposing it to the free market on January 1, 2005, when the quotas expired. The literature unambiguously finds that the import quotas were beneficial to the Bengali textile industry. The question now is whether the protections that Bangladesh enjoyed for thirty years created enough benefits to outweigh the costs that Bangladesh faces in an import quota-free world. This paper presents the consequences of removing the Multi-Fibre Agreement's import quotas for the textile industry in Bangladesh. Data analysis comes from information on economic indicators (like the trade balance and GDP), discussion of trade liberalization policies, and government's role in structural adjustment in order to determine how evolving economic actions and trade policies have impacted the Bengali textile industry and the households that depend on it for their livelihoods. As one of the world's poorest countries, Bangladesh's economy is an international concern. We must understand the economics of developing countries like Bangladesh in order to determine the best course of action that will most effectively challenge the status quo.

### **Genetic Analysis of Pigmentation in *Drosophila tenebrosa***

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University of Georgia

Pigmentation is a trait that evolves rapidly in many species of animals. An example includes the quinaria group of *Drosophila*, in which most species are yellow in body color with distinct dark spots spaced around the abdomen. The sole exception is *Drosophila tenebrosa*, which has a completely diffuse, dark melanic abdomen. In this experiment, I interbred *Drosophila tenebrosa* with a closely related yellow species, *Drosophila suboccidentalis*, looking for the genetic basis of inheritance of the melanic abdomen. I then performed backcrosses, using the F1 female hybrids crossed to each male *D. suboccidentalis* and *D. tenebrosa*, respectively. I scored and ranked the offspring based on pigmentation intensity of the dorsal abdomen. By analyzing the progeny of the F1 hybrids and

F2 backcrosses, it appears that the unique pigmentation phenotype in *D. tenebrosa* is caused by two main loci, a locus on the X chromosome and a locus on an autosome. I then used a candidate gene approach to ask which genes in the pigmentation pathway are associated with dark pigmentation in *D. tenebrosa*. I found two genes, *yellow* and *ebony*, that contribute to the dark pigmentation phenotype of *D. tenebrosa*. The *yellow* marker is located on the X chromosome, and the *ebony* marker is on an autosome. These or closely linked genes appear to have an additive effect to pigmentation and together can explain the majority of the dark pigmentation phenotype. This work will ultimately help us understand how changes on the gene level affect changes on the phenotypic level.

### **Effects of Medial-Wedge Orthotics on Knee Frontal Plane Moments in Individuals with Valgus Knee Alignment and Lateral-Compartment Osteoarthritis**

Jenny Brickman

Dr. Cathleen Brown, Department of  
Kinesiology, University of Georgia

Individuals with valgus knee alignment have an increased risk of developing lateral compartment knee osteoarthritis (OA), a common disease. Orthotics used to realign the foot and leg may offer a relatively inexpensive, noninvasive treatment option. Large knee joint valgus moments have been linked to lateral compartment knee osteoarthritis. The purpose of this study was to determine if valgus moments decreased in valgus-knee aligned participants with or without medial-wedge orthotics during tasks of daily living. Three participants with an average age of 61 with valgus knee alignment and self-reported lateral compartment osteoarthritis were tested using biomechanical motion analysis equipment. Knee moments in the frontal plane (maximum and minimum during the loading phase) were measured during three tasks: gait, sit to stand, and stepping down from a box. Qualitative descriptions were used to assess changes in moments. During the gait task, orthotics did not significantly change the valgus moment. In the sit to stand task, orthotics shifted the moment toward the valgus direction

by 14.9%. However, after omitting one subject's data, the results showed that orthotics were beneficial and the moment shifted toward varus by 11.4%. During the step task, orthotics decreased the valgus moment by 10.2%. These preliminary results indicate most participants experienced decreased valgus moment in each task when wearing orthotics, potentially decreasing the load on their affected knee condyle. However, the impact of orthotics on valgus moment may change on an individual basis. Further research should be done gain more accuracy and insight into individual differences.

### **Sex Differences in the Mechanisms Underlying Facial Expression Recognition: Effects of Cognitive Load and Facial Mimicry on Facial Expression Recognition**

Lindsay Briggs

Dr. Janet Frick, Department of Psychology,  
University of Georgia

Humans use at least two routes for recognizing emotion: an empathetic route that involves facial expression mimicry (matching), and a cognitive route that does not involve mimicry (Stel & Knippenberg, 2008). Facial mimicry is a process in which people automatically imitate others' facial expressions. The cognitive route is a slower process which involves matching visual input with one's knowledge about emotions. Males and females may differ in which route they use (Simpson & Frigaszy, 2010). Facial mimicry may play an important role in facial expression recognition, particularly for females. The extent to which males and females differ in the cognitive route remains untested. We explored two mechanisms which may underlie sex differences in facial expression recognition: the extent to which mimicry facilitates recognition, and the amount of cognitive resources necessary for recognition. We predicted that while females use the empathetic route and mimic more than males, males more often use the cognitive route. If this is the case, females' performance (i.e., speed, accuracy) should decrease when mimicry is prevented, while males' performance should decrease when cognitive load is increased. Participants were asked to rate facial expressions. We manipulated cognitive load with a word memory task. We

also manipulated the extent to which participants could mimic facial expressions by having them hold a popsicle stick between their teeth. We are currently collecting data and will present preliminary findings. This work has implications for communication between the sexes, as well as implications for those who suffer from impairments in facial expression recognition.

### **Black Stereotypes in Reality Television and the Reinforcement of Prejudiced Attitudes**

Melissa Brown

Dr. Leonard Martin, Department of Psychology,  
University of Georgia

The proposed studies explore the relationship between stereotypes of Black Americans presented in reality television shows and the racial attitudes of White Americans. They also explore the possibility that this relationship is affected by White Americans' real-world and mediated exposure to diversity. The experiment begins with a content analysis of reality television shows, focusing on the presence of minority contestants in a majority cast as well as how minority contestants interact with non-minority contestants and main characters. Content analysis will highlight instances such as how duration of a minority on camera, the nature of the behavior while on camera, whether or not the behavior may be perceived as positive or negative, and how frequently these instances occur. Study 1 will survey White Americans regarding their reality television viewership and their racial attitudes. Study 2 will content analyze reality television shows to determine which specific aspects of the shows may drive overall depictions of Black Americans. It is hypothesized that the more negative stereotypes of Black Americans a show contains, the more likely it is that White Americans who possess negative racial attitudes will consider these stereotypes to be accurate portrayals. It is also hypothesized that more intergroup contact will lead to more positive racial attitudes, regardless of stereotype knowledge. Such findings will elucidate the real world effect the unreal stereotypes displayed in this type of television media has on minorities.

### ***Nice to Have: Expression and Movement Through Film***

Virginia Broyles

Ms. Bala Sarasvati, Department of Dance,  
University of Georgia

*Nice to Have* is a work I created to explore the integration of dance and film. How can film techniques and editing contribute to the expression of a choreographic idea?

Traditionally, concert dance is performed onstage, and while many elements with lighting and set design are utilized, the choreographer is still somewhat limited in angles and distance from the viewer. With film this can be manipulated throughout the piece. Historically speaking, dance for camera is still a new medium, and I wanted to not only effectively present the choreography, but also use film to better fulfill the emotional content and story. The piece explores a relationship that is physically represented by fabric that ties two people together. I explored movement ideas and motifs through improvisation. Then I developed movement phrases and integrated them with the fabric, exploring the limitations and inspirations that came with using a prop. Working with film offered many options for viewing the dance choreography, but having so many options was also a challenge. Location was an important element to consider in the piece, as well as the lighting possibilities available. I planned filming to acquire a variety of shots, especially from various points of view and distances to express an intimacy that is not usually experienced when viewing a dance onstage. The next creative step was exploring how through editing of the film I could enhance the expression of the choreography and create a cohesive and interesting dance piece.

### **Geographies of Expression: the Arts within Space and Scale**

Tyler Bugg

Dr. Amy Trauger, Department of Geography,  
University of Georgia

To date, inquiry into a geographical understanding of the fine arts, and of theatre arts in particular, has been largely absent. It is this silence that this research attempts to fill with

staple concepts of the geography discipline. As geographical discourse is largely occupied with elements of *space* and *scale*, it becomes an applicable tool for describing the experiences to be had through the theatre arts. *Spatiality*, as geographers understand it, is fundamental to the experience of the theater. It is central to explaining the relationships between performers in productions, audiences that attend them, venues that host them, and state institutions that fund them; each player has unique spatial interactions with each of the others. Moreover, geography asserts that these interactions are situated in levels of *scale*. The full process of the theatre arts involves actors as small as the individual body of the performer and as large as the regulatory functions of state arts institutions. Interview and observational analysis of the theatre arts as both an academic discipline and a business of entertainment is at the center of this research, deriving data from the experiences of actors and directors, theater patrons and ushers, and state arts policy agencies. Geography, then, is a mediator of the interactions that make theatre the artistic outlet as we know it. As such, the experiences of the theatre arts can be viewed as *geographies of expression*, where the artistry of creative expression grows out of the geographies that give them root.

### **Characterization of *C. elegans* Insulin-degrading Enzyme**

Mary Burriss, CURO Scholar

Dr. Walter Schmidt, Department of  
Biochemistry & Molecular Biology, University  
of Georgia

Recent research on Alzheimer's disease (AD) has focused on the amyloid hypothesis, which states that accumulation of the beta amyloid (A $\beta$ ) peptide causes neurodegeneration. The insulin-degrading enzyme (IDE) degrades insulin, A $\beta$ , and several other biologically important peptides. If IDE activity, towards A $\beta$  specifically, could be enhanced, the accumulation of A $\beta$  would predictably occur at a lower rate and perhaps delay the progression of AD. The Schmidt lab has identified compounds that activate *RnIDE in vitro*. For a cost efficient animal model to study IDE and its activators, I have investigated the utility of the *C. elegans*

system. In the first part of my study, I created a bacterial vector for recombinant expression of *CeIDE*, which was purified via cobalt-sepharose column chromatography. A series of *in vitro* studies demonstrated the ability of recombinant *CeIDE* to cleave A $\beta$  and other substrates that are cleaved by IDE family members. Additional studies determined that *CeIDE* is not a good target for investigations of *RnIDE* activators due to lack of cross-specificity. In the second part of my study, *CeIDE* was investigated using a yeast system that allows for studies of the *in vivo* specificity of IDE family members through production of the **a**-factor pheromone. I created a yeast vector that was used to express *CeIDE* in yeast and demonstrated via genetic methods that *CeIDE* promotes pheromone production with the same efficiency as other IDE family members. These studies reveal that *CeIDE* has biochemical and enzymatic properties similar to mammalian IDE and other IDE family members and suggests that the *C. elegans* system can be used to study the physiological role of IDE enzymes more thoroughly, although there are limitations with respect to investigations of IDE activators.

### **Influences on the Outlook of the Post-College Educational Opportunities and Choices of Undergraduate Science Majors**

Ebony Caldwell, CURO Summer Fellow  
Dr. Monica Gaughan, Department of Health Policy & Management, University of Georgia

Women and members of some racial and ethnic groups are under-represented in the fields of science, medicine, and public health. In the field of medicine, minorities represent less than 15% of the physicians entering the workforce. This disparity is even more present in academic institutions at the faculty level, where minority representation is 5% despite the US population of minority groups being over 30%. Additionally, there are shortages of professionals from all backgrounds performing research in the sciences and practicing medicine in the United States, and these shortages are only expected to increase in the future. However, before these faculty members and professionals enter the workforce, they experience myriad influences as undergraduate students that shape their future employment and educational

decisions. The study focuses on the factors that influence the intentions for post-baccalaureate studies of undergraduate students. The participants of this study are University of Georgia undergraduate science majors recruited through either a snowball sampling or a convenience sample. All data collected were gathered through semi-structured interviews with a protocol of questions that asked participants how they perceived their academic and professional futures and what factors influenced their pursuits of these plans, including themes such as race and early education. The collected data served as the basis for qualitative analytic work exploring how different social constructs, such as family, gender and ethnicity, have affected the perceptions of the opportunities and likelihood of success for the participants in the study.

### **Role of the Telomere Binding Protein TPP1 in Recruitment of Telomerase to Telomeres in Human Cancer Cells**

Garrett Casale

Dr. Michael Terns, Department of Biochemistry & Molecular Biology, University of Georgia

Telomerase is the ribonucleoprotein responsible for lengthening telomeres at the ends of eukaryotic chromosomes. Telomeres are RNA-protein complexes that protect chromosomes from gradual degradation caused by the end replication problem. While most normal human somatic cells do not express telomerase, cancer cells have been found to possess reactivated telomerase activity. As an enzyme paramount to the survival of cancer cells yet dispensable in most adult tissues, telomerase is a promising target for future chemotherapeutic treatments. We are investigating the mechanism of recruitment of telomerase to telomeres in human cancer cells. We show here that TPP1, one of six core telomere binding proteins, is critical in telomerase recruitment to telomeres. Depletion of TPP1 expression via RNA interference inhibited telomerase recruitment to telomeres. Loss of telomerase recruitment was restored with the expression of an RNA interference-resistant form of TPP1. Furthermore, we found that the oligonucleotide-binding fold (OB-fold) domain of TPP1 is required for TPP1 to function

as a telomerase recruitment factor. These results identify and support a direct role of TPP1 in telomerase recruitment to telomeres and suggest that the OB-fold domain of TPP1 mediates the direct interaction of telomerase with telomeres.

### **The Art of Persuasion: How Small Business Owners Use Speech to Market Products in Roswell, GA**

Caitlin Cassidy, CURO Summer Fellow  
Dr. William Kretzschmar, Department of English, University of Georgia

Linguistics is a field that is not often explored within the context of marketing and business management. Rather, its study is often confined to analysis of historical languages and language acquisition, leaving little room for discoveries in the art of modern communication. My research intends to open doors to discoveries in the field of sociolinguistics, with regards to how speech can be used as a business strategy. The primary objective of this research is the identification of patterns in communication that characterize new members of the business community and allow for their success in the free market. I am looking for characteristics that help to establish credibility as an entrepreneur. I have conducted recorded interviews with three volunteers from the Roswell community who have come to Roswell from abroad and started businesses. Included in the recordings are conversations related to personal background, the decision to immigrate to Roswell, and the challenges one can expect from opening a small business. I have transcribed each of the interviews and have reviewed them in the hope of discovering specific themes. In particular, I am comparing these themes with what is already known about the speech of Roswell residents. I believe that a new understanding of the integration of international residents and their businesses will emerge and give the community of Roswell a means of improving communication between buyers and sellers, ultimately helping the local economy to continue grow and prosper.

### **First-Principles Investigations of Oxygen Vacancies on SnO<sub>2</sub> Nanofilms**

Daniel Cellucci, CURO Summer Fellow  
Dr. Steven Lewis, Department of Physics & Astronomy, University of Georgia

The *n*-type semiconductor tin dioxide (SnO<sub>2</sub>) has long been used as the working material for robust, inexpensive oxidizable-gas sensors. In recent years, advances in nanofabrication have made possible the well-controlled formation of SnO<sub>2</sub> nanocrystals. Since gas sensing in SnO<sub>2</sub> involves changes in surface resistivity as a function of gas concentration, nanocrystalline SnO<sub>2</sub> holds great promise for high-sensitivity gas sensors, due to the high surface-to-volume ratio. A key feature of the sensing mechanism is the facile formation and destruction of oxygen vacancies at (or near) the surface. In this talk I will discuss our ongoing first-principles investigations of surface oxygen vacancies in SnO<sub>2</sub> nanofilms. We have focused on vacancy formation among the so-called bridging oxygen atoms on the (110) surface of rutile SnO<sub>2</sub>, as a function of vacancy concentration and film thickness, studying the effect on local atomic and electronic structure. This work is the first phase of a longer-term investigation of surface vacancy phases on SnO<sub>2</sub> (110) as a function of temperature and oxygen vapor pressure.

### **Remote Sensing as a Generative Tool in the Creation of Fine Art**

Daniel Cellucci,  
Dr. Ralph Brown, Lamar Dodd School of Art, University of Georgia

As defined by the National Aeronautics and Space Administration (NASA), remote sensing refers to instrument-based techniques employed in the acquisition and measurement of geographically distributed information. The author has taken the data previously gathered from such remote sensing instruments as ground penetrating radar, electromagnetic conductivity, and SONAR and now seeks to use these samples to fabricate forms that can truthfully reflect the data from which they were derived. Building upon the results of research projects presented at previous CURO symposia that involved applications of SONAR to underwater art, the

author seeks to explore new possibilities in the area of sculpture that are offered by other tools that are employed in the study of remote sensing. The aim of this research is to take the data generated from these processes and to create a series of software tools that can effectively present this information in a virtual space. The virtual works created from these tools will be made visible via a technique known as augmented reality, whereby the use of specifically equipped mobile technologies can access the work in real time. In particular, two attempts to convey this space will be presented. The first will be in an indoor piece, involving fiduciary markers that will map the work into a gallery setting and the second will involve applications of GPS and accelerometer data to geographically positioning the user in an outdoor environment. The frameworks used to accomplish this feat will be capable of expanding to additional works and allow the placement of these works in otherwise inaccessible locations.

### **Assessing Baseline Characteristics of Mother-Child Dyads Participating in the AFFECT (A Family Focused Emotion Communication Training) Pilot Study**

Kristen Cerny & Julia Taylor  
Dr. Anne Shaffer, Department of Psychology,  
University of Georgia

The relationships between parents and children set the groundwork for the child's future relationships as well as general wellbeing and the development of psychopathology. Parenting interventions are used when parents need assistance communicating with, disciplining and strengthening their relationships with their children. Many interventions exist that use operant learning methods to improve child behavior (Eyberg, et al., 2008). While these interventions are effective, they do not directly address children's emotional functioning. The current study is a pilot test of AFFECT (Shipman & Fitzgerald, 2005) a community-based intervention designed to bolster parents' skills in active listening, emotion coaching, and emotional support. Participants currently include 13 families; data collection is ongoing. Families participate in a pre-intervention assessment

where they complete self-report measures and a structured interview. This study describes the characteristics of families who choose to enroll in AFFECT. Descriptive analysis of baseline presenting characteristics will allow us to understand the scope of the intervention and inform directions for future expansion of AFFECT. The Difficulties in Emotion Regulation Scale (DERS) and the Parenting Stress Index, Short Form (PSI-SF) will be used as measures of parental functioning. Child emotional and behavioral problems will be measured using parent report (Child Behavior Checklist) and child report (Child Depression Inventory, Multidimensional Anxiety Scale for Children). Although the current sample is too small to compare pre- and post-intervention data, it is important that an understanding of the participants' presenting characteristics is obtained to identify families who are likely to enroll in and benefit from this intervention.

### **U.S. Primary Care Physicians: A Dying Breed**

Agni Chandora, Roosevelt @ UGA  
Dr. Monica Gaughan, Department of Health  
Policy & Management, University of Georgia

Primary Care Physicians (PCPs) are at the forefront of medical care since they are among the first health professionals an ill individual encounters. A sizeable primary care workforce usually coincides with better health results. Currently, the U.S. has one of the lowest ratios of primary care physicians to total population in the developed world, and it has recently started to experience a decline in the percentage of medical students entering primary care. The growing and aging U.S. population needs a far larger number of primary care physicians than are projected to be produced, creating a shortage of at least 50,000 by 2020. Additionally, a PCP shortage already exists in rural areas due to an imbalanced distribution. This paper explores the future shortage and present maldistribution of primary care physicians in the U.S. and evaluates possible policy solutions to increase the provision of primary care services. Through literature and legislative reviews, background information was gathered to understand the problem, and four policy alternatives (status

quo, counseling for medical school students, increasing the use of International Medical Graduates, and expanding nurses' scope of practice) were created. Each alternative's outcome was then evaluated using the criteria of political feasibility, efficiency, and equity. The analysis suggested that expanding the scope of practice for nurse practitioners was the most favorable alternative for increasing primary care services. Finally, the challenges and implementation efforts associated with the recommendation are explained. This analysis offers the optimal solution based on the selected criteria to alleviate the PCP shortage.

### **The EEOC and the Federal Court of Appeals**

Kathryn Clifford & Sophie Winkler  
Dr. Scott Ainsworth, Department of Political Science, University of Georgia

Since the creation of the Equal Employment Opportunity Commission (EEOC) by the Civil Rights Act of 1964, the agency has been the federal government's primary means for addressing employment discrimination. Related to its mission, the EEOC has been involved in hundreds of federal Appeals Court cases from 1965 to 2000. Our purpose is to determine whether political influence affected the decision of these cases. For each case in which the EEOC was involved, data were collected on the court's decision, the nature of the three-judge panel resolving the dispute, and the state of the economy when the decision was rendered. The initial results are straightforward: the Appeals Court decide cases differently depending on the partisan and economic circumstances surrounding the cases. Under better economic conditions, panels tend to favor the EEOC, particularly when the partisan composition of the panel coincides with the party in control of the executive branch. The results show that even though the EEOC was designed to be an independent agency, it is still subject to partisan judicial review.

### **Perceived Barriers and Medication Adherence in Adolescents**

Anastasia Couvaras  
Dr. Ronald Blount, Department of Psychology, University of Georgia

The purpose of this study is to examine the relationship between perceived barriers and medication adherence for adolescents who are diagnosed with Inflammatory Bowel Disease (IBD). Barriers to adherence include unpleasant side-effects, forgetfulness, faulty organization methods, and oppositionality. It is important that these barriers be acknowledged and addressed because nonadherence to medication may lead to increased risk of mortality and morbidity. The participants in this study will be both the adolescents ranging from 11-18 years of age who have been diagnosed with IBD and their parents/caregivers. In order to determine individual barriers that need to be overcome, each parent/caregiver will complete the Parent Medication Barriers Scale (PMBS) and each adolescent will complete the Adolescent Medication Barriers Scale (AMBS) (Simons & Blount, 2007). Medication adherence will be assessed using the Medication Adherence Measure (Zelikovsky & Schast, 2008), a structured interview conducted separately with parents and adolescents to determine the extent to which adolescents adhered to their prescribed medication intake during the past week. A greater number of both parent and adolescent reported barriers will be associated with lower adolescent medication adherence. Therefore, there is a negative correlation between both parent and adolescent reported barriers and medication adherence. We will attempt to identify adolescent and parent perception of barriers that interfere with their medication adherence. By identifying barriers we can work to individualize solutions to improve medication adherence and health outcomes of adolescents with IBD.

### **Efficacy of Alternative and Combinatorial Drug Therapies in the Treatment of *Trypanosoma Cruzi* Infection**

Byron Crowe

Dr. Rick Tarleton, Department of Cellular Biology, University of Georgia

Chagas disease, the largest infectious disease burden in Latin America, is caused by the protozoan *Trypanosoma cruzi* and affects 16 to 18 million people. An estimated 50,000 people die every year due to infection, which chronically persists undetected for many years in the host. Benznidazole (BZ), the principle drug available for the treatment of *T. cruzi* infection, has largely unknown efficacy and substantial side effects. Importantly, the side effects are believed to increase with cumulative dosage. Benznidazole is usually administered for 30 to 60 days in humans, and we have recently developed several model systems, including a forty day consecutive treatment protocol, that allow for the detection of parasitological cure in mice. Posaconazole (POS), an experimental anti-fungal compound, has also demonstrated activity against *T. cruzi* with markedly lower toxicity compared to BZ. In this work, we asked if less frequent treatment with BZ and POS might be equally effective at curing *T. cruzi* infection in mice as compared to the standard 40 day BZ treatments. While 40 day treatments of POS or BZ show similar efficacy, shorter regimens using just POS were much less effective than identical treatments with BZ. Surprisingly, results suggest that treatment with POS for five consecutive days followed by seven doses of BZ at 5 day intervals was more effective at curing the infection than the same regimen with only BZ. These results suggest that treatments involving less frequent and thus less potentially toxic treatments may be effective in humans.

### **Friends of Convenience**

Robert Daniel

Dr. Michelle vanDellen, Department of Psychology, University of Georgia

Research indicates actual rejection and fear of possible rejection decreases a person's ability to exert self-control. This decrease coupled with a desire to be in social groups creates an

environment where people may join groups without commonalities. The purpose of this study is to measure the innate desire people possess for groups and how rejection affects that desire. We recruited participants from the research pool at the University of Georgia to participate in a study designed to measure people's desire to be in groups and the effect social rejection has on people seeking group membership. Four people were placed in a room with each other and completed a measure of personality purportedly so that we could test a software program that forms people into groups based on similarities. While the software was running, people completed an online ball toss game where they were rejected or included by others. The results were then shared on an individual basis and participants told the software didn't place them in a group. The participants were then asked if they would like to join the group regardless of having few commonalities with the group or work alone. Results show that people desire to be in groups. The inclusive nature along with the rejection manipulation showed a decrease in self-control. These factors work in conjunction to produce groups with identities distant from our actual values, which has implications for people's satisfaction with relationships and for how peoples' identities are formed within the context of group membership.

