

*The Honors Program's  
Center for Undergraduate Research Opportunities*



*CURO*

Center for Undergraduate Research Opportunities

2010 Symposium  
Program and Abstracts

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Athens, GA 30602  
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# *CURO 2011 Symposium Call for Abstracts*

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## Symposium 2011

Classic Center  
Athens, Georgia  
Monday, April 4, 2011

### CALL FOR ABSTRACTS

The Center for Undergraduate Research Opportunities at the University of Georgia provides a forum for undergraduates with a 3.4 GPA or who participate in a university-wide research program to present original research and creative works sponsored by faculty members. Undergraduate students from all disciplines are encouraged to participate. Representatives of public and private higher education institutions in Georgia are encouraged to apply.

Scholarly presentations may be in the form of an oral presentation, poster session, exhibition, performance, or work of art. Students can also present a tutorial about a research methodology or new technology. Undergraduate researchers who are at various stages of the research process are encouraged to submit abstracts describing where they are in the research process and the issues they face. Honors thesis students can also present in a Roundtable Forum. The Roundtables offer undergraduates pursuing an Honors thesis the opportunity to present their research to other thesis students working in the same discipline. Those who wish to present their work should submit an application and an abstract of a maximum of 250 words no later than **January 21, 2011** and a brief supporting letter from the sponsoring faculty member no later than **January 30, 2011** via the CURO web site. Group research projects should be submitted with one application and one letter of faculty support. All abstracts will receive graduate student peer review and feedback. All participants accepted into the Symposium will be notified by February 12, 2011, and their abstracts will be published in a book of abstracts. Sponsoring faculty are invited to preside at their students' sessions.

#### **Best Paper Awards**

Papers on work being presented at the CURO Symposium submitted by February 26, 2011 will be considered for Best Paper awards in the categories of humanities, social sciences, civic responsibility focus, international focus, and sciences. Papers must be submitted electronically to [curo@uga.edu](mailto:curo@uga.edu). Maximum length is 12 pages, double spaced, excluding references and appendices.

#### **Purposes of the Symposium:**

- To highlight excellence in research by undergraduate students
- To enrich the undergraduate experience by promoting communication and cooperation between faculty and students
- To provide a forum for undergraduates to communicate and disseminate their research findings and creative works
- To provide an opportunity for undergraduate researchers in the state of Georgia to engage with their peer researchers

#### **Criteria for Selection:**

- Originality and quality of research
- Quality of written abstract
- Ethical and responsible research
- 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.
- Letter of support from supervising faculty

This event will be free and open to the public. All interested faculty and students are encouraged to attend the CURO 2011 Symposium. Free parking will be available at the Classic Center. Free UGA bus transportation will be available from specified locations. For more information, contact [curo@uga.edu](mailto:curo@uga.edu), (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.