### **A Culture Identified by Canines: How Dogs Have Become an Integral Part of the American Public Self**

Alyson Dankner

Dr. Kaitlin Medvedev, Department of Textiles, Merchandise & Interiors, University of Georgia

In contemporary society, people surround themselves with material objects to fit in or stand out and have begun to use pets, especially dogs, as a means of self-identification. Today, dogs are often dressed like people, treated like children, and have better nutrition and healthcare than some humans. People are using dogs to improve their physical and mental health, enlarge their social circle and even attract members of the opposite sex. In this process dogs have become the new "accessory" of humans; they are dressed to complement their

owners' personal style and project their most important character traits. This paper will discuss this phenomenon and will show that an entire industry was created to pamper and decorate dogs, possibly making them the most versatile and expensive accessory ever. To arrive at my conclusions I have explored the history of the relationship between human and canines, studied the presence of dogs in literature, and read accounts about America's "First Dogs" in the White House. My study will first discuss the commercialization of the historical bond between humans and their canine companions by investigating the emergence of the dog fashion industry. Next, I will demonstrate that the items with which people choose to adorn their canine pets reflects the owners' personal interests and desires and conveys their social status and aspirations. I will show that in a society compelled to judge a book by its cover, we routinely make assumptions about a person's lifestyle, persona, and social status based on their dogs.

### **Where the Pavement Ends: An Evaluation of the Urban Heat Island Effect in Metropolitan Atlanta**

Malin Dartnell, Roosevelt @ UGA  
Dr. Jenna Jambeck, Department of Biological & Agricultural Engineering, University of Georgia

High concentrations of dark, impervious surfaces in urban areas can cause environmental problems (e.g., stormwater run-off and heat transfer) and generate high costs (e.g., through management of stormwater and excessive heat) for cities and their residents. One problem related to urban infrastructure is the Urban Heat Island Effect, a phenomenon of increased average temperatures in cities compared to surrounding rural areas. The Urban Heat Island Effect augments energy demand during the summer, reduces the air quality of the city, and can cause heat-related health problems and changes in local climate patterns. Many individuals and businesses lack the incentive or means to combat the Urban Heat Island Effect alone; therefore, an overall strategy is needed for an urban center. This study evaluates three broad strategies from the literature for combating the Urban Heat Island Effect for the city of

Atlanta, Georgia (where the Urban Heat Island Effect has been documented to be a problem). It begins with an introduction to some of the most effective mitigation strategies, before evaluating three options: 1) maintaining the status quo, 2) increasing the albedo of surfaces in the city, and 3) utilizing a combination of vegetation and high-albedo surfaces. Using a decision matrix, each strategy is examined for its effectiveness, feasibility (including relative costs), and efficiency, then ranked to recommend a strategy for Atlanta. Results of the study found that requiring high-albedo pavement is a reasonable strategy for Atlanta in order to increase the albedo of the city to reduce the Urban Heat Island Effect.

### **Intron Loss and Gain in the Br2/Dw3 Gene Across Grass Subfamilies**

Victoria DeLeo  
Dr. Katrien Devos, Department of Crop & Soil Sciences, University of Georgia

Documentation of intron loss and gain in conserved genes provides insight into the mechanism of genome evolution across organisms. This is a relatively unexplored area in plants. Studies in *Arabidopsis* and rice, two species that diverged around 150-200 million years ago, have shown differential presence for about 5% of introns, mostly due to intron loss. This study will look in particular at the orthologs of a highly conserved gene that codes for a p-glycoprotein involved in auxin transport. This gene, known as Br2 in maize and Dw3 in sorghum, has mutated forms that reduce the height of a plant by reducing the length of its internodes. Comparison of the sequence of the recently isolated gene in pearl millet with the orthologous gene sequences from maize and rice has shown evidence of at least two independent intron gain or loss events in the evolution of this gene in the three species. We have designed primers in conserved exons of the gene and are using those to amplify the introns in selected members of four grass subfamilies. Sequencing of the introns and intron-exon boundaries may provide insight into the mechanism of intron gain and loss. We aim to explore the evolutionary history of this gene in the grass

family and identify which grass has the most ancestral form of the gene.

### **Effects of N-Acetylglucosaminyltransferase Expression Levels on Colorectal Adenoma Progression**

Sarah-Bianca Dolisca

Dr. Michael Pierce, Department of Biochemistry & Molecular Biology, University of Georgia

Colorectal cancer is currently the third most prevalent form of cancer. Adenomatous polyposis coli (APC) gene mutations are attributed to multiple intestinal neoplasia (Min) within APC<sup>Min/+</sup> mouse models. The expression of this genotype results in progression of colorectal adenoma, a precursor to colorectal cancer. N-Acetylglucosaminotransferase V (GnT-V) is a glycoprotein whose functional role is the biosynthesis of N-linked glycans. GnT-V is associated with metastatic potential. APC<sup>Min/+</sup> mouse models with varying levels of GnT-V expression were used to investigate regulation of colorectal cancer formation and progression. Antibody and lectin blotting experiments were conducted on the colorectal tumors of the APC<sup>Min/+</sup> mice to identify glycan and signaling pathway changes. Results supported findings that downregulation of GnT-V in APC<sup>Min/+</sup> mice significantly inhibited progression of colorectal adenomas. The molecular mechanism that allows the knockdown of GnT-V to significantly decrease the progression of colorectal adenoma provides a potential preventative method of treatment of colorectal cancer.

### **A Sensitive Approach in Evaluating the PBP (Penicillin Binding Protein) Binding Specificity of Penicillins Using Activity Based Protein Profiling**

Vinh Dong, CURO Apprentice

Dr. Timothy Long, Department of Pharmaceutical & Biomedical Sciences, University of Georgia

This study synthesized and evaluated a novel beta-lactam probe that tests for the inhibition of certain penicillin binding proteins (PBPs) in different bacteria. Previously, beta-lactams with radioactive or fluorescent tags were used to label and visualize active PBPs in membrane

preparations. However, these methods were time consuming, hazardous, or inefficient because either the tags they use are radioactive, or that they attach a large fluorescent dye to the core scaffold, reducing both target affinity and cell permeability important for *in vivo* studies. Contrary to prior methods, the probe used in this study is nonradioactive, and utilizes a simple fluorescent dye, such as rhodamine and dansyl, attached to azidocillin core scaffold that bypasses these complications. Additionally, once the azidocillin is attached to the interested PBP, the dye reacts only with the PBP that has that scaffold. Thus, the assay development using this new probe is important because it provides the sensitivity and target specificity necessary to discover new, unknown targets of beta lactams for the development of new antibiotics.

### **The Use of Twitter by University of Georgia Student Organizations and Their Members**

Eric Ekwueme, CURO Apprentice

Dr. Brenda Cude, Department of Family & Consumer Sciences, University of Georgia

The internet is constantly changing; websites are quick fads that go in and out of style within a few years. A new social network site called Twitter is based on the premise of micro-blogging short messages about anything a person can think of. Twitter is slowly becoming a very powerful tool in the business world because of its advertising potential, but it seems to be lacking the same power on college campuses. This research studied usage of Twitter by the University of Georgia's student organizations and the undergraduate population. This study's central focus was the effectiveness of Twitter for student organizations and their members. To conduct this research, I selected 10 student organizations and contacted their presidents/ public relations chairs for interviews. During the interview, we discussed the reasons their organizations did or did not use Twitter and if they did, how Twitter was used. I then sent an online survey to a convenience sample of UGA's undergraduate population recruited via Facebook, Twitter, listservs, and word of mouth. The questions focused on students' Twitter use, why some decided to get an account while others did not, if the students were following

student organizations, and overall opinions on Twitter and student organizations using the site. Through this study, I hope to get an idea about how prevalent Twitter is on UGA's campus in regard to student organizations. I also want to identify ways student organizations could use Twitter to reach their desired audience.

### **Delegates' Personal Interests and Their Influence on the Crafting of Congressional Qualifications at the Constitutional Convention**

Khalil Farah

Dr. Keith Dougherty, Department of Political Science, University of Georgia

The paper seeks to determine what level of self-interest the founders exhibited during their framing of the U.S. Constitution. My hypothesis holds that the founders voted with respect to their future political ambitions when deciding who was eligible to run for national office. To evaluate this claim I look at the coded votes of delegates at the Constitutional Convention and compare individual votes to a delegate's economic standing. My research confirmed that no delegate distinctly voted to bar himself from being eligible to run for public office. This exhibits a degree of self-interest on the part of the framers of the Constitution. These findings are relevant to the current debate that has arisen over the place of the Founding Fathers in modern judicial interpretations of the Constitution. The theories of "original intent" and "original interpretation" exhibit deference to the founders as more noble than the people of the present. Showing that, to some degree, self-interest motivated the founders brings into question the views of some justices, like Anthony Scalia, who use the founders as justification for their rulings. No previous study has taken the founders' political aspirations as an explanation for their votes.

### **Luche Reduction**

Jessica Fazio, CURO Summer Fellow

Dr. Richard Hubbard, Department of Chemistry, University of Georgia

The organic chemistry laboratory manual has become outdated and, thus, should have a

makeover. It is important to move away from a "cookbook" approach of the procedure to a more investigative approach by the students through the addition of several unknowns. Moreover, reduction of the times spent for the reactions to take place should be reduced in order to implement more time for hands-on instrumental analyses. The addition of the Luche reduction experiment does both of these. By using different terpenes such as carvone, menthone, and pulegone with different solvents like methanol and different ratios of methanol with water, varying percentages of diastereomer products are yielded. The experiment is carried out by mixing and using the distillation method with the microscale glassware. The end product is then used in the polarimeter to get the optical rotation reading. Depending on the initial products used, the students will receive different readings for their optical rotation and then be able to calculate the absolute optical rotation of their product. This is an introduction to a new instrumental technique that will be used in the labs. The menthone has so far shown positive results. It has yielded a 18:82 neomenthol to isomenthol product which was solved after having a +34 degree rotation of the polarimeter. The expected ratio was to be 21:79, so the experimental results were very close to this. This shows good signs of advancing toward adding this experiment into the organic lab manual.

### **Traditional Textiles Through a Modern Lens**

Christine Fekete

Prof. Jennifer Crenshaw, Lamar Dodd School of Art, University of Georgia

The tradition of textile making is rooted in repetitive processes. Some traditional fabric methods that employ a repetitive process are loom weaving, knitting, wool felting, embroidery, and screen printing. The intention of my art is to manipulate fabric through the use of technology to create a new textile surface. My recent projects explore the use of the repeating module stitched together to create a single surface. An important part of my process is transforming the material I start with, transparent cotton fabric, into something new. My method involves painting yards of this fabric with glue and allowing it to dry. This treatment

stiffens the fabric, making it suitable to be cut cleanly into any shape. I then use a laser cutter to cut multiples of the same shape out of the treated fabric, which I then arrange and stitch into a large panel. Each of these steps is repeated until the finished panel is the right size. The process I have invented is far from traditional but keeps intact the repetitive nature of traditional textile making. Even though the finished textile is intended to be displayed in a gallery setting, it could also be used for the construction of high fashion garments or in interior design as a room divider or window covering.

### **Mineral Probes of Magmatic Processes at Valles Caldera, Northern New Mexico**

Emily First

Dr. Michael Roden, Department of Geology, University of Georgia

The Ma Valles caldera and its volcanic products have played a central role in our understanding of catastrophic, caldera-forming eruptions. We are using mineral compositions determined on the UGA JEOL microprobe in an attempt to understand processes in the magma chamber(s) responsible for the caldera-forming eruptions and ensuing post-caldera eruptions. Specifically, we are using compositions (S, F, Cl and by calculation OH) of the phosphate mineral apatite to infer evolution of magmatic volatiles from before until after the caldera-forming eruptions. We expect to see evidence of significant degassing in post-caldera units, indicated by apatite with low Cl, S and OH. This would imply eruption from the same magma chamber as the caldera-forming units. However, if more recent units show an increase in volatile content, this could indicate the intrusion of new magma and the potential for dangerous eruptions in the future. Preliminary findings show that apatite in one post-caldera unit, the South Mountain rhyolite, is fluorapatite (~3.5 wt% F, ~0.1 wt% Cl), consistent with eruption from a previously degassed magma chamber. An initial microprobe survey of the groundmass of the Bandelier tuff, the caldera-forming unit, indicates that apatite, if present, is rare and small. These findings are not unexpected, given the very low reported phosphorus concentrations

for this tuff, which are likely due to apatite fractionation prior to eruption. The abundant apatite we find in the groundmass of more recent eruptions (e.g., Banco Bonito) suggests that these later units came from a new or recharged magma chamber.

### **Do Black-furred Animals Compensate for High Solar Absorption with Smaller Hairs? A Test with a Polymorphic Squirrel Species**

Melanie Fratto

Dr. Andrew Davis, Odum School of Ecology, University of Georgia

In polymorphic mammalian species with multiple color forms, those with dark pelage are more prone to overheating, especially in warm climates, because their fur absorbs solar energy at a higher rate. However, studies indicate that physical properties of their fur prevent or minimize heat stress, although it is unclear which properties. We tested the possibility that black-furred individuals simply have shorter or thinner hairs, creating a lighter (in weight) coat or one that allows greater airflow for evaporative cooling. We examined museum specimens of eastern fox squirrels (*Sciurus niger*), a species that displays brown, grey or all-black pelage color, and used image analysis to quantify hairs from the dorsal surface and tail. From examination of 43 specimens (19 brown, 9 black and 15 grey), and 1,720 hairs, we found no significant difference in hair lengths across color morph, but significant differences in hair widths. Black squirrels had thinner body hairs than other forms (7% thinner), but thicker tail hairs (9% thicker). Given that the dorsal surface would be directly exposed to solar radiation, we interpret this as an adaptation to prevent heat stress during the day. Thicker tail hairs may be an adaptation for nighttime thermoregulation, since squirrels sleep with their tails wrapped around their bodies. These results add to a growing literature body of the functional significance of mammalian pelage.

### **The Message Behind the Music: Blind Tom's Response to Nineteenth-Century Views on Race**

JoyEllen Freeman, CURO Apprentice, CURO Summer Fellow

Dr. Barbara McCaskill, Department of English, University of Georgia

Today, the name “Blind Tom” possesses little or no meaning for most Americans. Just one hundred years ago, however, its mere mention would have excited people across the country. Thomas Wiggins (1849-1908), popularly known as Blind Tom, was a black musical prodigy born blind, autistic, and enslaved near Columbus, Georgia. Most scholars have shied away from exploring Tom’s perspectives on race and race relations because they do not believe that he had an extensive understanding of social life. As to be expected, many of Tom’s original compositions do seemingly avoid or acquiesce to nineteenth-century American attitudes towards race. However, drawing from archival newspapers, sheet music, eugenics literature, books on slave resistance, and conversations with experts, I found that he demonstrates an awareness of and protest against racial limitations because many of his later pieces resemble the work of Frederic Chopin (1810-1849). Chopin was known to use his works to evoke emotion and assert the independence of his homeland, Poland, from Russian tyranny. My findings reveal that Tom and Chopin had similar musical and biographical experiences. I argue that Tom may have drawn from the works of this composer to advocate freedom from the racial boundaries that attempted to confine him as an African American musician. Looking at Tom’s life through his music is important because it reveals the hardships and expectations that African American artists faced during the nineteenth century due to racism, and it provides insight into the racial struggles that contemporary artists still encounter today.

### **The Biogeochemistry of Hammock Groundwater**

Ashleigh Gainer

Dr. Samantha Joye, Department of Marine Sciences, University of Georgia

Hammock groundwater research, a component of the Georgia Coastal Ecosystems Long Term Ecological Research on Sapelo Island, is investigating the possible effects human development has on hammocks off the coast of Georgia. A hammock is an upland area between the mainland and a larger barrier island. Hammocks are popular locations for homes or vacation spots and therefore, can be greatly affected by development. Two undeveloped hammocks (HN\_i\_1 and PC\_i\_29) of similar size and vegetation zones were used to investigate hammock groundwater biogeochemistry in a natural environment. At both sites, groundwater wells are located at different land areas including the marsh, upland, and hammock. Samples were also collected from a local creek. Groundwater samples were analyzed and compiled with relevant data from previous years. The salinity, chloride, and sulfate concentrations at both sites were higher in the creek and marsh well locations in comparison to the upland and hammock locations. This is due to the inflow of seawater. The phosphate and ammonium concentrations were much higher in the marsh and upland wells at site HN\_i\_1 in comparison to site PC\_i\_29. The higher concentration of phosphate at site HN\_i\_1 may be related to the Holocene era from which the hammock originated. Understanding the biogeochemistry of the groundwater at these natural hammocks will give a means of comparison for developed hammocks in future research.

### **Ready for Disaster**

Smitha Ganeshan, Roosevelt @ UGA

Dr. David Williams, Honors Program, University of Georgia

In the past decade, the oil industry and regulatory body, the Bureau of Ocean Energy Management, Regulation and Enforcement, has conducted three surprise inspections and eight emergency drills. These emergency drills are the

only chance for oil companies to practice and rehearse emergency preparedness plans. Without follow-up inspections or guidelines to mandate the BOEMRE's recommendations, the incentive to maintain an evolving, ready-to-mobilize emergency preparedness plan is low and the risk of disaster remains high. Further, relationships between industry regulators and oil companies compromise the standards of evaluations. An extensive literature review coupled with a cost/benefit, timeline, and impact analysis led to the selection of a particular policy alternative from a list of five other viable options, which would allow oil companies to augment the perceived importance of emergency preparedness and risk mitigation. Through this policy alternative, each company will achieve a culture of risk mitigation and emergency preparedness by overseeing standardized quarterly emergency drills and regular self-inspection. The portfolio of each company's reports will be evaluated during rigorous, unannounced inspections and follow-up evaluations by the BOEMRE. This is the most effective way to affect the oil industry's underlying culture that shapes risk mitigation behaviors and emergency preparedness initiatives. This policy alternative will ensure that a disaster like the Deepwater Horizon oil spill will not occur again and, in the event of a crisis, that the oil industry will be well prepared to respond to the crisis.

### **Studying Human Seizures Using Zebrafish as a Model**

John Gaudet

Dr. James Lauderdale, Department of Cellular Biology, University of Georgia

In humans, an epileptic seizure is marked by a sudden, stereotyped increase of brain activity. The increase in activity is due to the uncontrollable discharge of many neurons and results in involuntary contractions of random muscle groups, and sometimes a loss of consciousness. The underlying basis for seizure disorders is largely unknown, and is difficult to study in humans. We hypothesize that zebrafish (*Danio rerio*) exhibit human-like seizures and can therefore be used as a comparatively simple vertebrate model to study these neurological

events. To compare seizures in zebrafish to those in humans, adult zebrafish were treated with a common chemiconvulsant (pentylenetetrazole, PTZ) and observed for both behavioral and electrophysiological symptoms of seizures. It was found that zebrafish swimming in a PTZ solution experienced violent, uncontrolled muscle spasms, and in a 10 mM solution or greater, all fish (n = 79) went catatonic. Also, preliminary electrophysiological recordings reveal that the neuroelectrical patterns in seizing zebrafish are comparable to the stereotyped patterns in humans. This data provides evidence that perhaps the adult zebrafish central nervous system is sophisticated enough to produce human-like seizures and is therefore of merit to study. Future goals of this research include studying the molecular and cellular basis for epileptic seizures and using zebrafish as a screen for anti-epileptic medication.

### **Representations of Children and Childhood in Jurek Becker's Holocaust Novel *Jakob der Lügner***

Isha Ghodke

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Jurek Becker is an East German novelist who survived a childhood divided between a Polish ghetto and German concentration camps. His 1969 novel *Jakob der Lügner* features an 8-year-old named Lina who secretly lives with the main character, Jakob. Children are seldom examined in the context of the Holocaust or its literary representation because those younger than 16 were not allowed to work in Auschwitz and those who could not work were killed. Young children often dictated the fate of their mothers because children represented a future that the Nazis aimed to eliminate. Focusing on the depiction of children such as Lina is significant, because it provides insight into the development of a generation that was responsible for raising itself during the Holocaust and that was so often caught between the blurred lines of childhood and adulthood. Specifically, the focus sheds light on the early years of today's survivors, as most were children during the Holocaust. I anticipate that Lina's role as a child will be

ambiguous, and characteristics representing a childlike state, such as gullibility, will instead be apparent within the adults of the ghetto. The purpose of this study is to examine Becker's use of storytelling as a theme in the novel through the interchange of childlike characteristics by analyzing the conflicting depictions of childhood and adulthood between Lina and the adults surrounding her.

### **Stability Analysis of the Inhibitor Resistant Phenotype of AJP50 in Biomass Fermentations**

Debashis Ghose, CURO Summer Fellow  
Dr. Joy Doran Peterson, Department of Microbiology, University of Georgia

The United States' dependence on foreign oil has increased demand for alternative fuels. Switching to biofuels would also lessen human contribution to greenhouse gases since emissions produced when the fuel is burned would be offset by the carbon sequestered in growing new feedstock. Lignocellulosic biomass, such as pine wood, can be fermented into fuel ethanol by a biocatalytic organism, such as *Saccharomyces cerevisiae*. Therefore, adapting *S. cerevisiae* to the harsh conditions found in biomass fermentations is vital to biofuel production. Strain XR122N was adapted by continuous fermentation of pretreated pine wood to yield strain AJP50. It has been previously shown that AJP50 will produce more ethanol and grow more rapidly than XR122N in pine wood fermentations. The present study used a Bioscreen C machine to create growth curves for both strains in various media. AJP50 was able to grow more rapidly and produce more ethanol than XR122N in all media examined. To determine if AJP50 retained its inhibitor resistant phenotype, the strain was cultured on solid and liquid YPD media for 48 hours. Growth curves were created to compare the growth of the newly cultured cells to the freezer-stock AJP50. Approximately 62% of the fresh culture maintained the same level of resistance as freezer-stock while other times they reverted to the parent phenotype, indicating the resistant phenotype is not completely stable. Developing culture techniques that will allow AJP50 to retain its phenotype would aid in study of the

strain's genetics, allowing for the creation of strains with advanced fermentation capabilities.

### **How Effective Are "Fuzzies" as a Tool for Developing a Holistic Understanding of Basic Genetic Principles?**

Erica Gibson

Dr. Eve Wurtele, Department of Genetics, Development & Cell Biology, Iowa State University of Science and Technology

When learning genetics, high-school students often develop misconceptions about concepts being taught. For example, students often develop a shallow understanding of inheritance and its underlying factors. As a solution, we chose to create an enjoyable way for students to develop a holistic understanding of basic genetics concepts. This study measured the effectiveness of using an educational game to teach these concepts. Effectiveness was measured by player satisfaction based on survey results and inter-rater reliability on player's recorded facial expressions during play. We also measured effectiveness by how much the player learned, which was based on pre- and post-test scores. The game was developed through an iterative design process in which the educational objectives remained the same but level of player interaction differed. Two game prototypes were developed in the process. One group of students played the first game prototype, while another group played the second. In both games, the objective is to breed and grow simple organisms called "Fuzzies" so that their color and pattern match that of a goal pattern. The main difference between the two versions was the level of interaction allowed. Players were able to interact with the process of meiosis in one prototype whereas the process was automatically carried out in the other prototype. We expected that a higher level of player interaction would increase the difference between pre- and post-test scores. Due to a small sample size the results were not significant. More extensive studies will reveal whether a holistic understanding was developed.

### **Sensory Systems in *Drosophila* Courtship**

Erin Giglio

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University of Georgia

All species use distinctive courtship patterns to identify mates of the same species. These patterns may involve stereotyped motions, pheromonal excretions, visual displays, or combinations of all three. The purpose of this project is to examine the sensory systems used in courtship behavior by two closely-related *Drosophila* species. *D. recens* and *D. subquinaria* are two species which do not mate with one another in the wild. It is possible that they avoid intercrossing by using different sensory systems during courtship, such as wing-based song, pheromonal smells, or visual displays. Alternatively, the two species may avoid crossbreeding with one another by using the same sensory system, particularly in populations where both species are present but using different forms of display within each system. To test which of these hypotheses was correct, I performed a series of individual crosses to identify the emphasis on each sensory system within each species. Flies from *D. recens* and two populations of *D. subquinaria* will be studied—one population living alongside *D. recens* and one population which does not share territory with *D. recens*. Within each population, the mating successes of flies for three sensory system losses will be assessed: those without wings, those without antennae, and those without vision. Finally, I will look at the gender-based differentiation of these categories by surveying the differences between courtship success with different combinations of intact or altered males with intact or altered females. Thus, I will measure the importance of these systems on courtship success.

### **An Analysis and Application of Foreign Language Education Methodology**

Mary Golden

Dr. Victoria Hasko, Department of Language & Literacy Education, University of Georgia

This paper practically examines methodology used in past and present foreign language classrooms. This paper first includes a critical

review of several major methodologies used in foreign language classrooms, including the Grammar Translation Method and the Communicative Approach in attempt to understand why each method continues to be or is not longer popularly used today. These methods, especially the Communicative Method, are compared with the ACTFL Standards. The writer also examines various Spanish textbooks to see which methods are manifested by the manner in which the textbooks are written. Furthermore, the writer discusses an observation of the “communicative” classroom of a high school Spanish teacher. The paper then shows an application of the most effective methods, especially the Communicative Approach, by giving examples of two lesson plans. The thesis includes a discussion of the results of the lesson plans after they were implemented in a high school Spanish classroom. Through this application, the paper seeks to analyze and practically apply foreign language education methodology to aid in creating more effective lessons for foreign language students.

### **Investigation of the Protein Content of Hirano Bodies**

Camille Gregory, CURO Summer Fellow  
Dr. Marcus Fechheimer, Department of Cell Biology, University of Georgia

Hirano bodies are actin-rich, highly structured protein aggregates found in the hippocampus of patients with many neurodegenerative diseases, including Alzheimer’s disease. The role of Hirano bodies in disease progression is largely unknown due to the lack of *in vivo* models. Previous studies of autopsied brain samples have shown that some proteins tend to appear in the same location as Hirano bodies. Mislocation of these proteins within Hirano bodies could be beneficial or harmful to the cells during neurodegeneration depending on the protein, the protein’s normal function, and the protein’s alternate function in disease. In cultured cells, Hirano bodies have been shown to reduce AICD-dependent apoptosis. Further investigation of Hirano bodies could provide clues to their physiological function. Previous experiments have purified Hirano bodies and used mass spectrometry to determine which

proteins co-localize to the formations in *dictyostelium*, a slime mold model organism. These data provide evidence as to which proteins could be associated with Hirano bodies and potentially explains how these structures are interacting in the cell and affecting neurodegeneration. Using immunofluorescent staining, I prove conclusively that certain proteins co-localize with Hirano bodies in *dictyostelium*. These experiments clarify the previous purification work by corroborating the mass spectroscopy data. The association of these proteins with Hirano bodies provides an indication of their role in disease and leads to further inquiries into their functional impact.

### **Screening for Domestic Violence in Divorce Mediation**

Camille Gregory, Roosevelt @ UGA  
Prof. Raye Rawls, The Fanning Institute,  
University of Georgia

Domestic violence affects the divorce process in significant ways depending on the type of controlling behavior exhibited between the couple. The most important consideration in divorce cases affected by domestic violence is the protection of victims from further harm; therefore, it is critical for the arbiters of divorce disputes to understand the power dynamics involved in the relationship. Mediators in the state of Georgia do not uniformly receive specialized training to recognize domestic violence, nor do they all learn how to assess the degree of coercive control exhibited by a divorcee over his or her partner. Policy does not align with significant changes in the study of intimate partner violence in the last decade. Analysis of the state's current system in conjunction with a review of new intimate violence assessment techniques reveals promising areas for improvement. Several alternatives to the current system, including maintaining the status quo, the elimination of mediation, the use of the DOVE screening process, the use of the Controlling Behaviors Scale, or the creation of a new coercive control measure, were evaluated based on three criteria: effectiveness, feasibility, and cost. The results of this analysis in conjunction with detailed literature review reveal that the reform of the

mediation process must include changes in mediator training procedures. Assessments of the degree of coercive control between divorcing couples using the Controlling Behaviors Scale ought to become standard procedure for mediators. With the results of such assessments, mediators will be able to make informed decisions about how to handle each case.

### **Telomere Recombination in Wild Type Yeast Cells**

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Telomeres are protective caps at chromosome ends that are composed of short tandem repeats. Their function has been tied to carcinogenesis and aging in humans. Most cancer cells maintain telomeres by using telomerase, while somatic cells have little or no telomerase activity. However, cells lacking telomerase, including a subset of human cancers, can sometimes elongate telomeres by utilizing homologous recombination. Previous research has shown that telomeres in wild type yeast cells can sometimes be recombined. This was shown by their ability to become extended by copying sequence from a transformed telomeric circle; however, it was not possible to tell if the recombined telomeres were normal length or abnormally shortened when they were recombined. Our goal was to construct and use mutationally tagged telomeric circles to distinguish whether telomeres in wild type cells have normal length or shortened length at the moment of recombination. First, telomeric circles containing phenotypically silent *Bcl* mutant telomeric repeats (that each contains a *BclI* restriction site) and a *URA3* gene were constructed. Next, these circles were transfected into *URA3*-deficient *Kluyveromyces lactis* mutant cells and only the cells with *URA3* are able to grow. The telomere structures in these transformants will be analyzed using the southern blot technique in order to see if wild type length telomeres are recombined with the telomeric circles. This study is significant in the way that it could help us understand the situations in which normally functioning telomeres can recombine.

### **Bedouin Dress: A Means of Cultural Continuity and Change**

Shelly Hagigi

Dr. Katalin Medvedev, Department of Textiles, Merchandising & Interiors, University of Georgia

Dress plays a crucial role in people's lives; therefore, in today's globalized world it is important to understand the multiple uses and meanings of people's dress practices in cultures other than ours. The way people dress depends on their personality, lifestyle, political beliefs, and the physical environment that surrounds them, among other factors. This paper investigates the changing aesthetics and the complex cultural and gendered meanings of contemporary Bedouin dress in Israel's Negev Desert. With the aid of academic and visual sources, as well as field research that included participant observation, a visit to Joe Alon Center's Museum for Bedouin Culture, and communication with Bedouin women, I have concluded that dress is a key element of the Bedouin culture. The Bedouins live in a patriarchal and collectivist society. Bedouin women's highly decorated yet non-revealing garments indicate a strong tribal identity and emphasis on the Islamic virtues of honor and modesty. In addition, their dress projects their marital and social status, conveys their personal aesthetics and sophistication of manual skills. The Bedouins' layered dress styles also aid their physical survival as their garments are specifically designed to withstand the extreme climate changes of the desert. Just like other cultural and ethnic groups, today the Bedouins are also affected by modernization, which is changing their traditional lifestyle and appearance. This study contributes to the existing studies on Bedouin dress the documentation of the recent changes in the dress practices of this intriguing nomadic culture and provides reasons for this change.

### **Without Anchors: Standardizing Child Placement after Deportation**

Christen Hammock, Roosevelt @ UGA

Dr. Larry Nackerud, School of Social Work, University of Georgia

United States immigration policy essentially consists of two comprehensive bills passed in 1996—the Illegal Immigration and Immigrant Responsibility Act and the Anti-terrorism and Effective Death Penalty Act. These bills do not effectively address the issues of “mixed-status families,” those in which two members of the same family hold different immigration statuses. This demographic is particularly problematic in Georgia, whose immigrant population increased 372% between 1990 and 2006. When immigrants living in Georgia establish families, their children are citizens by birthright. Their welfare is therefore Georgia's responsibility. Additionally, they are not eligible for removal, while their parents still remain deportable according to federal law. When removal of a parent occurs, the opposing goals of federal immigration court and state family policy cause de facto deportation of citizen children or an increase in foster care placement. Both result in a burden on Georgia's agencies and taxpayers. This paper's research consists of examining the failures of and gaps in current legislative and judicial code, as well as a review of other states' approaches to this problem. This paper intends to provide solutions for filling this gap in policy, evaluate the solutions according to relevant criteria, and ultimately argue for the creation of a liaison department within Georgia's Department of Family and Child Services to ensure that the best interests of the child are met in every case of removal.

### **Spatial and Temporal Analysis of the Ceramics at the Burnt Village, 9TP9**

Vanessa Hanvey, CURO Scholar

Dr. J. Mark Williams, Department of Anthropology, University of Georgia

The Burnt Village, also known as Okfuskenena, is located three miles west of present day LaGrange, Georgia. On September 21, 1793, white colonists burnt this Creek town and either killed or kidnapped the inhabitants.

Harold Huscher of The University of Georgia excavated the site during the field seasons of 1966-69. No final report was published and much of the collection has not been analyzed. Over the past year and a half, I have analyzed the ceramics and lithics from the Burnt Village. The pottery analysis allowed for the identification of several occupational periods at the site. These periods include the Middle Woodland, Middle Mississippian, Late Mississippian, and Historic periods. Using the mapping program Surfer, I will attempt to identify the geographical distribution of these differing occupational time periods. I will present the latest findings concerning spatial and temporal analysis of this data.

### **Creating the Physician of the Future: Addressing the Health Needs of Rural Georgia Communities**

Osama Hashmi, Roosevelt @ UGA  
Dr. Monica Gaughan, Department of Health  
Policy & Management, University of Georgia

The Georgia State Office of Rural Health states that rural Georgians are less healthy than those living in urban areas, are more likely to be uninsured, and have a higher probability of developing heart disease, obesity, diabetes, and cancer. Studies show that health care workers in these communities must be prepared to treat these patients holistically by overcoming physical, cultural, and social barriers. In response to this need for holistic medical education, medical schools must be better equipped to prepare their students to handle community health problems. In addition, rural Georgians are faced with an extreme shortage of Georgia medical students who choose to become primary care physicians. These physicians are essential for the detection and prevention of illnesses and are necessary to the well-being of high risk, rural communities. This paper proposes that Georgia implement a community health rotation program, available to Georgia medical students and health professionals. A cost benefit analysis of cost, feasibility, and effectiveness of Georgia's present resources indicates that a community health rotation program has the greatest potential for improving the quality of rural health care. Current rotation

programs in other states offer health care students first-hand experience in caring for patients in disadvantaged communities. By exposing medical students to the rewarding field of community health, a community health rotation program in Georgia has the potential to increase the number of students entering primary care as well as improve the overall quality of rural health care.

### **The Boom That Saved the Day**

Anisha Hegde, Roosevelt @ UGA  
Dr. Leara Rhodes, Grady College of Journalism  
& Mass Communications, University of Georgia

Emergency preparedness—including efficient oil clean up—was lacking in the aftermath of the Deepwater Horizon oil spill. To fix this shortfall, oil companies should be required to formulate efficient emergency plans, and the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) should be required to inspect each rig's capability to carry out its plan. Currently, the BOEMRE does not inspect emergency plans and each rig is expected to monitor its own response capabilities. However, literature reviews confirm that the Deepwater Horizon did not possess the fire boom it claimed to have on-site. Experts predict that immediate usage of booms would have restricted the spill to 100 miles offshore, preventing 211,680,000 gallons of oil leaked from reaching the coast. Despite a 10-day delay in boom usage, 125 burns conducted using booms had destroyed 2.8 million gallons of oil by June. A shortage of boats and clean-up crews was also evident. The Coast Guard needed 14 boats equipped to burn oil, but officials were only able to contract 8 boats. 20 skimmers were needed to collect oil on days with waves higher than 3 feet, but only 2 were on fully on-duty. The National Oceanic and Atmospheric Administration (NOAA) also reported a shortage of crews, which should have numbered 40 by June. If each oil company detailed a plan with an economical response toolkit—complete with manpower, booms, and boats—and the BOEMRE inspected each rig's capability to carry out its plan, future oil-related disasters could be contained more expediently.

### **Medical Therapies and Clinical Characteristics among Patients with Duchenne Muscular Dystrophy**

Anisha Hegde

Dr. Michael Terns, Department of Biochemistry & Molecular Biology, University of Georgia

Duchenne Muscular Dystrophy is the most common fatal genetic disease diagnosed during childhood. Over the last four years, the DuchenneConnect Registry, a resource connecting the DMD community, has collected data from 1,273 participants to better characterize patients and educate others. In this study, analysis of the data regarding steroid and therapy usage as well as behavior and learning concerns was performed by comparing usage and diagnosis frequencies to the clinical histories of respondents. This study found that a significantly higher percentage of patients who need walking aids use corticosteroids than those who can walk without assistance and that deflazacort, a drug not yet available in the U.S.A, is used almost twice as frequently as prednisone in boys who require walking aids. Heightened levels of autism, ADHD, and OCD were found in the DMD population when compared to the general population, and the incidence of behavioral concern diagnoses was found to increase in the later stages of the disorder. Therapy usage also increases as the disorder progresses. Analysis of therapy usage amongst DMD patients, however, exhibits no correlation indicating the effectiveness (measured in prevention of heart, bone, muscle, and tendon problems) of various therapies. 12.42% of those who have never tried any therapy have experienced broken bones related to the muscular dystrophy, versus 12.46% of those who have tried therapy. The findings ciphered from DuchenneConnect will help bridge the gap in knowledge between laboratory research and public health concerns of the DMD population.

### **John Lloyd Stephens and Mesoamerican Orientalism**

James Herman

Dr. John Short, Department of History, University of Georgia

Published in 1841, John Lloyd Stephens's *Incidents of Travel in Central America, Chiapas, and Yucatán* introduced American readers to the previously "undiscovered" Mayan civilization. In addition to his writings on Mesoamerica, he also documented his travels in Eastern Europe, Egypt, and the Levant. Stephens, however, has remained largely forgotten by historians and literary critics alike. The portrait that emerges from the little scholarship that does exist suggests that his travel writings, particularly those on Mesoamerica, were the product of the American Romantic Imagination and, in the spirit of Manifest Destiny, treated Mesoamerica as a blank canvas on which to express American colonial ambitions. The aim of my research, however, is to contest this claim. Long before he had set foot in the Yucatán, Stephens traveled extensively throughout the Orient, and in engaging the unexplored world of Mesoamerica, Stephens borrowed language definitive of European travel literature about the Orient. It was not the Romantic Imagination, renowned for its celebration of originality, which informed Stephens's discovery. It was, instead, the European tradition of presenting the Orient, through the use of both Oriental imagery and language, as a timeless and unchanging entity. A close analysis of his writings suggests a subtle transposition of these images over the Yucatán. Aside from the fact that virtually no scholarship exists on this important work, the significance of my research is that it sheds light on the historical evolution of American language of the exotic as well as the long-term structuring of American perceptions of the foreign.

### **Directed Differentiation of Human Embryonic Stem Cells to Mesoderm Lineages**

Daniel Hess, CURO-BHSI Participant  
Dr. Stephen Dalton and Dr. David Reynolds,  
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During early development, complex signaling from surrounding embryonic structures patterns cells as they pass through the primitive streak into the various mesoderm lineages including paraxial, intermediate and lateral plate mesoderm. Lateral plate mesoderm further divides into splanchnic and somatic mesoderm. The various mesoderm progenitors give rise to specific tissues of the human body. We sought to mimic the natural environment and elucidate the differentiation pathways of these mesoderm progenitors using an *in vitro* human pluripotent stem cell model. These mesoderm progenitors give rise to skeletal muscle, somites, kidneys, gonads, heart, and bone. Successful differentiation of human embryonic stem cells (hESCs) to any of these cell types has therapeutic potential for treating a wide variety of current diseases, such as muscular dystrophy, renal failure, heart disease and osteoporosis. hESCs were grown in chemically defined media containing an assortment of factors known to play a role in differentiation such as Activins, Wnts, BMPs and retinoic acid. Differentiated cells were analyzed by qPCR and immunofluorescence for markers of the various mesoderm progenitors. Initial data indicates differentiation of hESCs to paraxial mesoderm, evidenced by upregulation of Pax3 and Pax7. Preliminary data also demonstrates differentiation from lateral plate mesoderm (Brachyury+) to both splanchnic mesoderm (Foxf1+) and somatic mesoderm (Irx3+). Further experiments are necessary to show differentiation of hESCs to intermediate mesoderm and to more fully characterize the different mesoderm progenitors and their potential.

### **Exercising Glycoproteomics to Develop New Methodologies for the Detection of Early Breast Cancer**

Shanterian Hester, CURO Summer Fellow  
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Breast cancer is the second leading cause of cancer deaths among women, discovery of new biomarkers would enhance current methods used for diagnostics, monitoring and better prediction disease reoccurrence. Identifying Glycosylphosphatidylinositol (GPI) anchored proteins through new methodologies and technologies on breast tissue could lead to the discovery of new biomarkers for the early detection of breast cancer. GPI anchored proteins is a posttranslational modification that anchors the modified protein to the outer cell membrane. The synthesis of GPI anchored proteins requires approximately 20 enzymes, one of them being GPI transamidase (GPIT), which adds the GPI anchor to the C-terminus of the protein. Preliminary studies have shown GPIT is over-expressed significantly in breast cancer. In addition, GPI-PLD, another enzyme with the responsibility of cleaving GPI anchored proteins, was found at high levels in human serums and shown to be expressed at elevated levels in several cancer cell lines. This suggests that GPI anchored proteins may be increased in breast cancer patients due to elevations of the enzymes within the GPI biosynthetic pathway. In our study, we are utilizing glycoproteomics analyses and various methodologies to identify potential GPI anchored proteins specifically to breast cancer patients.

### **Risk-taking in Midterm Elections**

Dana Higgins  
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Science, University of Georgia

Since 1934, the president's party has lost seats in the House of Representatives in every midterm election with only two exceptions. With such a strong empirical trend in favor of the challenging party, more challengers to the party in control should strategically choose to run for the House in midterm election years. Thus far, research has focused solely on why the midterm

loss occurs and ignored the effect such a trend has on candidate emergence. This research seeks to establish a trend of challengers in midterm elections using previously established theories explaining the behavior of candidates. Candidate's behavior will be evaluated in context of the midterm election when empirically the president's party loses House seats. Data collected from both midterm and presidential year elections for the United States House of Representatives will be analyzed in a district-level test of the following hypotheses: 1) more districts held by the president's party are less safe in midterm elections than presidential year elections, 2) the average number of risk-takers, from a party other than that of the incumbent president, running for election is higher in midterm years compared to presidential election years, and 3) the average number of experienced risk-takers, from a party other than that of the incumbent president, running for election is higher in midterm election years than presidential election years.

### **Isolation and Characterization of Polyomavirus Middle T (PyVT) Mammary Cancer Stem/Progenitor Cells**

Jessica Holmes, CURO Scholar  
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Transgenic mice carrying Polyomavirus middle T (PyVT) antigen are commonly used models to study mammary tumorigenesis and metastasis, and are valuable tools to analyze the molecular and cellular mechanisms of breast cancer induction and progression. The biomarkers expressed in PyVT-induced tumors exhibit similar morphologic and histologic properties to that of human breast cancers, and are associated with a poor prognosis. Recent studies also indicate that mammary tumorigenesis may arise from the mammary stem-like cells which are found in higher concentrations in PyVT-induced mammary tumors. Effective identification and characterization of such mammary stem cells in PyVT-induced tumors can provide valuable diagnostic tools and subsequent treatment methods for human breast cancer. The focus of my research is to obtain, culture, and characterize key biomarkers present on

mammary cancer stem cells using tumors obtained from PyVT transgenic mice. My experiments involved setting up appropriate mating and genotyping of the mice using DNA extraction, Polymerase Chain Reaction (PCR), and gel electrophoresis to identify mice carrying the PyVT antigen. After obtaining PyVT mice, I isolated tumor cells and collected mammary cancer stem cells from tumor tissues by flow cytometry using stem cell marker antigen. By understanding more about mammary cancer stem cells, researchers can begin to characterize important molecular biomarkers, proteins, and signaling pathways which can lead to aggressive diagnostic and treatment strategies for human breast cancer.

### **Symbolization and Religious Thought**

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Competing interpretations on the reason for the origins of religious thought attempt to reduce this analysis to one variable. However, this field is irreducibly complex. For that reason, an interdisciplinary perspective can link different inquiries into a cohesive structure. These connections will emphasize evolutionary biology, theology, and epistemology. This paper draws upon a range of journal articles and books in an effort to provide a more holistic picture of current ideas. Specifically, it will focus upon the evolution of symbolization in religious thought framed within an adaptationist perspective. Religion not only improved social structures, but personal belief systems too. Current research supports that in our prehistory the human mind attributed ethereal influence to ambiguous events. This demand for explanatory causation, where x always points to and clarifies y, reveals an infatuation with coherence that implies the human mind finds necessity in space free of chance. Evolutionary biology indicates that as our ancestors physically developed so too did their capacity for abstract thought. Communal relationality, and its preference towards inclusiveness, evolved beyond human to human contact. The human mind, at some point along the evolutionary timeline, began to struggle with questions of meaning and belonging. Relations

transcended localized and immediate concerns by moving into the realm of the non-corporal. The symbol was born. The implications of this thesis impact important questions on issues of human uniqueness and meaning, as well as provide a more complete idea on the origins of religious thought.

### **Thwarting Radiological Terrorism: Policies for Regulating the Security of High-Risk Radioactive Sources**

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The September 11th terrorist attacks heightened international concerns regarding the security of specialized sources containing radioactive material, as extremist groups such as al Qaeda have made known their desire to use dirty bombs designed to disperse radioactive material in an act of radiological terrorism. The Nuclear Regulatory Commission's (NRC) current licensing mechanism fails to prevent wide variation in the physical protection systems which safeguard these sources because responsibility for maintaining security is broadly dispersed. Implementation of an adequate physical protection system is entirely the responsibility of the licensee in the majority of cases, and requirements for implementation are only general. As a result, the status quo is unsustainable in that the current requirements for accountability of radioactive materials do not reflect the threat level associated with radiological terrorism. This paper evaluates policy alternatives for regulating the security of high-risk radioactive sources in the United States. Three alternatives are compared to the status quo in terms of enhanced safety and security, cost-effectiveness, equity, and political feasibility. Projected outcomes for each alternative are based on a review of the existing literature, and when recommending a policy, the criteria most influential in mitigating the threat of a terrorist attack involving a dirty bomb and enhancing national security are weighted. This selection methodology advises Congress to amend current legislation and incorporate the alternative under which the NRC mandates all persons or companies to have installed an

adequate physical protection system prior to being granted a license for housing radioactive materials.

### **The American Obesity Epidemic: Creating Incentives for Nutritional Choices at the Point of Purchase**

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Obesity rates among adults and children in the United States have doubled to 30% and 17% respectively over the past 25 years. A major contributor to this trend is increased snacking, particularly of foods and drinks with a high sugar content, rather than larger meal sizes. This paper examines policy alternatives to reduce the consumption of high calorie, unhealthy drinks. The following criteria were used to evaluate the alternatives: positive impact on American diets, minimization of social costs, efficiency, political feasibility, and ease of implementation. Based on these criteria, a federal excise penny per ounce tax on caloric sweetened beverages was found to most effectively reduce sugar intake and reverse current obesity rates. Thirty-three states already have soda sales taxes in effect. Their ineffectiveness to lower consumers' BMIs, however, appears to lie in the current magnitude, ranging between 1.5% and 7%, and the application of the tax. In particular, the current state taxes are applied after the point-of-purchase and thus only weakly affect consumers' beverage purchases. A heftier penny per ounce tax applied at the point-of-purchase would raise the price of beverages such as soda by 15% to 20%. Reports by the Economic Research Service of the United States Department of Agriculture (USDA) suggest that this price change would reduce soda consumption and lower rates of obesity in the U.S. substantially. The tax would also generate revenue for potential use in public health initiatives.

### **Effects of Steel and Aluminum Shoes on Forelimb Action in Stock Horses**

Elodie Huguet

Dr. Kylee Duberstein, Department of Animal & Dairy Science, University of Georgia

Horseshoes of various materials have been adopted to satisfy the need of performance horses. Steel shoes are commonly used for their affordability and longevity; however, the use of aluminum horseshoes is being appropriated to the various requirements of equestrian activities, such as accentuating foreleg action for ameliorated movements. Consequently, the purpose of this study is to assess the effect of steel and aluminum shoes on forelimb kinematics of trotted horses. The objective is to determine which shoeing type allows for improved quality of gaits in order to increase performance in its various aspects. By performing two repeated measures crossover study on nine healthy stock-type horses, the effects of these two horseshoe types on forelimb kinematics were analyzed at the trot. Horses were trotted in hand for three repetitions over a distance of 50 meters every other week for two shoeing cycles. Video footage was then analyzed using gait analysis software (OnTrack Equine™) for each repetition. A preliminary six week study showed a trend towards increasing knee angle in horses wearing aluminum shoes versus steel shoes. A secondary study was conducted with more controlled marker placement and extended shoeing cycles by two weeks to allow for additional recording and data. The results obtained were analogous to the preliminary study in that there was a significant treatment effect with horses wearing aluminum shoes having a larger knee angle than horses in steel shoes ( $p < 0.5$ ). This finding is of particular importance to performance horse disciplines for which ameliorated knee action is desirable.

### **Microplasma Ion Ablation by Electrostatic Sampling Device for SERS Sensing**

Whitney Ingram

Dr. Yiping Zhao, Department of Physics & Astronomy, University of Georgia

Raman spectroscopy involves the change in the frequency of a photon to determine the

molecular identity of a particle. However, Raman spectroscopy is inefficient for commercial use due to its limited detection ability. Surface enhanced Raman spectroscopy (SERS) based on metallic nanostructures, enhances the signal of a normal Raman spectrum by order of  $10^8 - 10^{10}$  magnitude. Our lab uses silver coated nanostructures fabricated by oblique angle deposition. For SERS enhanced substrates, they have demonstrated excellent sensitivity for virus detection. It is our purpose to further increase the effectiveness of the SERS substrates by using an electrostatic device (ESD). An ESD is a small light-weight device, which uses a sharp pointed probe and high voltage to produce corona discharge. The discharge from the probe will produce ions that will ablate the surface of the SERS substrate. Our hypothesis is that this method will increase the signal to noise ratio of the SERS signal by removing the contaminants from the SERS surface. To observe enhancement of SERS signal, the sample will be contained in a glovebox purged with Argon, with the ESD device discharging directly onto the substrate. 2mL of BPE (trans- (bis) pyridyl-ethene) will be observed before and after exposure to the ESD on a glass substrate. Finally, a Raman spectrometer will be placed directly over the location of discharge. If the ESD shows enhancement of the signal of BPE, then the device will prove to be an effective tool for identification and detection of particulates such as viruses and TNT.

### **Development of a Plasmid to Detect Cobalamin Transport Mutants in *Mycobacterium tuberculosis***

Elena James, CURO Apprentice

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Tuberculosis, a disease resulting from infection by the bacterium *Mycobacterium tuberculosis*, kills approximately 2 million people annually. Vitamin B12 is a cofactor in various *M. tuberculosis* enzymatic reactions. Although the mechanism is not known, recent research has shown that this pathogen utilizes vitamin B12 when added to culture medium. As a result, vitamin B12 transport proteins may serve as

useful targets for the development of drugs that block uptake of the vitamin. In bacteria, riboswitches are RNA structures that block translation upon binding of a specific molecule. In *M. tuberculosis*, two vitamin B12 riboswitches have been identified. My project is to develop a genetic screen for vitamin B12 transport mutants in mycobacteria. Thus far, I have been working to create a plasmid that places a drug-resistance gene under the control of a B12 riboswitch. This plasmid, which can replicate in mycobacteria and in *E. coli*, is being modified by addition of DNA elements in the following order: a transcription terminator, the promoter and B12 riboswitch for the *M. tuberculosis metE* gene, a promoter-less resistance gene for the antibiotic apramycin, and a promoter-less counter-selectable gene, *sacB*. We hypothesize that this plasmid will confer to mycobacteria resistance to apramycin only when vitamin B12 is added to culture medium. If this system functions as anticipated, the next step will be to perform transposon mutagenesis to mutate the bacteria and select for vitamin B12 transport mutants.

### **Security Contractors: The Future of Peacekeeping?**

Archil Japaridze

Dr. Fred Manget, School of Law, University of Georgia

The objectives of this research are to assess the current and potential impact of Private Security Contractors (PSCs) on combat and peacekeeping operations. The research question addresses if PSCs would be able to effectively replace international peacekeeping forces (UN, NATO, AU). The private security industry is an increasingly growing field, one which serves a critical role in the War Against Terror. Although many contractors fulfill support and administrative tasks, a large amount serve in combat operations. These combat operations will be the topic of the research. The research will cover two aspects. The primary aspect will examine PSC combat operations throughout the course of modern warfare. This history-oriented portion will focus on operations in post-colonial Africa. This section will evaluate the efficacy of PSCs as peacekeeping forces. In addition to

analyzing PSC efficacy, the research will scrutinize international peacekeeping operations. By studying these two entities (UN peacekeepers and PSCs) the researcher will examine the feasibility, advantages and disadvantages to fielding PSCs in peacekeeping operations. The second portion will focus on the future of PSCs, especially on their potential role as peacekeeping forces. Traditional peacekeeping forces have historically come up short in many conflicts. The research will address the reasons for this shortfall, and in turn advocate for replacement. Due to the increased professionalism and training of PSC forces, the researcher anticipates that PSCs would be able to readily replace traditional forces.

### ***Plasmodium falciparum*: Expression of the DBL3x region of VAR2CSA**

Rachel Johnson, CURO Apprentice

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Infection by the parasite *Plasmodium falciparum* causes nearly 200 million cases of malaria annually. Pregnancy Associated Malaria (PAM), often resulting in fetal and/or maternal complications, is caused by the binding of parasite infected erythrocytes to chondroitin sulfate A found in the placenta of pregnant women. We are particularly concerned with VAR2CSA, a member of the Duffy-binding like (DBL) protein superfamily, which has previously been shown to mediate the binding of parasite to host. In this project, the DBL3x domain of the VAR2CSA protein was cloned into *E. coli* cells and expressed for protein binding studies. The DBL3x portion of the *var2csa* gene was amplified from blood samples from Kenya using PCR methods. The amplified inserts were then purified, cut, and ligated into a PET-28 expression vector. The ligation product was transferred into chemically competent cells using heat shock protocol. The presence of the insert-carrying PET-28 vector was confirmed using PCR colony analysis and again by restriction digests. The VAR2CSA protein was expressed and purified in these cells. We are now using this protein to study the binding of *Plasmodium falciparum* to chondroitin sulfate A in the placenta. Understanding the binding

properties of VAR2CSA to the placenta may lead to a vaccine and the prevention of PAM.

### **Renewable Energy-Powered Bulk Milk Cooling for Smallholder Dairy Farmers**

Jonathan Jones

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Uganda's population is approximately 30.7 million, 85.2 percent in rural agricultural areas. Agriculture makes up 15.1 percent of the country's total GDP and 90 percent of its exports, with dairy production commanding a large portion of the country's livelihood. Due to poor road networks, insufficient labor, and lack of electricity, many smallholder dairy farmers lack the means to preserve or refrigerate night milk, which results in large economic losses. Previous studies by the Uganda Industrial Research Institute and the Kisaalita Lab at the University of Georgia have shown success in developing a 15.5-liter renewable energy-powered zeolite absorption evaporative cooler that lowers the temperature of milk 18° C, allowing farmers to preserve night milk. In previous field trials, the 15.5-liter capacity was found limiting. The purpose of the current project is to scale-up the cooler to approximately 100-liter capacity. With a larger capacity, the system can be easily diffused among the more educated dairy farmers with more milk, which will increase the adoption of both the technology. The use of these innovations will permit more milk from smallholder dairy farmers to enter cold chain, facilitating increased incomes and overall increase of GDP of Uganda. The device will also potentially allow farmers to use excess biogas for cooking and lighting, decreasing the demand for woody biomass, which will reduce the deforestation rate, and reduce the release of methane gas from fermenting cow dung, which is a 21 times more potent as a greenhouse gas in comparison to carbon dioxide.

### **Worse Before it Gets Better? Or Just Worse?**

Meredith Jones, Roosevelt @ UGA

Dr. Santanu Chatterjee, Department of Economics, University of Georgia

In 1993, the Treaty of Rome established the European Economic Community. In order to protect against encroachments on national sovereignty, article 296 detailed that the customs union would not be extended to the defense industry. However, in 2009, EU Member States introduced a directive that would drastically reduce barriers to military and defense trade in an effort to allow European military supply companies to become competitive with other world suppliers. This decision was obviously made due to economic reasons. Legally, it conflicts with the Treaty of Rome. More broadly, it contradicts the supposed wish of Member States to keep their defense departments national. This decision speaks to Member States' priorities: economics, then politics. Thus two questions are raised: Firstly, will this progressive step towards economic integration outweigh such woes as debt crises and a euro that is rapidly losing value or will it just make a mild improvement in a system that is doomed to fail? Secondly, what impact on political integration and loss of national sovereignty will the introduction of this directive have? A simple cost-benefit analysis of the directive will show that it does indeed have economic benefits. Most of these benefits, of course, occur in the defense industry, though other industries are positively affected as well. It is unclear whether these benefits will "outweigh" the European Union's other problems, though further integration seems inevitable and unaffected by predictions of success or failure. This paper will also analyze look at the political ramifications of defense industry integration.

### **Children's Directional Understanding of Arrows**

Ryan Jordan

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Endogenous orienting is the phenomena through which attention is cued by a "meaningful"

stimulus toward a peripheral target. Previous studies have examined endogenous orienting through arrow cues in adults and in children. Children as young as five years of age are capable of using the directional meaning of the arrow to cue their attention to the target. However, children younger than five years of age seem to rely more on the perceptual properties of the arrow, such as size or weight, to orient their attention. The manner in which 3- to 4-year-olds' abilities (to recognize arrows as symbols indicating direction) were tested may not reflect their true understanding. Therefore, the current study will extend previous findings by using 3- to 4-year-old children to test the hypothesis that children as young as three years of age are capable of understanding arrows as a directional symbol. In order to determine that children are cued by the direction of the arrow and not other perceptual properties of the arrow (such as weight) only arrow heads and arrows with arrow heads on both sides will be presented. Children are presented with a computerized reaction time task. Participants are first cued by a central arrow, followed by a peripheral target that is either congruent or incongruent with the direction of the arrow. The child's task is to press a spacebar key as soon as the target appears. Speed and accuracy will be analyzed as a function of age. This work has important implications for understanding the development of cognitive processes, and more specifically, language development.

### **Characterization of Disease Causing Mutations of hENT3**

Ah Hyun Jun

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Human equilibrative nucleoside transporter (ENT)-3 is one of the three members of the ENT family, also known as the Solute Carrier 29 family, that facilitate movement of nucleosides across cellular membranes for salvage synthesis of nucleic acids. Unlike the other members of the family (hENT1 and hENT2), hENT3 alone exhibits pH-dependent transport characteristics, with its maximal activity observed at an acidic pH level between 5.5 and 6.5. hENT3 is also

unique in that it is localized intracellularly in the mitochondria and lysosomes and is thought to facilitate physiological roles of these organelles, although direct evidence supporting this conclusion is not available. In our previous studies, we have identified mutations in hENT3 that cause human disorders such as H and Pigmented Hypertrichosis Insulin-dependent Diabetes Mellitus (PHID) syndromes and shown that these mutations can affect transport properties, cellular localization, and stability of the protein. Emerging studies suggest that there are several additional genetic disorders (e.g. Familial histiocytosis, Rosai-Dorfman Disease) that are caused by mutations in other regions of hENT3. In my proposed honors thesis project, I will functionally and biochemically characterize all known clinically-relevant mutations of hENT3 linked to genetic disorders in humans utilizing cellular and molecular techniques. Specifically, I will use site-directed mutagenesis and *Xenopus*-based uptake studies to create mutants and study their effect on transport and cellular localization. These studies will enhance our understanding of hENT3's structure-function relationship as well as its role in health and disease states.

### **Y-Linked Variation and Senescence in *Drosophila melanogaster*: Starvation Resistance**

Pranav Kaushish

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The Y chromosome is generally regarded as possessing primarily male sex-determining genes in most organisms. In 2008, however, researchers found that the Y chromosome in the fruit fly, *Drosophila melanogaster*, actually houses polymorphic regions that affect expression of both X-linked and autosomal genes. Among these influenced genes were ones that affect many important cellular processes that could be linked to aging. Previous studies on the genetics of aging have not considered Y-linked genes. Given that Y-linked variation exists, it is therefore possible that genes on the Y chromosome may contribute to longevity in natural populations. Research has shown that stress resistance can be used as a proxy for

lifespan. Here, we assayed starvation resistance in two groups of flies that varied in the Y chromosome but were otherwise genetically identical. The flies were derived from two distinct populations, including Raleigh, North Carolina, and a region in Africa. Females possess two X chromosomes and do not have a Y, so they served as the control group. Survival analyses using the logrank and Cox proportional hazards models were performed along with analyses of variance to determine if the lines had significantly different mortality rates from one another. Ultimately, only one set of male lines showed significantly different longevity, but one group of female lines also displayed variability, suggesting that the experiment must be replicated before accurate conclusions can be drawn.

### **Extracting Power from Vehicle Induced Airstreams on Expressways**

Miles Keeney-Ritchie

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Diversifying our energy production infrastructure is now a priority with global energy demand rapidly increasing, and fossil fuel price volatility. This process entails researching every known source of extractable energy. To this end, this research identifies the sources and characteristics as well as determines the viability of capturing the airstreams generated by vehicles on expressways from the strategic placement of wind turbines. First, we conducted case studies of common vehicles with known drag coefficients to develop the theoretical maximum extractable power transferred to the air from moving vehicles. These analyses indicate consumer vehicles should dissipate 14 kW to 29 kW per vehicle indicating sizeable available energy on major highways with high traffic flow rates. In the second stage of this research we constructed a computer model of the fluid flows around a vehicle to refine our estimate of the energy transferred to the air and the characteristics of the ensuing airstream vortices. This allowed us to typify the directions, velocities, turbulence,

and duration of vehicle induced wind at possible locations for wind turbines.

### **Comparing the Effects of the Ras Inhibitor Manumycin A with Novel Ras Converting Enzyme 1 Inhibitors**

Song Kue

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Ras is a small GTPase protein involved in receptor mediated signal transduction pathways such as the Mitogen Activated Protein Kinase (MAPK) pathway that can elicit cell growth, differentiation, and survival. The proper subcellular localization and biological activity of Ras is dependent on post translational lipid modification which occurs in four steps: isoprenylation, proteolysis, methylation, and palmitoylation. Upregulation of Ras can lead to uncontrollable growth and cancer; therefore enzymes involved in lipid modification of Ras, such as farnesyltransferase (FT) and Ras converting enzyme 1 (Rce1), are potential targets for chemotherapeutic agents. In this study, novel compounds (C1, C4, C9) previously screened for anti-Rce1 activity in yeast were compared to a validated FT inhibitor, Manumycin A, in human cancer cells for their ability to inhibit Ras dependent MAPK phosphorylation. SKOV3 ovarian cancer cells were treated with Manumycin A and the novel Rce1 inhibitors in the presence of serum. We used Western blot analysis to determine the inhibition of MAPK phosphorylation using the known pharmaceutical inhibitor Manumycin A and the novel compounds. Compounds C1 and C4 had no apparent inhibitory activity, suggesting that Ras is fully functional. However, the compound C9 was able to inhibit MAPK phosphorylation. Ongoing experiments will be done if the effects are specific, and to determine the effect of this compound on overall cell viability and toxicity. In conclusion, these novel Rce1 inhibitors pave the way for developing novel chemotherapeutic agents targeting Ras.

### **A Salient Issue of Today and Tomorrow: Biotechnology and Research Face Peach State Politics**

Justin Leef

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Researchers and businesses associated with Georgia's biotechnology field represent considerable economic and educational forces today. Experiencing more than 40% growth in the past decade, this industry is poised to build upon its 21,000 jobs and roughly \$961 million in wages for Georgians. Record partisanship within the General Assembly and statewide offices combined with extreme ideological oppositions from small portions of the electorate stand to possibly stunt future biotech and research growth. Legislative indifference stands to weaken the industry in Georgia as much as outright opposition. Interviews conducted with politicians, researchers and administrators from universities, private companies, business entrepreneurs, and individuals in the popular press believe that Georgia must embrace ideological moderation concurrent with political support and positive legislation. Objective analysis of the biotech industry's current status within the state is needed in order to determine how to enhance its strengths and correct areas of weakness. A synthesis of this knowledge with a detailed evaluation of how other states have successfully grown their own biotech industries and research facilities will prove vital. The Peach State has overcome resistance to the installation of industry, facilitation of higher education, and racial desegregation within the last century. Just as political leaders of the state's past worked together to galvanize an embrace of progress, so too must they in the future by facilitating the growth of Georgia's biotech industries and research organizations.

### **An Analysis of Two Great Russian Poets and a Discussion of Their Ties to Russia's History and its People**

Anna Legostaev, CURO Scholar

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Georgia

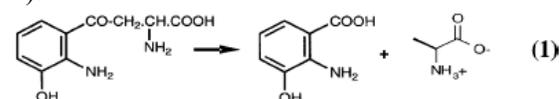
A Russian czar, Nicholas I, once called Alexander Pushkin the most intelligent man in all of Russia. Alexander Pushkin lived in the nineteenth century, and during his short thirty-eight years of life, wrote the most beloved poetry in Russian history. However, it was not simply love for Pushkin's poetry that drove the Czar of Russia to personally censor his work. Alexander Pushkin had his own political agenda, and was quick to pass an unfavorable judgment about the state of the political system. Pushkin was very closely associated with the Decembrist Revolt, a famous uprising plot of the noblemen to abolish serfdom. By examining his more radical poems such as "Ode to Liberty", I hope to show Pushkin's connection to the political and social turmoil of his time period. The somewhat ambiguous relationship between the Czar and the poet also sheds light on the degree of power Pushkin wielded with his pen. Ultimately, it was Pushkin's involvement with the intrigues of the high society of Russia, which led to his untimely death in a duel.

### **Kynureninase and Its Affect on Late Onset Diseases**

Asaph Levy

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Kynureninase is a part of the aspartate aminotransferase superfamily, which is dependent on pyridoxal 5'-phosphate (PLP). Mammalian kynureninase catalyzes the hydrolytic cleavage of 3-hydroxy-L-kynurenine to 3-hydroxyanthranilic acid and L-alanine (eq 1).



We have worked closely with the enzyme after isolating it from a human cell by first testing for enzyme activity in our buffered solution, as well

as after purifying our enzyme after running it through a Ni-CAM (Sigma) resin column. Purified kynureninase showed acceptable enzyme kinetics which indicated a successful yield of enzyme. Plasmids have been isolated for use as a vector to replicate our desired sequence by PCR. We are currently studying the effects of the N-Terminus on the Kynureninase enzyme. Bacteria have an N-Terminus whereas humans, and other upper level eukaryotes, do not. This is important because Kynureninase is a key enzyme in the Kynurenine pathway, which degrades most of our dietary tryptophan. This pathway's genes are expressed in immune system cells; with the main metabolite produced being Quinolinic Acid (QA). Excessive QA in CNS tissues, due to overstimulation of the Kynurenine pathway, is thought to contribute to many neurodegenerative diseases such as: Alzheimer's, Stroke, Epilepsy, and Huntington's disease. If we can test the affects of the N-terminus on the bacterial Kynureninase, we should be able to clone human Kynureninase with N-Termini and develop a cure/preventative agent for these diseases.

### **Polysialylation Changes During Human Stem Cell Development**

David Liddle

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Embryonic stem cells (ESCs) possess pluripotency, the ability to develop into any type of cell, and this renders them ideal tools for prevention and treatment of diseases. Previous research has shown that polysialic acid (PSA), a polymerized glycan, may be involved with the mechanism of stem cell differentiation. PSA shows high expression in developed cells, but is absent in ESCs. This trend is analogous to the expression of PSA in neural precursor cells which are also undergoing differentiation. PSA contains a polyanionic charge that may regulate stem cell migration and subsequent differentiation through electrostatic repulsion forces. The first goal of our research was to elucidate the protein to which PSA attaches in developing stem cells. This was accomplished by comparing ESCs and developed stem cells using immunoblotting after SDS-PAGE. The

results showed that the neural cell adhesion molecule (NCAM) is the PSA acceptor in developed stem cells. The second goal of our research was to investigate the function of PSA. Small interfering RNA was used to knockout the gene for the polysialyltransferase PST (ST8SiaIV), the enzyme that binds PSA to NCAM. Through recombinant technology, a plasmid with the siRNA gene was transfected into human ESC samples. Then the growth factors BMP and WNT were added to induce differentiation. Future results will reveal whether knocking out PSA blocks stem cell differentiation, thus indicating whether PSA plays an integral role in the process. Ultimately, a better understanding of the differentiation mechanism will provide important advances in stem cell biology and medicine.

### **Rce1 Membrane Topology**

Edward Lilla

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Uncontrolled proliferation and migration of transformed cells in the human body is one of the main characteristics of cancer. The Ras signaling pathway, which is essential for growth in normal human cells, is hyperactive in cancer. The oncoprotein Ras has been identified as a possible therapeutic target for treating cancer. Rce1p is a protease responsible for post-translation modification of Ras. By inactivating Rce1p, Ras will not be able to initiate cell propagation in cancerous cells. In order to manipulate the activity of Rce1p, a better understanding of the mode of cleavage and topology of the protease must be gained. Western blotting and PEG-mal (methoxypolyethylene glycol 5000-maleimide) modification of cysteines found in Rce1p will help determine the topology of Rce1p. Several yeast mating tests have been performed on yeast strains carrying various mutants of Rce1p. These mutants contain point mutations where in cysteines were modified to alanines or serines. The mating tests have verified that the yeast strains successfully express the desired mutant strains of Rce1p. The next step of our project is to perform PEG-mal reactions on the mutant

strains of yeast. Once the PEG-mal reactions are complete, Western blots can be performed on the samples. The results from the Westerns will help us determine if cysteine modifications of Rce1p occurred or not. The combined results from these several mutants will help determine if our current topology map is correct or needs modifications.

### **Developmental Changes in Human Infants' Strategies for Recognizing Human and Animal Faces**

Hannah Machemehl

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University of Georgia

Infant face recognition is a popular topic of study within developmental psychology due to its dynamic development in the first year of life. In the present study we examined human infants' and adults' strategies for recognizing faces, as well as differences in the discrimination of human and animal faces. Participants included 4- to 6-month-old infants (n = 61), 9- to 11-month infants (n = 44), and adults (n = 67). Participants passively viewed faces of humans, capuchin monkeys, or sheep. These faces were manipulated in three ways: feature spacing (e.g., distance between the eyes), feature identity (e.g., eyes and mouth taken from one face and placed on another face), and facial contour (i.e., inner contents of the face on different heads). Participants were first familiarized with a face for 20 seconds. They were then shown 30 trials in which the same face was paired with a novel face for 4 seconds. We measured the proportion of time looking to the novel faces as a measure of discrimination. We found that with age, humans use additional strategies for recognizing faces. Specifically, 4- to 6-month-old infants only discriminated faces with different head contours. Older (9- to 11-month-old) infants also were sensitive to changes in facial features. Adults were additionally sensitive to feature spacing. We are currently examining differences across species. This work gives us insight into the development of face recognition, which is a fundamental ability for species-typical social relationships.

### **Membrane Topologies of E. coli HemH and HemG Biosynthetic Protein Studies Using Alkaline Phosphatase Fusions**

Aisha Mahmood

Dr. Harry Dailey, Department of Biochemistry & Molecular Biology, University of Georgia

Heme biosynthesis in both eukaryotes and prokaryotes occurs via a highly regulated metabolic pathway of seven enzymatic steps, starting with the precursor compound 5-aminolevulinic acid. In the final two steps, a protoporphyrinogen IX oxidase (PPO) yields protoporphyrin IX, which reacts with ferrochelatase to yield protoheme. Research has focused on characterizing these enzymes at the molecular level. Presently this is achieved through cloning, over-expression and characterization of the enzymes of a multitude of organisms. PPO activity in eukaryotes occurs on the cytosolic side of the inner mitochondrial membrane and requires molecular oxygen as an electron acceptor. The membrane topology, however, is unclear in E. coli. There are various ways to determine sites where a membrane protein interacts with other proteins. A genetic method offers the advantage of independence from exposure or reactivity of amino acid side chains. Proteins that span the cytoplasmic membranes of E. coli have different domains exposed to the cytoplasm and periplasm. Fusion of a membrane protein to alkaline phosphatase can help characterize these domains and protein position. This experiment uses fusions of alkaline phosphate to both HemH and HemG to determine their membrane topologies. Ultimately determining the locations of these proteins will allow us to identify more effective drug targets in E. coli and lead to a deeper understanding of heme biosynthesis in eukaryotes.

### **Revisiting U.S. Procurement of Non-Emergency Food Aid**

Ammarah Mahmud, Roosevelt @ UGA

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Non-emergency food aid assists 925 million chronically hungry people worldwide. The

United States is the largest contributor of foreign food aid, donating 55% of all food assistance in the past decade. Legislation requires the U.S. to purchase domestic goods and ship food on U.S.-flagged vessels. These requisites increase the costs of procurement and shipment, and reduce the quantity of food supplied per dollar spent. From 2001-2007, the costs of international transportation led to a 52% decrease in average tons delivered. The United Nations emphasizes the link between local production of agriculture and development, but procurement from target countries is not considered. The current policy's emphasis upon U.S.-domestic procurement and its misuse of expenses decrease the efficiency of non-emergency food aid. This paper discusses three potential policies to improve procurement efficiency. The first alternative suggests procuring food regionally and locally from target countries. The second delineates a public-private partnership between the U.S. federal government and a private organization. The final alternative advises the U.S. to buy the least expensive goods, and lacks domestic preferential treatment. Potential solutions are evaluated according to their effect upon target countries, political feasibility, and cost-effectiveness. This paper proposes the U.S. to partner with administrative organizations to research target areas and determine their local food production. This provides a direct relationship between the U.S. and target area, while maintaining a U.S. role when local goods are inadequate. This paper analyzes three competing alternatives and determines which is most efficient in combating hunger and developing long-term stability.

### **The Influence of Popular Adolescent Television Programs**

Mona Malacane

Dr. Leonard Martin, Department of Psychology, University of Georgia

Sexual imagery in shows targeted toward adolescents may increase adolescent sexual behavior and body dissatisfaction. The present studies examine whether this imagery has increased in the past two decades and if it predicts attitudes toward women. In Study 1, we content analyzed a three episode sample of six adolescent show's Sexual Appearance and

Sexual Behavior. We found that recent shows contained more Sexual Appearance and Sexual Behavior variables compared to older shows included in this content analysis. In Study 2, we will survey participant's viewership of these shows as well as their attitudes on ambivalent sexism, beliefs about women, their body shape and self esteem, and beliefs about female leaders. Based on participant's viewership, we anticipate finding that those who endorse ambivalent sexism, have more negative attitudes towards women, have lower body shape self esteem, and who view women as less effective leaders also watched more hours of recent television shows. Our research suggests that watching adolescent shows with more sexual variables influences attitudes towards women. Implications for more positive messages being used in the media are discussed.

### ***Bufo marinus* Pathogen and Parasite Analysis as a Model for Ecosystem Change**

Georgianna Mann, CURO Summer Fellow

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As human populations continue to increase, effects on the natural environment are inevitable. Quantifying these changes and their implications on species are imperative for ecological research. The Rio Tempisque Project in the Guanacaste region of Costa Rica attempts to address this through ecosystem experiments to measure the effects of human activity on the surrounding environment. This research strives to reveal if the cane toad, *Bufo marinus*, would be an effective sentinel species. Pathogens and parasites lead to detrimental effects on the health of amphibians. By studying the pathogen and parasite burden of cane toads in two different types of land management practices (high and low pesticide use), I aimed to determine: 1) if high pesticide agricultural areas can be long term surrogate habitats for cane toads, and, 2) if cane toads are an appropriate sentinel species for land use changes in the Rio Tempisque Basin. In June 2010, 18 *Bufo marinus* were collected in four field sites with various pesticide regimes in Costa Rica. Each were measured, sexed, necropsied and had fecal, intestinal and organ samples collected. The samples were examined

for lung and intestine endoparasites. The prediction of a positive correlation between the pesticide use and parasite prevalence was disproven. However, a positive correlation between location and parasite load in the toads was discovered, indicating that human land use may lead to an increase in parasite abundance. As a sentinel species, *Bufo marinus* would allow the Rio Tempisque project to scrutinize environmental changes as a result of human influence.

### **The Effects of Negative Political Campaign Advertising**

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University of Georgia

Between 60-65% of political campaign expenses are used for television advertising (Hale, Fox, and Farmer 330), making it the dominant modern campaign tool; however, in the recent gubernatorial election in Georgia, a large deal of political ads via television and other communication mediums were negative in nature meaning a portion of campaign expenses were used to simply discredit fellow competitors. Candidates for elective office today spend millions of dollars on negative political ads. Although some research has been conducted that examines negative political advertising, results of the effects they have on Georgia constituents have been mixed. My research will examine the opinions of Georgians regarding the prevalence of negative political advertising in the recent gubernatorial election between former Governor Roy Barnes and the eventual winner, Governor Nathan Deal. Using data from the Fall 2010 Georgia Poll conducted by the Survey Research Center at The University of Georgia, descriptive statistics on whether or not Georgians thought negative ads were present during the campaign will be computed, and the nature of how Georgians felt about the ads will be coded through responses to open ended questions. Finally, analyses will be conducted to see if demographic differences among Georgians regarding negative campaign ads existed.

### **Study of the Genetic Diversity of Isolated *Veratrum woodii* Populations in Georgia Using AFLPs**

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*Veratrum woodii* is a rare and protected plant species in Georgia. The species occurs in the southwestern and northern part of the state. These clusters of populations are separated by a distance of several hundred miles that would seem to prohibit outcrossing. Given the species' rarity in Georgia, managers at the Georgia Department of Natural Resources would like to know whether the southwestern and northern Georgia populations are genetically distinct. A management plan for the species should also include information on the overall genetic variation within and among of *Veratrum woodii* populations in Georgia. Over the course of the semester we identified primer combinations for Amplified Fragment Length Polymorphisms (AFLPs) for 13 populations *Veratrum woodii* and used these to characterize variation within and among populations that have been sampled from all known Georgia populations. These primer pairs are used to selectively amplify fragments of varying sizes of DNA; the differences in the sizes of the generated fragments then serve as a representation of the polymorphisms or variation between individuals or populations. Data was analyzed using GenAlEx, to characterize genetic structure using dominantly inherited markers such as AFLPs. We found that despite the physical distance, the *Veratrum woodii* populations are maintaining a majority of their variation among populations, and may be outcrossing freely which supports our hypothesis that outcrossing is still occurring. In terms of conservation, this means that it would be prudent to maintain conservation efforts for all populations in the state.

## Abstracts

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### Assessment of 5-Aminolevulinic Acid Synthase Expression & Purification Methods

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Heme is synthesized in a series of eight steps which, unlike many other biochemical pathways, occurs in both the cytoplasm and the mitochondria. The first enzyme in this pathway is of particular interest, 5-aminolevulinic synthase (ALAS), a pyridoxal phosphate-containing protein. Although it is translated in the cytoplasm of the cell, its catalytic activity takes place in the mitochondrial matrix. Thus, in addition to posttranslational modifications to the precursor enzyme, preALAS, there also exists some translocation mechanism by which the precursor is transported into the mitochondria. Past studies have demonstrated that heme forms a negative feedback loop to its own biosynthesis at this point by inhibiting the uptake of preALAS (Yamauchi, 1979). Three conserved heme regulatory motifs (HRMs) have been observed on the preALAS enzyme (Timko, 1993). Two of these are located in region I of the enzyme, the leader sequence which targets the protein for transport, and the last is located in region II, closer to the N-terminus. While it has been demonstrated that these motifs are required for heme inhibition, the mechanism behind this is not currently understood. Thus, the main purpose of this project has been to determine whether or not heme physically binds to preALAS to regulate its own biosynthesis. Methods used to determine this relationship included protein expression, through various recombinant E.coli plasmids, as well as protein purification, through affinity column chromatography. Unfortunately, obstacles arose in the effort to obtain a purified form of the protein, so further binding assays were unable to be performed. The focus of the project subsequently shifted towards method alterations for improved protein yield and quality.

### Zot as a Potential Virulence Factor for *Neisseria meningitidis*

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*Neisseria meningitidis* (meningococci, MC) is a Gram-negative diplococci that exists as normal flora in the nasopharyngeal mucosa. However, despite this commensal relationship, MC is also one of the leading causes of bacterial meningitis. In a study by Bille et al. (2005), a comparative analysis of MC genomes from invasive strains (isolated from patients with meningitis) and carriage strains (isolated from healthy individuals) revealed a sequence corresponding to a filamentous bacteriophage that is significantly associated with only invasive strains. This prophage was named the Meningococcal Disease-Associated prophage (MDA $\Phi$ ). Our study focuses on an MDA $\Phi$  gene, *zot*, which is proposed to encode a zonula occludens toxin that can disrupt tight junctions in the Blood Brain Barrier (BBB). This potential virulence factor may allow paracellular passage of MC across the BBB. To test the hypothesis that MC *Zot* can disrupt tight junctions, this study will examine the effect of MC  $\Delta zot$  mutants on human brain microvascular endothelial cells (HBMEC) that model the BBB. Southern blotting analysis was used to assess the number of copies of *zot* in *N. meningitidis* Z2491 (serotype A) and 6 un-sequenced MC isolates. These Southern blotting results will be confirmed using PCR. Each copy of *zot* will be deleted and the resulting  $\Delta zot$  mutant strain will be used to infect polarized monolayers of HBMEC. If MC *Zot* disrupts tight junctions, further studies will be conducted to define the role of *Zot* in MC pathogenesis. MC *Zot* may become a target for therapeutic or vaccine strategies.

### Legitimacy and Status in Mixed-Gender Task Groups

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The present research examines status and legitimacy in task groups using theories

stemming from the Expectation States Theory paradigm. In the present study, three participants took several pre-tests that measured their creativity, job and academic histories, etc. In one condition, the experimenter assigned a supervisor and told the participants this was based on their pre-test scores. In the other condition the group was told the supervisor had been randomly assigned. In actuality, the supervisor was assigned randomly in both conditions. The other two participants were assigned the role of assistant. The three participants then took part in a collectively oriented task group. In this experiment, both legitimacy of the supervisor (based on the method of assignment) and the gender of the supervisor and assistants were manipulated. This allowed for a 2x2x2 experimental design. It is predicted that female supervisors will have lower status and legitimacy as leaders when compared with male supervisors, and that supervisors who were “randomly” assigned will have lower status and legitimacy compared to the supervisors who were assigned based on “merit”. The present analyses will examine status of the supervisors in the traditional method of self-report surveys filled out by all participants after the group activity, but also look at behavioral measures of status such as words spoken, criticism levied, and praise given. It is predicted that there will be an observable effect of undermining female supervisors authority and legitimacy when examining behavioral measures that will not be present or be less evident in the self-reports.

### **The Orpheus Myth Over Four Hundred Years**

Caleb Moreno

Dr. Dorothea Link, Hugh Hodgson School of Music, University of Georgia

The Greek myth of Orpheus has been the focus of much discussion in the musical world, often seen as both a dramatic story and an allegorical lesson. Orpheus was the subject of one of the earliest operas in 1607 and since then has been adopted in many variations for opera. While much of the literature in the field has both reviewed performances of Orpheus operas and critiqued the operas as compositions, little study

has been made in relation to their Greek origins. The aim of this paper is to investigate how the myth’s involvement in opera has changed over time and how this is reflected in the music. First I will establish the Greek history and context of the myth. Then, I will sequentially detail four specific operas representative of the 16<sup>th</sup> through 20<sup>th</sup> century styles, comparing each to the Greek myth and to each other as appropriate. In the process I will highlight key differences in plot and character. These distinctions will indicate several approaches to the Orpheus myth: Monteverdi’s retelling, Gluck’s re-imagining, Offenbach’s satirizing, and Birtwistle’s comprehensive presentation of the myth. I will show how the music of each opera supports these approaches according to the musical language of each time period on a large scale and also according to the conscious aesthetic choices of each composer in specific scenes.

### **Epidemiology of Equine *Staphylococcus aureus* in Georgia and Kentucky from 1995-2003**

Tatum Mortimer

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*Staphylococcus aureus* can infect many animal species. In horses, *S. aureus* can cause respiratory, joint, and wound infections. Antibiotic resistance is a growing problem in medical and veterinary fields, as antibiotic resistant infections are difficult to treat. While methicillin resistant *Staphylococcus aureus* (MRSA) began as a nosocomial infection, in the past decade the infection has become community associated (CA-MRSA). Infection by MRSA occurs in companion animals, including horses, which could serve as a potential reservoir for human infection. Our purpose was to study the epidemiology of equine *S. aureus* obtained from clinical samples from 1995 to 2003 in Kentucky and Georgia. We hypothesized that equine MRSA isolates from Georgia and Kentucky would be clonal and related to the CA-MRSA strain USA500, similar to results of equine MRSA studies in other locations. Isolates were characterized by presence of *mecA*, *SCCmec* type, and toxin genes by PCR. Pulsed-field gel electrophoresis

(PFGE) was performed to assess the genetic relatedness of the isolates, as well as twelve human control isolates. 59% of isolates were positive for *mecA*. MRSA was found to be present in the horse population in 1996, earlier than the first reported case of equine MRSA and the CA-MRSA epidemic in humans. 92% of MRSA isolates were SCC*mec* type IVd. Analysis of PFGE results revealed that 78% of MRSA isolates were closely related to each other and USA500. This clone appears to be highly successful in horse populations and was circulating among the horse population before recognition as a community acquired pathogen.

### **“Cuando uno toma el agua del Tambopata...”: Migration and the urban environment in Madre de Diós, Peru**

Bryn Murphy

Dr. J. Peter Brosius, Department of Anthropology, University of Georgia

The region of Madre de Diós, Peru, contains the best-preserved area of the Amazon rain forest and the highest levels of biodiversity on earth. Because of this notoriety, Madre de Diós is also home to a high concentration of non-governmental organizations (NGOs) focused on conservation and sustainable development. These NGOs are predominantly staffed by non-local professionals who were raised and educated in urban areas of Peru and later migrated to Madre de Diós to work. The purpose of this study was to evaluate whether the non-local and originally-urban characteristics of these NGOs' workforces affect conservation outcomes in rural versus urban areas of Madre de Diós. Interviews were conducted on a sample of fifteen employees of NGOs in Madre de Diós. Interviewees' responses were analyzed with reference to the social constructivist school of thought in environmental anthropology, which argues that social constructs cause people to value rural landscapes over urban landscapes, resulting in greater investment of conservation resources into rural landscapes at the expense of urban landscapes. In contrast with the predictions of the social constructivist literature, interviewees' responses demonstrated approximately equal valuation of rural and urban landscapes. These results suggest the need for

further research, including a larger sample of interviews, to determine whether Madre de Diós truly represents a counterexample to social constructivist predictions.

### **Epigenetic Effects of Bromate on p21 and Histone-2AX Expression in HEK293 Cells**

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The epigenetic effects of bromate ( $\text{BrO}_3^-$ ) exposure in human embryonic kidney 293 (HEK293) cells were investigated.  $\text{BrO}_3^-$  is a byproduct of ground water disinfection procedures (ozoneation). It has been designated a possible human carcinogen by the International Agency for Research on Cancer.  $\text{BrO}_3^-$  treatment (10 – 200 ppm) causes damage to HEK293 cells based on cell death assays and increased levels in specific regulatory proteins (p53, p38, cdc2, etc.) in HEK 293 cells over 72 hours. Immunoblot analysis indicates that  $\text{BrO}_3^-$  induced epigenetic changes as assessed by increased expression of phosphorylated histone-2AX (H2AX), a histone correlated with DNA damage that facilitates DNA repair.  $\text{BrO}_3^-$  exposure also led to a G2/M cell cycle arrest that correlated to increased expression of tumor suppressor gene, p-p53, and other regulatory genes p-p38, p21, cyclin B1 and p-cdc2. Treatment of cells at low concentrations (1 – 100 ppm) for 48 hours showed similar trends in protein expression levels suggesting that bromate's toxicity may lead to epigenetic alterations. Preliminary studies demonstrate that bromate treatment of human embryonic kidney 293 cells increases the phosphorylation of H2AX. This modification in histone expression level suggests the hypothesis that bromate, at low levels, induces epigenetic changes in *in vitro* models of toxicity.

### **Analysis of rRNA Maturation in *Escherichia coli***

Rakia Nasir

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The maturation of ribosomal RNA (rRNA) in the bacterium *Escherichia coli* generates the functional species necessary for ribosome assembly. The rRNA genes in *E. coli* are organized into seven distinct operons that are comprised of 16S, 23S, and 5S precursors transcribed as a 30S precursor. Previously, it has been demonstrated that the 30S precursors are cleaved into four discrete pre-rRNAs with the help of endoribonuclease III (RNase III). Studies have shown that RNase III cleave sites on the double-stranded RNA in order for the maturation process to begin. However, our lab has demonstrated that additional enzymes participate in the separation of 16S and 23S rRNA species from the larger precursor. Our goal is to determine the ribonuclease(s) responsible for rRNA processing in the absence of RNase III. We hypothesize that a backup pathway involving multiple enzymes dependent on an RNA helicase unwinding the double-stranded RNA allow cleavages by other ribonucleases that cleave single-stranded RNA. To test this hypothesis, we are constructing specific *E. coli* strains, which are defective in potential and known ribonucleases that may affect the rRNA processing. RNA extractions will allow us to visualize the effect on rRNA in the absence of enzymes possibly involved in the rRNA maturation process. A better understanding of rRNA maturation may facilitate the development of new antimicrobials that specifically target this pathway in bacteria.

### **The Effects of Manganese on Human Neural Stem Cell Cultures**

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Human Neural Stem cells (hNSCs) have the potential to replace brain cells in patients with neurodegenerative disorders. Neural cell adhesion and development depend on integrins, so using integrin activation, hNSCs can adhere

to a substrate or implant in the brain to replace degenerated cells. Through activation of integrins, it is hypothesized that manganese (Mn<sup>2+</sup>) will direct cells to a glial fate more rapidly than random differentiation. This study's objective is to obtain an increased rate of gliogenesis due to integrin activation, which will result in a purified glial cell population. To increase the rate of gliogenesis, 0.03 mM MnCl<sub>2</sub> differentiation media was added. Glial cell gene expression was determined by Real Time Polymerase Chain Reaction. Results indicated that five of the seven genes were positive with MnCl<sub>2</sub>. Immunocytochemistry was performed using standard immunofluorescence protocols. Antibodies against glial proteins were used, but only one was positive. Higher concentrations of manganese have been shown to cause symptoms similar to Parkinson's disease, but a challenge now is to identify the neurodevelopmental consequences of manganese exposure. We will also determine the point where manganese causes a lethal dose response. Neural Progenitor cells provide an excellent developmental avenue for understanding the effects of common materials/toxins that are present in development. I performed dose response testing using an Alamar Blue proliferation assay, which indicated a definitive dose-response to manganese. Ultimately, we will know how manganese can potentially increase neural cell adhesion and growth at lower levels and how it is toxic at higher concentrations.

### **Emotion Regulation in Children: Implications for Affect and Childhood Psychopathology**

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Within the scope of emotion research, much attention has been paid to the role of negative emotions in youth psychological functioning, but only a scant amount to the role of positive emotions. Yet, theory and preliminary empirical research with adults suggest that positive emotions can facilitate cognitive and psychological functioning. With implications for treatment outcome, i.e., more effective clinical interventions, research which examines the role

that emotion plays in one's psychosocial functioning is crucial. The purpose of this study was to examine the specific role of positive emotions in relation to emotion regulation (ER) and the presence of psychopathology in children ages 7-12. The following hypotheses were generated. First, it was expected that situational appropriate displays of positive affect during the negative emotion tasks would positively correlate with ER. Second, it was hypothesized that displays of negative affect in the positive emotion task would negatively correlate with ER. Third, it was anticipated that ER would function as a mediator between affect and psychopathology. Overall, ER was expected to be negatively correlated with symptoms of psychopathology. To conduct this research, children and their parents independently completed measures of the child's ER and symptoms of psychopathology. Children and their parents also participated in a behavioral observation task that required the family to discuss a time when the child felt happy, angry, anxious and sad. Behavioral observations were coded using Observer XT, and frequencies of positive and negative affect were obtained. Data were analyzed with correlational and mediational analyses.

### **Dust and Breath - Works of Art and Technology**

Brittany Norman  
Prof. Martijn Van Wagtenonk, Lamar Dodd  
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In *Genesis*, the creation of man is twofold: "And the LORD God formed man of the dust of the ground, and breathed into his nostrils the breath of life." My studies in art and technology both grow out of the same desire to create--to take the matter around me and give it form and give it life. Whereas my studies in art have given me the tools to bring shape to my ideas and give them form, my studies in technology have given me the tools to breathe life into these forms--to give them the ability to move, sense, and respond to their environment. This body of artwork is born out of a culmination of four years of interdisciplinary studies in computer science, engineering, digital media art and sculpture. Creation methods have involved a

combination of studio art practices, computer programming, electronics design and mechanical design.

### **LysR-type Transcriptional Regulators**

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There are over forty LysR-type transcriptional regulators, LTTRs, in *Acinetobacter* sp. strain ADP1. According to the DEG ([Database of Essential Genes](#)), five of the many LTTRs in ADP1 have been predicted to be essential under specific growth conditions. The five essential LTTRs are ACIAD0461, ACIAD0746, ACIAD2511, ACIAD1539, and ACIAD2384. Only ACIAD2384 has homology to an LTTR with known function, MetR, which controls methionine biosynthesis in bacteria. *Acinetobacter baumannii* is a pathogen that is resistant to most antibiotics. As a result of its resistance to drug treatment, the bacterium kills tens of thousands of hospital patients each year, and specialists say that this pathogen is an emerging threat. The essential LTTRs in ADP1 are present in *A. baumannii* and, thus, may represent novel drug targets in the pathogen *A. Baumannii*. The investigation of the role of these LTTRs has been initiated by evaluation of the DNA sequences encoding the LTTRs, followed by the introduction of the essential LTTR genes into a plasmid that adds a polyhistidine C-terminal purification tag for simple protein purification from *E.coli* BL21(DE3) "Codon Plus" competent cells. All four LTTRs have been amplified by PCR and inserted into the expression vector. Successful protein purification of ACIAD0461 using metal-chelate chromatography has transitioned to crystallization studies in anticipation of providing valuable structural data. The structural and functional studies done on these LTTRs, improve our understanding of microbial metabolism and transcriptional regulation, and also help us identify novel drug targets that may lead to an important drug discovery.

### **The Effect of N-Back Stimuli Type on Performance**

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Aphasia is a multimodal language deficit that results from damage to the language areas of the brain. Recent research in aphasia has considered the role of working memory. Working memory can be assessed using the N-back, a computerized task composed of alternating images that recur at specified intervals. In recent aphasia research, two different versions of the N-back have been used, one using fruit and the other using faces. The current study seeks to determine if stimulus type (fruit or faces) influences task performance of individuals with aphasia. For instance, if individuals engage in sub-vocal rehearsal of presented items, the task becomes linguistic. This is far more likely to occur with the fruit stimuli, for it is unlikely that individuals will be able to name face stimuli, making the task nonlinguistic. Results from the current study will aid in determining how to most accurately measure working memory in aphasia. In the current study, the fruit-back and faces-back were compared in healthy and aging populations. Individuals with aphasia (N=3, Mean age=62.3) and neurologically intact controls (N=18, Mean age=82.27) were recruited. Both the fruit and faces tasks consisted of three levels correlated to increasing working memory load. Data were analyzed based upon the number of correct responses, errors of omission, and errors of commission. A difference in performance between healthy individuals and IWA is expected in the linguistic task, but not in the nonlinguistic. A better understanding of working memory's role in aphasia can lead to improved assessment and ,therefore, rehabilitation of aphasia.

### **Investigating Early Warning Signals and Critical Slowing Down in Changing Environments**

Tierney O'Sullivan  
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University of Georgia

Extinction has long been a fascination of scientists but is incredibly difficult to study comprehensively. It is becoming an increasingly important topic due to habitat fragmentation and climate change throughout the world. The difficulty of studying extinction is that scientists often predict it, but are unable to reverse it because of late detection. The problem is that extinctions result from bifurcations, when a small change in a parameter creates a significant change in the system's behavior. Once a bifurcation occurs, the result is often irreversible. We used *Daphnia magna* as a test subject to investigate the presence of early warning signals in the form of increases in statistical patterns such as variance, autocorrelation, and standard deviation from the mean. These changes can predict extinction before the bifurcation occurs. The *Daphnia* populations were assigned to 96 chambers, and each chamber was assigned one of four treatments where all environmental conditions were kept constant except temperature. The temperature treatments divided the chambers into four categories: constant, increasing, periodic, and decreasing. Population sizes in the chambers were recorded daily, and the data were analyzed to determine the presence of the early warning signals of the critical slowing down phenomenon using statistical tests in R. The analysis uses a range of window sizes to detect increased levels of the indicators, which can predict bifurcations that lead to extinction. Additional analysis must be done to determine if the presence of the signals in the data is conclusive.

### **Expression of the DBL3x domain of VAR2CSA in *E. coli***

Oluremi Ojo, CURO Apprentice  
Dr. David Peterson, Department of Infectious Diseases, University of Georgia

*Plasmodium falciparum*, the parasite that causes the most virulent type of malaria, results in nearly one million deaths annually. Our research focuses on pregnancy-associated malaria (PAM), which accounts for 10,000 annual maternal deaths and 3% to 8% of infant mortality in Sub-Saharan Africa. PAM results from infected erythrocytes binding to chondroitin sulfate A (CSA), a receptor on the placenta, preventing nutrient exchange between the mother and fetus. Infected erythrocytes express the protein VAR2CSA, which mediates binding to the placenta. VAR2CSA is a large protein and consists of six different domains called DBL1-DBL6. We primarily focus on studying the DBL3x domain, which has been shown to mediate parasite binding within the placenta. Our goal is to characterize the binding of DBL3x in an effort to further understand the mechanisms of the parasite's adhesion to the placental CSA. In our study, we have isolated variants of the DBL3x domain from blood samples obtained from pregnant women in Kenya. Our goal is to understand how binding of the DBL3x domain differs between these samples. To achieve this goal, we use PCR based methods to amplify the DBL3x region from our samples and ligate them into a plasmid that allows expression of this protein in *E. coli*. The purified protein will be used in binding studies to placental CSA to analyze its binding properties. Understanding the binding properties is important as a disruption at this step could prevent infected erythrocytes from binding to the placenta and, ultimately, decrease the virulence of *Plasmodium falciparum* in PAM.

### **Evaluation on Blood Flow Velocity and Arterial Diameter Produced by Compression Therapy**

Rebecca Parker, CURO Scholar, CURO Summer Fellow  
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Exercise is an effective treatment for cardiovascular disease. A proposed mechanism for the benefits of exercise is the increase in blood flow and subsequent increase in arterial vasodilating capacity. Some have difficulty performing adequate exercise due to disabilities and, therefore, suffer from cardiovascular disease. This study was designed to determine the optimal body position during leg compression therapy to augment blood flow resulting in arterial vasodilation. Twelve able-bodied control subjects completed a round of compression therapy—termed muscle pump (90mmHg @ 5s) in the supine position, and twelve subjects were in a seated position. Ultrasound velocity measurements of the femoral artery were taken during: 3 minutes baseline, 8 minutes compression and 2 minutes recovery. Femoral artery diameter was recorded at baseline and immediately after compression ended. Average blood velocity was  $129.7 \hat{A} \pm 68.9\%$  (mean  $\hat{A} \pm SD$ ) of baseline while in the supine position and  $138.7 \hat{A} \pm 49.4\%$  for the seated compression tests (both not significant,  $P > 0.05$ ). Femoral artery diameter after the supine test was  $103.5 \hat{A} \pm 0.47\%$  of baseline, while the diameter after the seated tests was  $99.4 \hat{A} \pm 5.3\%$  of baseline (both not significant,  $P > 0.05$ ). Preliminary evidence suggested that neither the supine nor the sitting positions resulted in a significant increase in average blood flow velocity. However, the trend for an increase in diameter while in supine position suggests that the velocity oscillations could have physiologically important effects on diameter. If confirmed, “muscle pump compression” could be a viable method for improving arterial health in people who have difficulty exercising.

### **Pronunciation of Word-Final [ə] by Older Male Speakers from the South of France**

Matthew D. Passarello

Dr. Diana L. Ranson, Department of Romance Languages, University of Georgia

A notable feature of Southern French dialects is the variable pronunciation of word-final mute *e*, which is almost never pronounced in the North, so that a Southern speaker might say [k.ɫməsə] rather than [k.ɫmsə] for *comme ça* ‘like that’. Even though this vowel is subject to variability in the South, little attention has been paid to the factors affecting its pronunciation. The goal of the present study therefore is to analyze the possible linguistic factors favoring the pronunciation of mute *e* by Southern speakers. The corpus consists of 236 tokens of mute *e* in recorded conversations with seven men over 40 years of age from the South of France. The linguistic factors tested are the mode of articulation, point of articulation, and voicing of the consonants preceding and following the potential mute *e*. The results indicate that the following consonant affects the pronunciation of mute *e* while the preceding consonant does not. Whereas the total rate of pronunciation of word-final mute *e* is around 40% for preceding consonants, regardless of their mode of articulation (whether stop, fricative or liquid) or voicing (whether voiced or voiceless), these rates range from 25% to 57% for following consonants. The highest rate of pronunciation occurs before stops, especially when the preceding consonant has a different mode of articulation. Rates of pronunciation are also higher when preceding and following sounds differ in voicing. It appears then that mute *e* is more often pronounced between dissimilar sounds perhaps in order to facilitate the articulatory transition.

### **The Role of Histidines in pH Dependence of Human Equilibrative Nucleoside Transporter 3**

Bhavi Patel, CURO Scholar

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Human equilibrative nucleoside transporter 3 (hENT3) is one of four members of the equilibrative nucleoside transporter (ENT) family, a conserved family of solute carrier (SLC) proteins that allow for facilitated diffusion of nucleosides and anti-cancer and anti-viral nucleoside analogs. hENT3 differs from other members, which are predominantly cell surface transporters, in that it functions exclusively intracellularly, localizes to organelles such as the lysosome and the mitochondria and shows maximum transport activity at an acidic pH range of 5.5-6.5. In this study, we will determine the amino acid residues that are responsible for hENT3’s pH dependence. Histidine has a pKa of approximately 6.0, and has been shown earlier to regulate pH dependent ligand-binding of many membrane proteins and receptors. Histidine has a positive charge at pH 5.5, where hENT3 shows maximum transport activity. At pH 6.5 and greater, however, histidine does not and hENT3 transport is inhibited. Therefore, we hypothesize that changes in the ionization of one or more histidine residue(s) (e.g. positions 132, 268, 294, 403 and 473) in the predicted translocation pore of hENT3 protein are likely regulating its activity. To study this, we will mutate, either singly or in combination, histidines in hENT3 to neutral, positive and negative amino acids through site-directed mutagenesis. Subsequently, we will perform radio labeled transport studies on mutant RNA injected *Xenopus* oocytes to study alterations in known endogenous substrates (e.g. adenosine). These studies are expected to lay groundwork in understanding the mechanisms of hENT3 transport of nucleoside drugs used in clinics.

### **Characterization of Striated Fiber Assemblins in *T. gondii***

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In *Toxoplasma gondii*, an obligate intracellular parasite, there is a unique set of proteins known as striated fiber assemblins (SFAs). The tachyzoite stage of this Apicomplexan parasite contains three distinct SFA proteins: SFA2, SFA3 and SFA4. Although SFAs are yet to be characterized in Apicomplexans, one such SFA protein has been described fairly well in the algal ancestor of Apicomplexans, *Chlamydomonas reinhardtii*. Immunofluorescence assays (IFAs) using an anti-SFA antibody in *Chlamydomonas* have shown that SFA is dynamic over the cell cycle and may play a structural role during division. Fluorescent microscopy of the SFAs in *T. gondii* under the strong and constant t7s4 promoter has shown possible localizations and structures for SFA2 and SFA3. These results might not be reliable due to overwhelming background fluorescence within the cell. Also, microarray data shows strict regulation of SFA2 and SFA3 during the cell cycle. The results of these experiments suggest that SFAs are sensitive to the time they are promoted and the strength with which they are expressed. With antibodies against *T. gondii*'s SFAs, more accurate localizations and structures of the SFAs during different stages of the cell cycle were identified. The results of the experiments will provide a deeper understanding of the biology of *T. gondii* and the disease that it causes. Furthermore, insight into the function of SFAs could have implications for other Apicomplexan diseases such as malaria and cryptosporidiosis.

### **Battling With Bytes: A Cybersecurity Doctrine for the United States**

Tony Pelli, Katherine Arnold, Yuliya Bila, Rohan Mukhopadhyay, Shyam Shanker, Patrick Smith & Seth Taylor, Roosevelt @ UGA  
Dr. Dan Everett, Department of Computer Science, University of Georgia

Cyber security is becoming an important security issue, as the recent attack on Iranian

nuclear centrifuges by the computer virus called "Stuxnet" demonstrated. In terms of U.S. vulnerabilities, many experts fear that cyber attacks could cripple critical infrastructure in the electricity and banking industries. Despite the increasing importance of cyber security to the United States' national interest, there has been little comprehensive research on the danger posed by cyber attacks. Current research on the issue is focused too narrowly on the threat posed by cyber-terrorism or "lone wolf" hackers. This paper presents a database of known major cyber attacks by both state and non-state actors. It further identifies the type of cyber attack, which nation or group it originated from, and the intended target. In addition, this paper presents an evaluation of the cyber security capabilities of several key countries including Russia, China and EU member states. Upon examination of this data, we conclude that the threat of cyber attacks is indeed serious, but should not be overstated. Following this conclusion, the paper identifies several areas in which the United States can improve its cyber security and outlines a cyber security doctrine to guide future policies. In particular, public-private coordination and budgetary changes are suggested. Additionally, special attention is paid to the possibility of cooperation between states over cyber security issues.

### **Cognitive X's and O's: First Steps in the Resolution to the Offensive-Defensive Realist Debate**

Chad Peltier  
Dr. Jeff Berejikian, Department of International Affairs, University of Georgia

The offensive and defensive realist debate is primarily over how states prioritize security preferences. Do states seek to defend the status quo, as loss aversion would predict, or do they constantly feel the pressure to expand in a gain-seeking manner? I contend that states' grand strategies contain both types of behavior. This study bridges the gap between the offensive and defensive realist camps by using loss aversion, which was recently supported by studies in cognitive neuroscience, as the decision making structure instead of rational choice theory. I conducted an ordered logistic regression analysis

of the COW militarized interstate dispute dataset in order to determine how states prioritize their security preferences as either gain-seeking (offensive) or loss aversive (defensive).

### **A Flow Cytometry-Based Method of Glycosylation Profiling**

Emily Peng

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Glycoproteins are polypeptides that have oligosaccharide chains, or glycans, covalently attached to their surfaces. These polymers play essential regulating, functional, and structural roles in biological systems by providing a means for cell-to-cell interactions. Determining the types and amounts of glycans present on the surface of a glycoprotein provides key information about the function and development of the protein. In order to be accepted as therapeutic agents, glycoproteins must have their glycosylation states thoroughly characterized. Currently, procedures for glycosylation profiling involve combinations of mass spectrometry and high-performance liquid chromatography. These methods are complex, time consuming, and do not always give a complete characterization of a protein's glycans. We are developing a more efficient and complementary flow cytometry-based method of glycan analysis. In this method, proteins that bind specifically to certain glycan linkages (lectins) were covalently attached to microspheres, or beads, with discrete levels of red fluorescence. The lectin-bead conjugates were incubated with a solution of oligosaccharide labeled with green fluorescence. The amount of glycan bound to each lectin bead was measured in a flow cytometer. The higher green fluorescence intensity of a lectin bead relative to the other beads confirmed that the glycan of known linkage bound specifically to its lectin, and shows this method can correctly indicate the types of glycans present in solution. The results also show that this method has potential for identifying glycans on the surface of glycoproteins.

### **Oil Palm Proliferation in Latin America**

Rachel Perez, CURO Apprentice, CURO Summer Fellow

Dr. J. Peter Brosius, Department of Anthropology, University of Georgia

This project examines the environmental and social effects of the oil palm/palm oil industry throughout Latin America by reviewing literature from a variety of sources in order to create a concise report. Palm oil, extracted from the African oil palm, is a highly profitable product whose diverse uses have most recently expanded to include bio-fuel. Cultivation of the palm occurs primarily in Southeast Asia, but is rapidly expanding to Latin America, largely to the detriment of the region. Oil palm cultivation occurs chiefly on large-scale monoculture plantations, a practice that causes ecological damages including deforestation, decreased biodiversity, and air, soil and water pollution. Cultivation practices also have negative social effects: local populations (often composed of marginalized groups such as racial/ethnic minorities) suffer land rights violations, displacement, unhealthy living and working conditions, decreased political representation and threats of violence among other afflictions. The oil palm mega-plantations create land scarcity, causing a significant decrease in food crop cultivation and a subsequent increase in food prices throughout the region. Large-scale growers use political and economic power to continue unsustainable practices in the name of short-term economic efficiency, while opposition groups, a demographic including conservationists, human rights organizations, universities and local populations, struggle with coordinating a united front in order to confront industry abuses. This project aims to bring more attention to a lesser-known environmental issue and present the findings and possible resolutions to interested parties in the hopes of addressing this issue before it progresses in to a more advanced state.

### **The Use of PCR Assays to Determine the Extent of Zones of Hybridization of *Culex pipiens quinquefasciatus* and *Culex pipiens pipiens* in Georgia**

Katherine Perofsky, CURO Scholar  
Dr. Daniel Mead, Department of Population Health, University of Georgia

In Georgia, *Culex pipiens quinquefasciatus* has been identified as the primary vector of West Nile virus (WNV). Statewide WNV surveillance data collected between 2001 and 2008 indicates that during the peak transmission period (July through late September) WNV infection rates in *Cx. p. quinquefasciatus* are high. However, in Georgia the low number of reported human cases of West Nile virus does not correlate with the *Culex* mosquito high infection rate. A study conducted on Georgia mosquitoes in 2003 reported the occurrence of *Cx. p. quinquefasciatus* and *Cx. p. pipiens* hybrids in an area within the state which is outside of the previously recognized hybridization zone (the northern region of Georgia). Hybrids of these species may have an alteration in host feeding preferences which could account for the low number of human WNV cases in the state. We hypothesize that the *Culex* hybridization zone is more widespread in the state as opposed to limited to Northern regions. To redefine the hybridization zone in Georgia, we used a previously described PCR protocol to analyze specimens of *Culex pipiens quinquefasciatus* and *Culex pipiens pipiens* that were collected from various regions of Georgia and identified based on morphology. The results of this study show the extent of hybridization between *Cx. p. pipiens* and *Cx. p. quinquefasciatus* to be small, yet suggest the hybridization zone in Georgia encompasses a wider area than previously considered.

### **Expression of Heat Shock Proteins 27 & 72 in Canine Intracranial Meningiomas**

Grant Perry  
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Meningioma is the most common type of brain tumor in dogs and the most likely to be treated. Heat shock proteins (HSPs) are up-regulated

during times of environmental stress and are associated with tumor maintenance via stabilization of tumor proteins. HSPs 27 and 72 have previously been shown to be present in human tumors, which make these HSPs a reasonable target for tumor therapy. The goal of this study was to see if HSPs 27 and/or 72 are expressed in canine intracranial meningiomas and, thus, potentially a therapeutic target. The study also sought to determine any similarity between human and canine tumors. This was a retrospective study of forty-one tumor samples from dogs. Immunohistochemistry (IHC) was performed using anti-HSP 27 or 72 antibodies to detect the presence of each HSP. Control samples used were canine mammary carcinoma and squamous cell carcinoma, both of which express HSPs. Staining intensities and percentages of tumor area were determined for each protein by semi-quantitative methods. HSP 27 was expressed in greater than 1/3 of cases (36%). HSP 72 was expressed in greater than 1/2 of cases (52%). Additionally, both HSPs were expressed in 21% of cases. This shows that expression of HSPs 27 and 72 does occur in canine intracranial meningiomas and deserves further investigation. Their potential as a target for treatment is also being evaluated further in association with markers of cell proliferation and dedifferentiation.

### **Women with Naturally Bright Red Hair Report Higher Pain in Response to Thermal Stimuli and Reduced Pain in Response to a Mild Muscle Injury Compared to Dark-Haired Women**

Akil Piggott, CURO Apprentice  
Dr. Pat O'Connor, Department of Kinesiology, University of Georgia

Variations in the melanocortin-1 receptor gene that result in bright red hair also are associated with a greater sensitivity to cutaneous thermal pain among women. It is of practical significance to learn whether women with bright red hair also are more sensitive to other noxious stimuli that cause pain. This study aimed to compare the cutaneous thermal and muscle pain responses of women with naturally bright red hair to women with dark-hair in response to a mild muscle injury. Red (n=5)- and dark-haired

(n=5) women were tested on 3 successive days. Measures of inflammation, pain and function of the non-dominant arm were obtained before and after 18 eccentric actions of the elbow flexors which induced a mild muscle injury. Changes in inflammation, arm function, forearm flexor strength, and both muscle pain and cutaneous thermal pain were induced by 2-second heat exposures of 45, 47 and 49°C presented to the skin of the non-dominant forearm and posterior lower leg using a 30x30 mm thermode. Compared to dark-haired women, women with bright red hair reported: (1) higher pain intensity (arm = 19% & leg 23% higher) and pain affect (arm = 34% & leg 15% higher) ratings, and (2) a greater reduction in pain ratings in response to the muscle injury (effect size deltas of .15 to .61). Effects on inflammation and arm function were smaller. The primary novel finding is that red-haired women show a greater reduction in pain ratings in response to muscle injury compared to dark-haired women.

### **Witch-Doctoring Tolstoy: Applying Traditional Healing Philosophies to *The Death of Ivan Ilych***

Ryan Prior, CURO Summer Fellow  
Dr. Katarzyna Jerzak, Department of Comparative Literature, University of Georgia

As the humanities provide us with a rich reservoir of wisdom on what it means to be human and to live a good life, viewing the body and illness from a perspective beyond the merely biochemical can yield not only better doctors but also a better society. Throughout history, different civilizations have had widely varying medical philosophies, stemming from their religion and philosophy as much as their art and literature. Studying notions of sickness and death in Western literature, we can find yearnings for a more humane medicine, one that realizes that healing must be as spiritual and emotional as it is physical. In Tolstoy's meditations on sickness and death in *The Death of Ivan Ilych*, we find a character whose attempts to find healing through relationships are condemned by a medical doctor as "foolishness." Yet Ayurvedic practitioners in India, valuing community, inquire about a patient's social well-being in the initial

consultation. Ivan Ilyich comes to realize that his moral failings, family relations, and bitterness are as much to blame for his illness as his actual physical make-up. His internal monologues seem as if taken from sociological and anthropological case studies of Ayurvedic practitioners, healers who might tell victims of anxiety not to take Xanax, but to gain perspective by spending time with the poor. In comparing Ayurvedic case studies with passages from Tolstoy's text, this study will construct an Ayurvedic "treatment" for Ivan Ilych, one that aligns with the character's own judgments of himself, a philosophical cure that succeeds where science could not.

### **The Effect of Parasite Infection on Monarch Butterfly Mating Behavior**

Malavika Rajeev, CURO Summer Fellow  
Dr. Sonia Altizer, Odum School of Ecology, University of Georgia

Monarch butterflies (*Danaus plexippus*) are commonly infected by a debilitating protozoan *Ophryocystis elektroscirrta*, which can inhibit growth and decrease survival of individuals in wild populations. This study examined the effect of parasite infection on monarch mating contests and mating success. Monarchs have a unique mating behavior (called 'forced copulation') whereby males chase and force themselves onto passing females. Although female monarchs do not actively choose their mating partners, females can struggle to avoid mating with certain males, and males may abandon attempts with certain females. Because infected monarchs are often in poorer condition than healthy butterflies, and mating with an infected partner poses the risk of spore transmission to offspring, infected male and female monarchs might mate less often than healthy butterflies. Lab-reared healthy and experimentally infected adults, equally distributed across sex and infection status, were placed in large outdoor enclosures. Mating contests and successful matings were recorded over 10 days. Our results showed that both healthy males and females mated more frequently than infected butterflies; however, this effect did not reach statistical significance. While the average number of contests per day was slightly higher for healthy versus infected

males, infection status did not have a significant effect on mating attempts. Most successful matings were between healthy males and infected females. Collectively, these results suggest that monarchs do not discriminate between healthy and infected mates, which should benefit parasites by allowing continued transmission via mating contacts.

### **Development of a System for Targeted Mutagenesis in *Mycobacterium Tuberculosis***

Akanksha Rajeurs, CURO Scholar  
Dr. Russell Karls, Department of Infectious Diseases, University of Georgia

One third of the world population is infected with *Mycobacterium tuberculosis*. Annually, 7 to 9 million infected individuals suffer from active tuberculosis disease (TB) resulting in ~ 2 million deaths. The current TB vaccine, *Mycobacterium bovis* BCG, is rarely used in the U.S. because of variable efficacy (0-80%) against pulmonary TB. Attenuating *M. tuberculosis* to produce a more effective, safe, live vaccine will require deletion of multiple virulence factor genes from the chromosome. Current selection systems to delete genes from this bacterium utilize homologous recombination to replace a target gene with an antibiotic resistance gene. As a vaccine strain encoding multiple antibiotic resistances may lead to transfer of antibiotic resistance genes to other bacteria, we are developing a modified system to first replace the chromosomal gene with a cassette of genes encoding a selectable marker, a fluorescence marker and a counter-selectable marker. The first enables selection for the mutant. The second aids microscopic analyses of the mutant. The third provides a means for subsequent deletion of the cassette from the chromosome resulting in an unmarked, drug-sensitive mutant. Efforts are in progress to use this system to target a natural antibiotic resistance gene in *M. tuberculosis* and *M. bovis* BCG. Deletion of this gene will result in bacteria that can be killed by the antibiotic.

### **Kinetic, Temperature Dependent and Structural Analyses of YqhD, an *Escherichia coli* NADPH Dependent Oxidoreductase Enzyme**

Cortney Ralston  
Dr. William Lanzilotta, Department of Biochemistry & Molecular Biology, University of Georgia

YqhD is an NADP<sup>+</sup> dependent oxidoreductase that is of extreme importance to the cell. In general, YqhD catalyzes the reduction of toxic aldehydes produced from aerobic respiration in an NADPH dependent reaction. Buildup of toxic aldehydes in humans has been linked to diseases such as cancer, diabetes, emphysema and arthritis (Perez et al 2008). Our laboratory has determined the specific activity as well as the  $K_M$  and  $V_{max}$  of YqhD for propionaldehyde by performing assays that monitor the NADPH dependent reduction of propionaldehyde using UV-Visible spectroscopy. Our laboratory also elucidated a crystal structure for YqhD in order to address substrate specificity. Our hypothesis was that YqhD must also have an “open” confirmation, in contrast to what was originally reported. Our structure confirms this hypothesis and provides an explanation for the observation that YqhD can reduce several aldehyde substrates. A second hypothesis was focused on the application of YqhD, in combination with *Pyrococcus furiosus* hydrogenase I (PFH-I), in hydrogen-driven production of 1,3-propanediol, a compound used to manufacture a polymer that can be spun into a strong but flexible fiber. PFH-I is unique in that it can be used in the production of NADPH through the oxidation of hydrogen gas. Given that *P. furiosus* is a hyperthermophilic anaerobe, and recent evidence for YqhD genes in thermophiles with high homology to YqhD from *E. coli*, we proposed that YqhD may demonstrate some temperature stability and be applicable in hydrogen-driven production of 1,3-PD. An investigation of YqhD activity at elevated temperatures is presented herein.

### **Victory over the Sun: The Russian Futurist Transcendence over Materiality**

Joanna Reising

Dr. Nell Andrew, Lamar Dodd School of Art, University of Georgia

*Victory over the Sun*, a Russian Futurist opera performed in St. Petersburg in 1913, was the combined effort of three prominent Russian Futurists: Kazimir Malevich, who designed the sets and costumes; Alexei Kruchenykh, who wrote the dialogue; and Mikhail Matiushin, who wrote the music. The Three Futurists were out to reform Russian theater, to transform it in the ways of the new art. This opera, with the combined efforts and innovations of three important Russian futurists, was a pivotal moment in the history of Russian Futurism. Although it was something uniquely Russian, its creators relied on inspiration from the west, namely Cubism and Italian Futurism. *Victory over the Sun* is the culmination of Russian Futurist theories that collaborate in a performance not meant to lead the audience to a clearer image of forms in space as with their French and Italian counterparts, but into a particularly Russian utopia of nonsense, through transcendence over the Sun, the personification of the material and rational. This is an important point to make when considering the avant-garde as a whole as it was developing across Europe. The styles and ideas borrowed from French Cubism and Italian Futurism fully entrench Russian Futurism in the Western tradition. But the opera in particular proved that Russian Futurism was not limited to painting or sculpture or poetry; it was a cacophonous combination of all media that lent itself to a pre-revolutionary Russian moment.

### **Design of a Computed Tomography Scanner with Components from an Existing DEXA Machine**

Katherine Riccione, CURO Scholar, Ryan

Boelter, Tina Carson & Chase Mooney

Dr. Mark Haidekker, Department of Biological & Agricultural Engineering, University of Georgia

A computed tomography (CT) scanner is to be designed with a number of components obtained

from an existing dual-energy x-ray absorptiometry system (DEXA). These components include a dual-energy x-ray generator, a detector consisting of a scintillator crystal connected to a photomultiplier tube, and the necessary electronics for the x-ray source. The design was given a number of requirements, including a point spread function of at least 5 mm, volumetric scan ability, pencil beam geometry with an x-ray intensity of no greater than 140 keV, and a shielding apparatus that no more than doubles the background radiation at a distance of 1 m. With the x-ray source, detector and electronics provided by the existing DEXA system, the remaining components to be designed include a rotational sample stage capable of translational movement along the x-, y-, and z-axes; suitable sample holders that allow for observation of the sample during operation; a proper shielding apparatus; and any necessary software for calibration and image collection. Once complete, this CT scanner will be available for researchers in the UGA engineering department and will be capable of scanning various samples including, but not limited to, small animals, bones, plant materials and geologic matter. The benefits of this CT device over its original DEXA forerunner include faster image acquisition time, better image resolution, and the ability for selectable projections.

### **Effects of *Ligustrum sinense* Presence and Removal on Nitrogen Mineralization Rates**

Rebecca Risser

Dr. Paul Hendrix, Odum School of Ecology, University of Georgia

Chinese Privet (*Ligustrum sinense*) is a common invasive in the southeastern United States, particularly in low lying riparian areas. Other invasive shrub systems have been found to have effects on soil characteristics and processes. As a result, nutrient cycling is often affected. This study explores the effects of privet removal on nitrogen mineralization rates at sites in the Oconee River basin. Four sites were selected and treated four years ago, each containing three plots: 1) The control in which privet was present; 2) privet felled by chainsaw; and 3) privet chipped by a mulching machine. In

addition, three reference, or desired future condition sites which are naturally privet free, were sampled. Soil samples were collected from these sites and were incubated for 28 days to determine net ammonia and nitrate mineralization rates. Preliminary results indicate that mulched plots have higher mineralized nitrogen than control plots and plots where privet is removed by felling. High biomass input into the mulched system combined with smaller particle size may have lead to this result, along with flooding in 2008 which washed away debris from the felled sites particularly.

### **Using Fluorescence to Identify Insect Damage to Cotton Bolls**

Erin Roberts, CURO-Engineering Participant  
Dr. Mark Haidekker, Department of Biological & Agricultural Engineering, University of Georgia

Every year, cotton crops across the Southeast United States are damaged by stink bugs feeding on the cotton bolls, rendering them unusable. When a stink bug feeds on a cotton boll, it can create three types of damage: lint damage, “warts” on the inner carpal wall and exterior puncture marks. As cotton is a vital industry, a fast and easy method of detection of infestations is needed. We discovered that this damage is associated with blue-green fluorescence under ultraviolet excitation. The purpose of this research is to determine whether fluorescence can be used in the field to diagnose cotton bolls as either damaged or undamaged. We examined cotton bolls that were grown in a greenhouse, some of which were exposed to stink bugs and others which were not. Images of all sides of the cotton bolls were then taken under ultraviolet light and blue LED light using a highly sensitive camera. Then the cotton bolls were manually opened and inspected for any signs of damage. We have found that there is a specific pattern of fluorescence on the outer carpal wall that is indicative of interior lint damage. This information can be examined with image analysis methods to predict if a cotton boll has internal damage without opening the boll.

### **Improving the Claims-Making Process in Context to the 2010 Deepwater Horizon Oil Spill**

John Rodriguez, Roosevelt @ UGA  
Dr. Leara Rhodes, Grady College of Journalism & Mass Communications, University of Georgia

The 2010 *Deepwater Horizon* Oil Spill decimated the tourist-dependent economies of the five affected states (Texas, Mississippi, Louisiana, Alabama, and Florida), and shattered the livelihoods of those who lived there. At the behest of President Obama, the responsible party created a \$20 billion escrow fund in order to compensate affected individuals and businesses. This project analyzes the shortcomings of the Gulf Coast Claims Facility (GCCF) in an effort to create a more effective alternative claims process. We hypothesize that anecdotal evidence will support the data that summarizes the difficulty (both on a logistical and administrative level) of the claims procedure. The anecdotal evidence and qualitative data collection was gathered through interviewing individuals who were affected by the Spill and who had a first-hand experience of the claims process. The GCCF failed in the following ways: it was unprepared to handle the vast amount of claims; it did not have an established protocol in handling claims; and it also had close ties BP. The research concludes that in the case of future incidents, a governmental agency needs to be established to handle the response process, equipped with an agreed-upon procedure and appointed administrator to impartially judge individual claims. The only involvement the responsible party will have in the agency will be in funding the claims. The agency’s claims analyst staff should be increased so as to assist claimants both quickly and effectively. With such an agency in place, future claims processes will be handled more transparently and promptly.

### **Morphological Changes Accompanying Killing of *Trypanosoma brucei brucei* by Human Serum**

Carla Rutherford, CURO Summer Fellow  
Dr. Stephen Hajduk, Department of Biochemistry & Molecular Biology, University of Georgia

*Trypanosoma brucei brucei* is a eukaryotic parasite that infects mammals, but is unable to infect humans due to the cytotoxic activity of human serum, mainly as a consequence of a minor subclass of serum high-density lipoprotein called Trypanosome Lytic Factor (TLF-1). Conflicting observations have complicated our understanding of the mechanism of *T. b. brucei* killing by human serum. To elucidate the killing mechanism, we analyzed morphological changes associated with human serum treatment, using both fixed cell imaging and time-lapse microscopy of live cells. Treatment of *T. b. brucei* with human serum suggests two distinct cellular mechanisms are associated with cell lysis. Using freshly collected, high specific activity human serum, we observed that *T. b. brucei* rapidly undergoes morphological changes appearing “kite-shaped” prior to cell lysis. The morphology of *T. b. brucei* incubated with low specific activity human serum was dramatically different. Three conditions produced low specific activity human serum: 1) The presence of elevated levels of haptoglobin, 2) prolonged storage at 4°C, and 3) brief incubation at 62°C. Using low specific activity serum, we observed the gradual formation of a large cytoplasmic vacuole and a delay in trypanosome killing, which immunofluorescence microscopy confirms is not the cell lysosome. These studies support the hypothesis that human serum killing of *T. b. brucei* may require the activity of multiple proteins, and that one of these proteins may be selectively inactivated by haptoglobin, heat treatment or storage, resulting in the distinct morphologies observed. Understanding this mechanism will allow us to better understand human innate immunity.

### **Attuning to Positive Social Cues as an Effortful Process for Socially Anxious Individuals**

Raha Sabet  
Dr. Michelle vanDellen, Department of Psychology, University of Georgia

The purpose of this project is to investigate the impact of anxiety on responses to social threat. In general, people attend to positive cues after social threat. However, these attention processes may not operate similarly for people at varying levels of social anxiety. At low levels of social anxiety, attuning to positive cues should occur naturally and should not involve effort. However, at high levels of social anxiety, attending to positive social cues may be effortful. This project involves two studies designed to investigate whether the regulation of positively oriented social attention requires effort by people high in social anxiety. Both studies will be conducted on male and female college students. In each study, I will measure trait social anxiety and manipulate the extent to which participants’ ability to exert effort is reduced. Study 2 builds on Study 1 by including a manipulation of social threat such that some participants will be led to believe that they will be evaluated while reading a passage from Shakespeare’s Hamlet. In each study, attention to positive social cues (e.g., attention to happy faces) is the primary dependent variable. All participants will be fully debriefed.

### **Reducing Water Usage by Repowering Plants in Georgia**

Hank Schwartz, Roosevelt @ UGA  
Dr. Laurie Fowler, Odum School of Ecology, University of Georgia

From 1970 to 2009, the metro Atlanta population exploded from 1.7 million to 5.3 million, and during the same period, farming irrigation in Georgia has increased from 200,000 to 1.4 million acres. The competition for resources is evident: a 2007 drought led to a decrease in \$1.3 billion of economic output, and Georgia currently has the largest proportion of imperiled freshwater fauna in North America. Additionally, based on a 2009 U.S. federal court ruling, Atlanta will not be able to make

withdrawals from Lake Lanier past 1970 levels, effectively reducing the city's water supply by half. In order to dramatically reduce water consumption, certain aged power plants in Georgia should be "repowered." When an existing plant is repowered, boilers and generators are either replaced or revamped in order to increase efficiency, reduce emissions and lower water requirements by up to 97%. A review of scholarly journals, university research, business publications and other state water strategies indicates that repowering plants is the fastest and most efficient solution to Georgia's water shortage. While the initial cost will be significant, the payback on the investment will be achieved within four to six years. Considering that the power requirements are highest during the driest months of the year, repowering certain strategic plants in Georgia would reduce the adverse effect of droughts and ensure continued economic growth for the region.

### **A Cold Calculus: Spending in K-12 Education**

Matthew Seitz, Roosevelt @ UGA  
Dr. Catherine Sielke, Department of Lifelong Education, Administration & Policy, University of Georgia

Funding for Georgia's K-12 education system has plummeted by \$4.3 billion over the last decade, \$2.3 billion in the last two fiscal years alone. With revenue projections looking bleak, further cuts will be necessary in the future. Districts have already taken advantage of "easy" cuts; their task now is to make tough, practical decisions that minimally inhibit student opportunity. This paper scrutinizes the evidence for and against four common budget remedies—teacher pay reductions, increased property tax rates, increased class size, and targeted cuts of upper-level and non-core classes—for cost-effectiveness, with an end goal of helping school districts manage funds available to them until tax revenues increase. Evidence on cost-saving measures from the public and private sectors is considered to harmonize the efficient methods of the business world with the "education at any cost" mentality that has dominated public life in recent decades. An across the board wage

decrease to teachers and administrators in conjunction with an increase in local property tax is recommended as the most cost-effective solution. This is a temporary measure—both educator salaries and local millage rates will need to be reassessed once the economy recovers, and longer-term policies are enacted. Until then, our school systems must keep all options—however unpopular—on the table.

### **Every Man a King: Robert Penn Warren, Populism and Contemporary American Politics**

Matthew Sellers, CURO Scholar, CURO Summer Fellow & Roosevelt @ UGA,  
Dr. Hugh Ruppensburg, Department of English, University of Georgia

Robert Penn Warren writes extensively about politics and political personalities, and that discussion leads him to consider populism's impact on the southern political landscape. From the tobacco wars in *Night Rider* to his representation of demagoguery in *All the King's Men*, Warren examines the circumstances surrounding the genesis of populist movements, delves into the personalities that drive them, and speculates about their consequences and demise. In light of recent developments in American politics—the rise of the Tea Party, grounded in conservative populism, and the election of Barack Obama, founded on liberal populism—Warren's novels' treatment of populist politics takes on new significance. Using Warren's literary evaluation of populism, created in his novels and poetry, this thesis will analyze the significance of populism to contemporary American politics. It will draw comparisons between political rhetoric as presented in Warren's novels with that found in contemporary political speeches; the characterization of the crowd with the media's characterization of populist movement members; and the characters of the figures who lead Warren's fictional movements with the real leaders of movements, like Organizing for America and the Tea Party. This comparison will elucidate the role populist movements play in shaping policy and politics by contrasting Warren's vision of populism with the reality of populism in government. The thesis will

conclude with a discussion of the conflict between institution and individual, highlighting efforts to reform ethics in government using Willie Stark as an exemplar, as well as considering the long-term sustainability of populist movements.

### **Ty1 Element Antisense RNA Activity from Natural *Saccharomyces* Isolates**

Alexander Sevy, CURO Scholar  
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Retrotransposons are a class of mobile DNA elements found in most eukaryotic genomes. These elements replicate through an RNA intermediate and insert at various locations in the genome. Ty1 retrotransposons are present in *Saccharomyces cerevisiae* and related species, such as *S. paradoxus*. *S. cerevisiae*, otherwise known as baker's yeast, is an effective model organism for studying retrotransposons because of the powerful genetic and molecular systems developed for this organism. Ty1 elements produce long antisense RNAs that inhibit transposition *in trans* and confer copy number control (CNC). We hypothesize that Ty1 elements present in *S. cerevisiae* and *S. paradoxus* isolates contain sequence polymorphisms that affect antisense RNA synthesis, stability or function. Therefore, genomic Ty1 element sequences recovered from selected *Saccharomyces* genomes were assessed for their ability to confer CNC, using a test strain carrying a genetically marked Ty1 $his3-AI$  element. DNA sequence analysis is underway to determine the location of polymorphisms within the Ty1 CNC region. Future work will determine if the Ty1 polymorphisms affect antisense RNA expression or function. Since HIV and other retroviruses have a life cycle that is closely related to Ty1, mechanisms regulating Ty1 transposition may also inhibit retroviral replication, and lead to novel therapeutic approaches.

### **The Evolution of Aging in *Saccharomyces cerevisiae***

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Understanding aging remains a central question in biology; however, it is often ignored in microbes. So yeast (a "model organism" in biology) has proven to be exceptionally important in this study because it combines the advantages of microbes, while also being a eukaryote. In my project, I am addressing two questions to determine whether, at an optimal level, mutations will increase and/or decrease the lifespan of the budding yeast, *Saccharomyces cerevisiae*. First, I am determining whether a particular lab strain shows evidence for an evolved, intermediate aging rate. Second, I am addressing whether the aging trait can rapidly respond to selection. To answer the first question, I cultivated on agar media, and then transferred to liquid media, a set of 149 mutation-accumulation lines, and then determined how random mutations alter the pattern of aging. If most mutations have similar effects on aging, this indicates selection has favored extreme, as opposed to intermediate, aging. To answer the second question, I am examining whether the same strain has responded to many rounds of selection for extended aging. Using a Bioscreen C (Thermolab system), an automated incubator/spectrophotometer, I will be measuring the growth curves. For the results, I will use Excel® to create mortality curves with the collected data. I will compare the results of the 149 lines to the ancestors, deduce a pattern and compare the effects of the mutations in different media. Showing that aging is an evolved phenotype will demonstrate that it is an important trait in microbes, similar to other organisms.

### **Human Embryonic Stem Cell Derived Neurons as Biosensors for Neurotoxins**

Anuj Shukla

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Many environmental toxins can cause serious damage to the human central nervous system. Neurotoxins can generate reactive oxygen species (ROS) which damage important signaling mechanisms in the body's neural network. Currently, there is a need for a human cell-based sensor that utilizes functional biology to detect hazardous neurotoxins and their ability to produce ROS. Human neural progenitor cells (hNPs) derived from human embryonic stem cells (hESCs) were successfully differentiated into neurons in our lab; these hNPs provide an unlimited source of differentiated neurons which have the potential to be reliable human cell-based sensors. In fact, neurons derived from hESCs have shown to be remarkably accurate for toxicological applications compared to the results of similar in vivo studies. Therefore, the purpose of this study is to develop a hESC-derived biosensor by analyzing the functional effects of various neurotoxins on hNPs and hNPs differentiated into neurons. ROS generation in the neurotoxin-treated hNP and neuronal cultures was detected by the addition of a novel dye that only fluoresces in the presence of ROS. After addition of Tempol, a known ROS quencher, the fluorescence intensity of the neurotoxin-treated cultures decreased to control levels. We are currently testing other functional effects of the neurotoxins in correlation with ROS production. For example, the differentiation potential of the neurotoxin-treated hNPs is being analyzed by staining for neuronal marker proteins normally present during differentiation. Our results thus far show that hNPs and neurons derived from hESCs can be potent sensors for ROS generating neurotoxins.

### **Italian Futurism and Interventionism**

Jennifer Skinner

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The Futurists were an avant-garde group of writers and artists who originally advocated for a break with tradition. Their leader F. T. Marinetti promoted the push towards modernity in his "Futurist Manifesto," wherein he described the experience of man mixing with machine. In addition to machinery, they believed violence represented the true spectacle of a frenetic and unstable urban life. Like most of Europe in 1913-14, the Futurists knew that war was approaching and advocated in their work for Italian intervention. These interventionist works are the turning point for the Futurists, and my paper argues that these works anticipated the upcoming rise in fascism, for which the Futurists became supporters and propagandists. I will show how the Futurists began to take little steps towards fascism through their artworks and their writings, and I will also track how the Futurists increasingly became a vital gear in the fascist machine. In addition, my argument demonstrates how under the right circumstances an avant-garde art movement can easily become a proponent in a nationalist dictatorship. This element of my argument is essential for understanding why a liberal artistic movement became a supporter of a conservative political movement. Finally, I will analyze the role the Futurists play in Italian Fascism and how their art prolonged the life of the Italian Fascist government. Ultimately, the Futurists turned to fascism because of their interest in Italian intervention.

### **Is Distraction an Effective Method for Tolerating Distress?**

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Distraction is widely cited in the literature as a method for tolerating distress; however, the evidence on the subject is inconclusive. Previous studies investigating the efficacy of distraction have used different methods of inducing distress and different types of distracters, making

comparisons between studies difficult. The current study utilized a Cold Pressor Test (CPT) in order to induce stress in undergraduate participants. The CPT has been used in a plethora of studies and is an empirically validated method for inducing stress in the laboratory. It involves submerging the participants' non-dominant hands in 0-1° C water for three minutes in order to produce physiological arousal. Changes in blood pressure and heart rate were measured in order to assess participants' physiological responses to stress. Participants were randomly assigned to either a control or a distraction group for the task. The participants in the distraction group were allowed to watch a three minute film clip that has been empirically validated as positive-affect inducing, while the control group was not given any distraction. Data will be analyzed using a multiple analysis of variance to determine if the participants who engaged in the distracting task during the CPT showed less change in physiological arousal (as measured by heart rate and blood pressure) from baseline as compared with the control group. If the hypothesis is correct, it will provide evidence that distraction is an effective method of preventing increases in physiological arousal during times of distress.

### **In the Image of the Artist**

Daniel Smith

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All creations inevitably reflect some aspect of their creators. To better understand the underlying nature of art, I spent the past several months investigating the most dramatic instance of this phenomenon as evidenced in self portraiture. I researched a number of artists. I looked at Albrecht Durer's super-realistic, divine renditions; Michelangelo's monumental conceits; Rembrandt Van Rijn's humble and vulnerable paintings; and a number of other artists' works and writings. I questioned these masters' artistic philosophies and methodologies and constructed my own in a series of self portraits. As a genre, self portraiture removes all variables from the creative process except the basic reproduction of the image and likeness of the artist. This approach towards art is one of the

earliest, and in its simplicity it is the most powerful. Ultimately, I reproduced my own image in a series of images, which hopefully communicate more than mere words. In this photographic series, I used both the integrity of film and the flexibility of digital technology. Some images I printed simply in the darkroom. Other images I photographed in parts and later compiled, distorted or fabricated the individual elements on a computer. Through these alternatively traditional and unconventional means, I compiled a number of realistic and surreal images. In constructing each image, I paid careful attention to symbolism, pose and art historical relevance. My images speak for themselves, presenting my own ideas about self portraiture, yet echoing the conceits of numerous self portraitists throughout history.

### **How Leadership Makes a Difference: The Predictive Role of Managerial Leadership Competencies in a Multi-National Company**

Rebecca Stein

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Increasing size of organizations, coupled with the information/technology revolution and an ever-expanding global environment, has created complex organizational systems, which are impossible to fully grasp or completely control (Kotter, 1982b). Furthermore, senior executives of these large companies are expected to provide leadership in the midst of this complexity, and are held responsible for organizational outcomes. This potent environment demands reliable information to assist organizations in the development of their leaders. Unfortunately, many important questions remain unanswered. Do leadership competencies of managers predict critical organizational outcomes? If so, which leadership competencies are more important than others? Three thousand managers from a Fortune 500 company were rated on 9 leadership competencies and performance and business objectives were collected. Analyses were conducted to determine whether leadership competencies were related to important business outcomes. Possible explanations for the results are discussed and recommendations for future research are proposed.

### **Changing Environments: Effect on Extinction Time and Distribution**

Theresa Stratmann

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University of Georgia

In an era of increasing species extinctions, it is vital to understand processes of population extinction in hopes of eventually predicting and preventing them. We used the aquatic ectotherm, *Daphnia magna*, as a model organism to study how deteriorating environmental conditions caused by temperature change affected the populations' extinction times and distributions. Three sets of twenty-four chambers of *Daphnia* ( $N_0 = 20$ ) were subjected to temperature regimes according to three treatments: 1) increasing temperature, 2) decreasing temperature by  $0.1^\circ\text{C}/\text{day}$  from  $20^\circ\text{C}$  and 3) constant  $20^\circ\text{C}$  temperature (control). Each treatment pushed temperatures toward a different end of the *Daphnia*'s thermal tolerance. Therefore, we hypothesized that the treatments would alter extinction risk differently: if one increased risk, the other would decrease it. In contradiction to these predictions, inspection of the data with the Cox proportional hazards regression and linear models showed that temperature treatments did not explain differences in survival time. Further analysis showed that random contamination by algae determined extinction time, and chambers subject to temperature manipulations became contaminated significantly later than control chambers. As a result, the temperature treatments indirectly affected survival. The treatments also resulted in different distributions of extinction times. The decreasing temperature treatments had a distribution that was shifted to the right, which means that some populations persisted much longer than most. This controlled laboratory experiment allows us to gain understanding of mechanisms that can cause population extinction, and we are now working to put our findings into such a context.

### **Presence of Newcastle Disease through Immunohistochemistry in Tissues of Chickens Diagnosed with the Disease in the Field**

Lauren Sullivan

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Newcastle disease is a familiar problem to most poultry producers. Many strains of the virus exist, and can cause a wide range of clinical signs in chickens. The most serious forms of the disease are foreign to the US. The less severe forms of the disease are thought to cause mild to moderate respiratory problems, leading to decreased productivity. Consequently, many producers vaccinate their birds. Often chickens with respiratory problems are submitted to diagnostic laboratories, where they are diagnosed with Newcastle disease through identifying the presence of virus. In our laboratory, we are examining the respiratory tracts through histology and immunohistochemistry. First, heat-induced antigen retrieval is performed in a buffer solution; then a commercial agent is used in a blocking procedure in order to ensure the specificity of the antigen. Lastly, both primary and secondary antibodies are applied in order to visualize the binding reactions. Although there is evidence of respiratory damage noted morphologically, in fact, very few of the tissues have Newcastle disease virus evident through immunohistochemistry within the inflamed tissue. Consequently, we believe that many of the diagnoses of Newcastle disease are erroneous, and the viral identification was of the vaccine virus. Further investigations are warranted to confirm and expand upon these findings.

### **Linguistic and Musical Coherence**

Ai Taniguchi

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The comparative study of linguistic and musical semantics has gained popularity in recent years, but researchers have yet to explore the potential commonalities in the processing of context-

based meaning of language and music. The purpose of this research is to investigate such connections by testing the effect of contextual coherence of music on linguistic memory. "Contextual coherence" in this study has been designated as the process of individual segments connecting to form a meaningful whole. In language, this is the inferencing process; the musical parallel of it is the periodic structure, in which two musical phrases must complement each other in structure or function to create coherence. Two poems were selected, and two versions of music were assigned to each--one coherent, and one incoherent. The coherent piece abides by the periodic structure defined above. The incoherent piece was achieved by rearranging the coherent piece so that adjacent phrases do not form ideal periods in terms of material and/or function. 40 healthy college students listened to two songs, one coherent and one incoherent, and recalled the words of each poem. Participants recalled fewer words in the incoherent version of the songs than in the coherent version, thus potentially indicating that musical incoherence disrupts memory for poetry. This may imply that coherent musical context acts as a scaffold to linguistic comprehension. The significance of this study lies in the possible revelation of processing commonalities of linguistic and musical discourse, with potential applications in facilitating first and second language instruction.

### **Intramolecular Friedel-Crafts Cyclization with Arylsilanes**

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An electrophile adds to the ipso carbon atom bearing the silyl substituent of an aryl silane to generate a carbocation stabilized by the silicon's well-established  $\beta$ -effect; the loss of the trimethylsilyl group produces a product in which the electrophile has replaced the silyl group. Electrophilic aromatic substitution reaction of aryl silanes are widely known and include halogenations, Friedel-Crafts alkylation, Friedel-Crafts acylation and nitrations. Not surprisingly aryl silanes are useful to prepare functionalized arenes. Majetich et al. showed that a Lewis

acid-activated dienone (A-ring) can react with an arene (C-ring), undergoing cyclialkylation to produce a cycloheptane (B-ring). Application of Friedel-Crafts cyclialkylation to silyl substituted arene-dienone systems allows for exploration of the reactivity of the silyl moiety. Treatment of this system with a Lewis acid under kinetic control should produce the cycloheptane while not affecting the silyl substituent on the arene ring. The introduction of the silyl functionality would potentially allow a handle for further transformations, leading to more diverse tricycles. The synthesis of the arene-dienone began with transmetalation of o-bromotoluene and the addition of chlorotrimethylsilane. The resulting aryl silane was then treated with NBS to form benzylic bromide. 6-methyl-3-ethoxycyclohex-2-en-1-one was then alkylated with bromide using the Stork-Danheiser protocol and then reacted with vinylmagnesium bromide to furnish the dienone. Treatment with  $TiCl_4$  only produced the tricycle in which the trimethyl silyl group had been lost. However, using  $BF_3 \cdot Et_2O$  as the Lewis acid produced cyclialkylation and retention of the silyl moiety. Re-exposure of this product to Lewis acid catalyst resulted in protodesylation.

### **The Effects of Lutein and Zeaxanthin Status and Macular Pigment Optical Density on Neural Efficiency**

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Macular pigment is comprised of dietary carotenoids lutein and zeaxanthin that are intercalated within the macular region of the neural retina. Macular pigment has been shown to prevent retinal degeneration and improve visual function (Beatty et al, 2000; Wooten & Hammond, 2002). Although lutein and zeaxanthin are found in highest concentration in retinal tissue, they are not unique to the retina. For example, lutein and zeaxanthin have been located in the frontal and occipital cortices of the brain (Craft et al, 2004). Whether lutein and zeaxanthin also protect cortical tissue and enhance cortical function is an open question. The hypothesis of the current study is that the brain benefits from the protective effects of

lutein and zeaxanthin, resulting in better cognitive performance and increased neural efficiency. Macular pigment density was measured in both young and older adults non-invasively via heterochromatic flicker photometry. Given the fact that lutein and zeaxanthin in the neural retina are known to correlate with lutein and zeaxanthin cortical levels, macular pigment density was used as a biomarker of cortical lutein and zeaxanthin and was compared to performances on cognitive and visual measures used to determine neural efficiency. Cognitive measures consisted of a rapid categorization task and a standard battery used to evaluate cognitive vitality. Neural efficiency was measured via the temporal contrast sensitivity function (tCSF) and a visual masking task. Preliminary evidence shows that macular pigment density is correlated with performance on visual and cognitive measures, suggesting that lutein and zeaxanthin are related to neural efficiency.

### **The Role of Indoleamine 2,3-Deoxygenase in CD8 T Responses to Influenza Infection**

Jeffrey Tran

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Current influenza vaccines are designed to generate antibody-specific immunity against predetermined strains of virus and are ineffective in protecting against novel or emerging strains. Targeting conserved T cell epitopes can provide protection against unexpected circulating strains of influenza; however, this protection wanes over time. Thus, understanding and exploiting the mechanisms involved in CD8 T survival and maintenance may aid in the development of a successful anti-influenza vaccine eliciting cell-mediated immunity. Indoleamine 2,3-deoxygenase (IDO) is a tryptophan catabolizing enzyme up regulated following influenza infection, which suppresses naive T cell proliferation and induces the apoptosis of T cells. To determine whether IDO suppression may be a viable option to enhance T cell immunity to influenza infection, wild type and IDO knockout mice were infected with influenza, and the number, frequency and

function of the influenza-specific CD8+ T response were monitored over time. IDO knockout mice demonstrated a more robust virus-specific T cell response to influenza in the lung and lung airways (the site of viral replication) compared to wild-type during the early effector phase of the response.

However, both groups of mice harbored similar levels of influenza-specific CD8 T cells at later stages of the immune response. Future experiments will determine whether an IDO deficiency alters the phenotype and function of these memory cells when rechallenged with influenza. Together our data provides a detailed picture of how IDO regulates T cell responses to respiratory infection.

### **Cuticular Pheromones and Fire Ant Queens: Smells like Mom**

Waring Tribble

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The Red Imported Fire Ant (RIFA), *Solenopsis invicta*, has been the subject of intense research because of its status as a serious invasive pest. One major emphasis of study in ant biology focuses on the question of how pheromones (chemical signals) are used for communication. This question applies especially to the polygyne (multiple-queen) and monogyne (single-queen) social forms of RIFA. Previous research has found strong genetic control for the organization of a RIFA colony into polygyne or monogyne societies. These two social forms feature specific genotypes at a single Mendelian locus and phenotypic differences in behavior, physiology and biochemistry. We studied the process by which colonies of each form accept new queens. Workers in queenless colonies will accept a new queen in certain circumstances, but polygyne workers only accept into their colony polygyne queens, and monogyne workers only accept into their colonies monogyne queens. Preliminary studies indicated that this behavior may be influenced by chemicals. We first showed that fresh polygyne and monogyne corpses elicited the same specific worker responses of queen acceptance and rejection according to queen genotype as do live queens, demonstrating that the queens are not accepted on a behavioral

basis. We then showed that chemically extracted queen pheromones, deposited onto inanimate surrogates (paper wicks), also elicited appropriate worker ant discrimination behavior. These results support the hypothesis that worker discrimination behavior is elicited by chemical differences between workers of the two social forms.

**“I’ve got the rhythm, she’s got the blues.”  
Relations Between Temperament, Maternal  
Stress and the Development of a Sleep-Wake  
Rhythm in Infancy**

Vivien Tsou

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Although there is extensive literature on factors that may influence an established sleep-wake rhythm in adulthood, there is little published on factors that may influence the characteristics of developing sleep-wake rhythms in infancy. In this study, we will examine the situational (e.g., maternal stress, environmental cues) and dispositional (i.e., temperament) characteristics that may influence the onset and characteristics of a sleep-wake rhythm in infancy. We hypothesize that increased maternal stress and difficult temperament will lead to later sleep-wake rhythm onset and poorer sleep-wake characteristics. Data collection is currently underway. Approximately 30 mother-infant pairs will be participating in this longitudinal study. When their infants are three and six months of age, mothers will complete measures about themselves (i.e., Life Experiences Questionnaire, Daily Hassles Scale) and their infants (i.e., Infant Behavior Questionnaire, sleep and feeding diaries). At four and five months, mothers complete sleep-wake characteristics of interest, including presence of a circadian rhythm, infant sleeping quarters, longest sleep duration, number of awakenings and total nocturnal sleep time. From this data, we expect to see differences in onset and characteristics of the sleep-wake rhythm predicted by maternal stress or infant temperament and how the relation between situational and rhythm characteristics are moderated by infant temperament. We will conduct bivariate correlations to assess relations

between maternal stress, maternal contact, infant temperament and infant sleep characteristics. Multiple regressions will examine how maternal factors predict sleep-wake rhythm onset and characteristics, and temperament will be examined as a potential moderator of this relation.

**Preserving Georgia’s Waterways: Tackling  
Interbasin Transfer in Georgia**

Pranay Udutha, Roosevelt @ UGA

Dr. Laurie Fowler, Odum School of Ecology,  
University of Georgia

Georgia’s population is unevenly distributed—almost 60% lives in metro Atlanta. Furthermore, Atlanta has consistently displayed one of America’s highest growth rates over the past decade, causing a disproportionately concentrated demand for water by Metro Atlanta. This phenomenon has generated severe water management issues, resulting in increased interbasin transfers (IBT). Metro Atlanta spans several narrow river basins of differing elevations, rendering water transfer from higher basins into lower basins cheaper than pumping water back up to its source basin. Without careful management, IBTs may inflict substantial, sometimes irreversible, damage to ecosystems of both recipient and donor basins. IBTs facilitate introduction of non-native species to each basin, degrade water quality and decrease water supply for some areas. Currently, no effective comprehensive policy regarding IBT in Georgia exists. This paper recommends a per acre-foot tax on IBT. The mechanism of action is straightforward, internalizing spillover costs and decreasing IBT profitability, and precedent for such proportional taxes already exists. An analysis of economic literature, judicial reviews, and policies of neighboring states facing similar water management issues indicates that this is the most efficient and effective policy for controlling IBT. This policy can be expected to stem further species invasion and water quality deterioration.

### **Measurements of Inhibition: The Relation Between the Eriksen Flanker Task and the Stop Signal Task**

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Inhibition is an important behavioral ability that is essential for proper functioning. When it deteriorates, it leads to problems that could result in clinical disorders or psychopathology. There are many tasks, which vary across laboratory and field of study, that test inhibition. Knowing how performance on these varied tasks is related, and which ones provide unique information, would help researchers reduce the number of tasks used in studies. Performance can be measured by the proportion of correct and incorrect responses, as well as the amount of time it took to respond correctly and incorrectly. One common test is the Eriksen Flanker task, in which subjects have to focus on the direction of one central arrow amidst flanking distractor arrows (which can face in any direction) and have to respond appropriately. Another measure of inhibition is the Stop Signal task (SST) in which subjects have to resist a primed motor response when they see a stop signal. The hypothesis is that the results of the two tasks will be highly correlated. Performance on the Flanker task will predict outcomes on the SST in terms of error rates and reaction times, with poorer performance being indicative of decreased inhibition. The study was conducted on 100 undergraduates at the University of Georgia. Future researchers will benefit from these findings as it will enable them to optimize their studies by conducting tests that are uniquely informative, while still being able to predict performance on similar tasks based on the high correlation rates.

### **Nutrient Enrichment Effects on Detrital Food Resources in Streams: Implications for Microbes and Consumers**

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Excessive nutrient enrichment has become the primary water quality issue for most of the

freshwater and coastal marine ecosystems in the world. In this study, we examined nutrient enrichment effects on detrital food resources of stream consumers. We measured nutrient content (nitrogen (N), phosphorus (P) and carbon (C)) of two resources utilized by stream detritivores: fine particulate organic matter (FPOM) and leaves. We tested whether nutrient enrichment in streams affects detrital nutrient content and determined the implications for stream consumers by comparing samples of FPOM and leaves collected from a reference stream and experimentally enriched stream (with N and P) at the Coweeta Hydrologic Laboratory. Reductions in carbon to nutrient ratios (C:N, C:P) indicate higher nutrient content and food quality for consumers. We found C:P became reduced in the nutrient-enriched stream for both leaves and FPOM (approximately 38% reduction in both cases). We compared the C:P food requirements of shredders (which feed on leaves) and collectors (which feed on FPOM) to observed C:P values and found that nutrient enrichment decreased P limitation for shredders and enhanced C limitation for collectors. Thus, runoff of nutrients to streams would increase production of shredders and potentially reduce production of collectors, which contribute differentially to ecosystem services provided by streams. Our results help lay the groundwork for understanding how excess nutrients entering streams will differentially affect food quality for different groups of stream organisms, with implications to ecosystem function.

### **Grand Strategy as it Pertains to the Korean Peninsula**

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The current diplomatic gridlock and military tensions on the Korean Peninsula are a product of the manner in which the key external actors in the region—China, Japan, Russia and the United States—define their national interest. All of the non-state actors involved have publicly claimed to support both non-proliferation and the reunification of the North and the South, yet their actions sometimes prove otherwise. Though leaders from these states may publicly

declare that they are motivated by interests such as peace and principle, their actions seem typically driven by a fundamental desire to maximize power and profit, even if it means delaying the reunification of the two Koreas. This difference in words and actions has led to a lack of progress in achieving the set goals of non-proliferation and reunification. The paper acknowledges that states conceive their national interests based on the framework of the 4Ps: power, peace, prosperity, and principles. Through analysis of diplomatic documents, official speeches and objective scholarly sources, it becomes clear that while each actor may publicly define its national interest in terms of peace and principles, many leaders ultimately make foreign policy decisions based on power and prosperity-based interests. Currently, the stalemate on the Korean Peninsula persists because the key external powers calculate that their power and prosperity are best served by promoting the status quo instead of reunification. This reality has kept the six parties involved in the Korean peninsula, despite over a half-century of negotiations, conflicts and compromises, from coming up with a solution for peaceful reunification that is acceptable to all sides.

### **Breastfeeding Practices among Hispanic Women in Athens**

Caroline West

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Breastfeeding is the optimal source of nutrition for newborns, with immediate and long-term effects on infant and maternal health. The numerous benefits, including protection from infant infections and obesity, and promotion of cognitive development and healthy infant growth, are well established in medical literature and government policy. Despite these benefits, national levels of breastfeeding are lower than goals set by US Healthy People 2010. As the fastest growing population in the United States, Hispanics are of particular concern when examining disparities in access to health care and health outcomes. While Hispanic women meet some of the national breastfeeding goals, rates of optimal breastfeeding among this

population remain stagnant and low. A review of literature identifies national breastfeeding trends among Hispanic populations, including factors influencing breastfeeding decisions, various barriers women face to initiate and continue breastfeeding and general attitudes and beliefs concerning the practice. Narrative data collected from individual interviews with four Hispanic women in Athens was analyzed to illustrate the prevalence of these breastfeeding trends on a local level. Questions concerning breastfeeding were coded for frequently used phrases, which were subsequently categorized according to trends found in the literature review. Results demonstrate a consistency with national trends, including the common perception of insufficient milk supply and practice of combining breast milk and formula before the optimal weaning age. A comparison between national and local breastfeeding trends provides insight in promotion of healthy breastfeeding practices among Hispanics in Athens and the broader Hispanic community.

### **Academic Relevancy: A Focus Group Study**

Taylor Whelchel

Dr. Christopher Pisarik, Division of Academic Enhancement, University of Georgia

Colleges and universities are under increasing pressure from parents, the government, and the business community to prove that their academic curriculum is relevant. Most of the stakeholders of higher education have well documented positions on why a college education is relevant. For example, the government's prominent position is that higher education is relevant because it perpetuates national economic growth. Faculty members often view academics as relevant because it facilitates social and civic responsibility. However, there is little literature that explores the relevance that college students find in their academic experience. In this focus group study, fourteen students in a life skills class with varying majors, discussed and defined the construct of academic relevance from their perspective. The transcript of the focus group was analyzed using a qualitative coding methodology. Analysis of the data produced two distinct types of academic relevancy—direct and indirect. Each of these types of relevancy was

found to exist in three life dimensions: academics, occupation and personal development. Thus, participants found their academic experience to be relevant in six distinct ways. The results of this study lays the foundation for future quantitative studies that will further analyze this construct of academic relevancy. This is important because it will enable researchers to explore the extent to which academic relevancy has an effect on important constructs such as motivation, persistence, academic performance and psychological well-being.

### **Clinico-pathological Characterization of Newly Isolated Newcastle Disease Viruses from Dominican Republic, Belize and Peru**

Anna White

Dr. Corrie C. Brown, College of Veterinary Medicine, University of Georgia

Newcastle Disease Virus (NDV) is the causative agent of Newcastle Disease, a highly contagious and fatal poultry disease. The virus belongs to the family *Paramyxoviridae*, subfamily *Paramyxovirinae*, genus *Avulavirus*. New strains frequently arise, creating serious transboundary risks. Three NDV isolates from recent outbreaks in Peru (APMV1/poultry/Peru/1918-03/2008), the Dominican Republic (APMV1/chicken/Dominican Republic (Juan Lopez)/499-31/2008), and Belize (APMV1/chicken/Belize (Spanish Lookout)/4224-03/2008) were each characterized by phylogenetic analysis and clinico-pathological assessment. Complete sequencing of the F gene revealed that Peru and Dominican Republic isolates likely belong to a new genotype, while Belize is a member of NDV genotype V, which is commonly circulating within Central and North America. Intra-cerebral pathogenicity indices were 1.88, 1.78 and 1.75 respectively for DR, Peru and Belize. Experimentation was conducted by inoculating groups of 4-week-old, White Leghorn chickens via eye drops containing the three isolates. Subsequent to inoculation, birds were monitored clinically and euthanized sequentially. Tissues were collected for histopathological examination and immunohistochemistry for viral nucleoprotein.

Disease was severe in chickens inoculated with all the strains, with each chicken dying before four (Peru, Belize) and six days post-infection (DR), due to acute systemic illness, necrosis of lymphoid tissues and detection of nucleoprotein in multiple tissues.

### **Business Model Generation and Energy Informatics**

Tyler Williamson

Dr. Rick Watson, Department of Management Information Systems, University of Georgia

Sustainability needs to be tightly woven into the thinking of every senior executive if we are to develop a sustainable society. Furthermore, those businesses seeking to capitalize on "the Green Movement" must put sustainability at the forefront of all of their planning and product development. Our goal is to provide business leaders with an energy efficiency oriented framework to allow them to transform their organizations into sustainable enterprises. Through the review of existing literature and professional experiences, we have taken the business model generation canvas (Osterwalder & Pigneur, 2009) and developed a layer to stimulate Energy Informatics (Watson, Boudreau, & Chen, 2010) thinking. Business model generation is a technique to capture the essential features of an organization's business. It addresses such issues as value proposition, sources of costs and revenues, partnerships and customers in a concise and graphical manner. Osterwalder and Pigneur's book has quickly become an international best seller because the technique is powerful and collectively engaging. We have taken the business model generation canvas and created a group collaborative version on Cacao, which is web-based software for creating diagrams collaboratively. One of the features of Cacao is the ability to create layers, so we have augmented our initial two-layer model of a blank canvas and key questions with a layer containing questions to provoke Energy Informatics thinking within organizations. The resulting canvas will be made publicly available to advance the development of Green IS.

### **Diversity of Orchid Fungal Symbionts in Estonian Mine Tailings**

Samuel Willis

Dr. Richard Shefferson, Odum School of Ecology, University of Georgia

Nutrient and water availability are two key requirements of plant survival. Mycorrhizal symbioses help orchids subsist in areas with apparently low soil nutrients and water availability—in this case, Estonian mine tailings that contain little more than burnt oil soaked shale and ash. We extracted all DNA in soil samples taken from multiple sites in the mine tailings in both the summer and the fall. The sample size for summer was 25 and the sample size for the fall was 62. We carried out Polymerase Chain Reaction (PCR) on purified DNA samples, and performed gel electrophoresis and Restriction Fragment Length Polymorphism (RFLP) pattern determination. We then sequenced non-identical RFLP patterns and carried out Basic Local Alignment Search Tool (BLAST) searches to determine the organismal composition of the areas. We found 20 unique RFLP patterns for the fall samples and 12 unique RFLP patterns for the summer samples. The dominant organisms found were mycorrhizal fungi in families Thelephoraceae and Cortinariaceae. The overall diversity of mycorrhizal fungi determined by Shannon's Diversity Index shows that for the fall,  $H=2.33$ , and for the summer,  $H=1.84$ . This is higher than the mycorrhizal diversity in the Brazilian rainforest where  $H$  ranges from 1.2 to .87. This is important because although the fungi in the mine tailings only associate with orchids, it shows that mycorrhizal fungi in general may assist in reclaiming and restoring environmentally decimated locations such as mine tailings, landfills and other nutrient poor areas.

### **Smart Moves: Avoiding Common Investing Mistakes**

Munir Winkel

Dr. Swarn Chatterjee, Department of Housing & Consumer Economics, University of Georgia

For investors, the financial world can be overwhelming and confusing. Novice investors have little experience with financial markets. They often do not understand the implications of their actions when it comes to trading stocks, bonds, CDs, mutual funds or index funds. Worse, best-selling books, television hosts and internet articles often provide misleading or inaccurate advice, and investors fall prey to numerous psychological mistakes. We asked: "What mistakes do investors typically make" and "How can investors avoid making those mistakes?" To provide investors with scientific and understandable answers to those questions, we compiled and synthesized information from numerous scholarly articles and books. Based on our preliminary analysis, we found that investors trade stocks too frequently and have their profits unnecessarily eroded by commissions and taxes. The securities investors sell often outperform the securities they keep, and despite claims to the contrary, most investors fail at their attempts to "time the market." We also identified several psychological factors that negatively influence investor behavior, which include hindsight bias, projection bias and loss aversion. Based on our findings, beginning and experienced investors alike can gain confidence and learn which behaviors and trading strategies to avoid. Our findings will enable investors to avoid making costly investing mistakes.

### **Sexual Attitudes, Media Use and Norms: Sexually Explicit Media and Exposure Effects on Norm Distortion**

Courtney Witt

Dr. Tom Reichert, Grady College of Journalism & Mass Communications, University of Georgia

This study sought to explore the relationships between two personality variables (sexual self-schema, sensation seeking), consumption of media with both light (e.g., Maxim magazine) and heavy (e.g., pornographic websites) sexual content, and respondents' perceptions of social

sexual norms. Both personality variables are related to a variety of sexual attitudes and behaviors, and therefore should predict exposure to sexual media. Additionally, a link has been shown to exist between pornography use and distorted perceptions of sexual practices (e.g., infidelity, group sex), such that sexual media use should be positively associated with estimates of sexual normative behavior. With this literature and these concepts as guides, an extensive online survey was developed that measured both personality concepts, sexual media exposure, and a range of sexual practices. Participants (N = 314), consisting of a convenience sample of female and male undergraduates at the University of Georgia, completed the survey with anonymity. Although the analyses are not yet complete, preliminary results suggest that both personality variables are related to sexual media use. More important, both variables and sexual media use are linked to inflated perceptions of sexual behavioral norms, such that participants who score high on these variables also perceive sexual activity to be at higher levels than participants with low scores. These findings are important because they show that exposure to sexually explicit media, even that which appears in popular magazines and network television, can influence perceptions about sexual practices that may ultimately influence behavioral expectations and outcomes.

### **Increasing Enrollment of Eligible Children in Georgia's Medicaid and CHIP Programs**

Abby Wong, Roosevelt @ UGA

Dr. Angela Fertig, Department of Public Administration & Policy, University of Georgia

In 2010, approximately 193,000 children in the state of Georgia were eligible for either Georgia's Medicaid or CHIP program, PeachCare for Kids, but were not enrolled. The state of Georgia has an obligation under the newly implemented provisions of the Patient Protection and Affordable Care Act (PPACA) and the Children's Health Insurance Program Reauthorization Act of 2009 (CHIPRA) to increase the take-up of children into Medicaid and PeachCare for Kids. The objective of this research is to compare various policy alternatives for the implementation of a more

rigorous enrollment program in Georgia. Through a comparative analysis of three policy alternatives currently being employed in other states, Express Lane Eligibility (ELE) is found to be the best policy option for the state of Georgia based on three criteria: cost, implementation feasibility and enrollment increases. Specifically, the Georgia Department of Human Services, through the authority granted to state Medicaid and CHIP agencies under Sec. 203 of CHIPRA, should utilize eligibility verification from other public programs, such as Supplemental Nutrition Assistance Program (SNAP), for Georgia's Medicaid and CHIP applicants. Enrollment increases will afford low-income children access to primary care physicians and preventative services that will not only avert the development of costly, chronic illnesses in the long-term, but also preempt the incurrence of high, uncompensated health care costs for the state of Georgia in the short-term.

### **Representations of the East German Secret Police in Contemporary German Literature**

Laura Wynn, CURO Scholar

Dr. Martin Kagel, Department of Germanic & Slavic Studies, University of Georgia

The East German Secret police have long intrigued people because of their secrecy and the way in which they pervaded the lives of East Germans. It was estimated that at the end of the 1980's more than one in seven East Germans was either employed by the East German Secret Police or was asked, cajoled or coerced into becoming a confidential informant. The stories of how the Stasi, as they were commonly known, ruined the lives of normal citizens seeking a way to voice their opinions has become infamous worldwide, and many memoirs and journalistic pieces have delved into these issues. In her novel *Heute wär ich mir lieber nicht begegnet (The Appointment)*, Nobel-prize winning novelist Herta and Paul Amirian looks deeper into the impact that the secret police in the eastern bloc had on its citizens. The novel, which has heretofore been largely ignored in favor of her more overtly political works, follows a woman whose appointments with the Secret Police in Romania demonstrate the

Stasi's ability to trap citizens without having to physically imprison them. The role that literature plays in adding to the discussion of the secret police in the Eastern Bloc is one of showing the confusion and terror that accompanied the lives of those who dared to oppose the strict rules of the communist regime. It is through literature that the Stasi come alive, not merely as a government bureaucracy, but as a living being which lay at the heart of East Germany.

### **Sanctity as a Means of Conservation: Tongariro National Park, New Zealand**

Allegra Yeley

Dr. Fausto Sarmiento, Department of  
Geography, University of Georgia

Thousands of mountains across the world are sacred to many religions and societies. Additionally, mountains contain natural resources that sustain millions. Because these landscapes are spiritually significant one may assume that their protection is guaranteed. However, anthropogenic activity endangers both the natural and cultural aspects of mountain environments. In New Zealand, the Māori term for "sacred mountain" is *maunga tapu*. Tongariro National Park (TNP) is located on the North Island of New Zealand and is home to the sacred peaks Tongariro, Ngauruhoe and Ruapehu. In 1887, TNP became the first national park in New Zealand. In 1990, it was designated a UNESCO World Heritage Site. The sacred mountains are a popular tourist destination and an important source of drinking water and geothermal energy. I examined Māori and Pākehā (non-Māori) conservation methods and the effect of the mountains' spiritual significance on conservation practices in TNP, which is evident in the park's very existence. The park was created because the mountains were sacred and has protected them for 124 years. My methods consisted of literature review and interviews with academics and scientists in New Zealand. I found that Māori tribes, scientists and other actors are concerned with the high level of tourist traffic in TNP, which may harm the ecosystem and sacred sites. Although the mountains may be sacred only to Māori, clearly labeling them "sacred" may persuade others to respect the sanctity of the environment. Effective conservation in TNP will rely upon equal

consideration of economic, environmental and spiritual factors.

### **Exploring the Life and Technique of Michael Chekhov**

Jacob Young, CURO Summer Fellow

Prof. George Contini, Department of Drama &  
Theatre, University of Georgia

Michael Chekhov was a Russian actor and theatre theorist who lived during the early 1900s. His technique placed more emphasis on the actor's use of imagination and physicality than the naturalistic theatre of his day. Because of this difference, he was marked as a revolutionary mystic by the Russian government and was forced to flee the country to save his life. He traveled across Europe and finally fled to the United States. He died leaving behind only two autobiographies in Russian and a single training manual. The purpose of this research is to present the history of Michael Chekhov and his acting technique in the style of a solo performance. The performance will explore Chekhov's method of teaching as well as his method of acting, focusing specifically on the use of gesture to create and develop a character. Research has been gathered abroad at the international Michael Chekhov workshop in Windsor, Ontario, under the instruction of experts in Michael Chekhov's system of acting, including his last living student. Additional research was conducted in the Michael Chekhov archives of Windsor University. The results of the research are in mid-creation. The production is currently half-way written and is entering the rehearsal process now. The goal of the performance is to use a study of Chekhov's growth to show us how theatre allows people to grow themselves. This project revolves around the art of theatre and addresses its significance in our current era.

### **An Analysis of Green Buildings: Comparing Tsinghua University's Sino-Italian Ecological and Energy-Efficient Building and UGA's new Odum School of Ecology Building**

Sheena Zhang

Dr. Laurie Fowler, Odum School of Ecology,  
University of Georgia

China has recently surpassed the United States as the highest emitter of carbon dioxide. In both countries, approximately 30% of total greenhouse gas emissions and nearly 40% of total energy consumption are due to the built environment (i.e. buildings and infrastructure). Because China's energy structure is coal-based, the rapid rate of urbanization and demand for new construction has resulted in significant environmental and public health effects. By improving energy efficiency in buildings, carbon emissions can be reduced by up to 22%. This study focuses on two green buildings—the Sino-Italian Ecological and Energy-efficient Building at Tsinghua University in Beijing and the Odum School of Ecology Living Building at the University of Georgia in Athens, GA. Green buildings in the public sector were selected for analysis because universities are at the forefront of the green building industry. Interviews with project managers, university administration, architects, and green building consultants were conducted, in addition to literature research to compare the two buildings and green building industries in China and the United States. Through comparison of the two buildings, insight will be gained into understanding how to overcome barriers to the further growth of the green building industry in these two countries. By addressing obstacles in the green building industry, green buildings can become the standard of building construction and have a reduced impact on climate change, the environment and public health.

### **Glare Disability, Photostress Recovery and Chromatic Contrast in Relation to Retinal Lutein and Zeaxanthin**

Quincy Zhong

Dr. Billy Hammond, Department of Psychology,  
University of Georgia

Disability due to glare and recovery from photostress are particular problems for people with eye disease and for the elderly in general. Chromatic sensitivity is also affected by glare, due to color unsaturation by bright light, which can decrease the quality of images by obscuring borders. Previous studies have shown that dietary carotenoids, such as lutein and zeaxanthin, are linked to macular health. Recent data has also shown that preventing short wave light from hitting foveal cones results in improved glare disability, photostress recovery and contrast sensitivity. In this study we measured the macular pigment densities of 150 subjects, ages 21-40, using a standardized psychophysical technique. Glare disability, photostress recovery and contrast sensitivity were measured in Maxwellian view, where a real image of a light source is directly focused on the pupil, using a broadband xenon light source. Our results indicated that macular pigment density was significantly related to glare disability ( $p < 0.0015$ ), photostress recovery times ( $p < 0.01$ ) and contrast sensitivity ( $p < 0.00005$ ). These results confirm earlier reports of a strong relation between variation in retinal carotenoid concentrations and many aspects of visual function.

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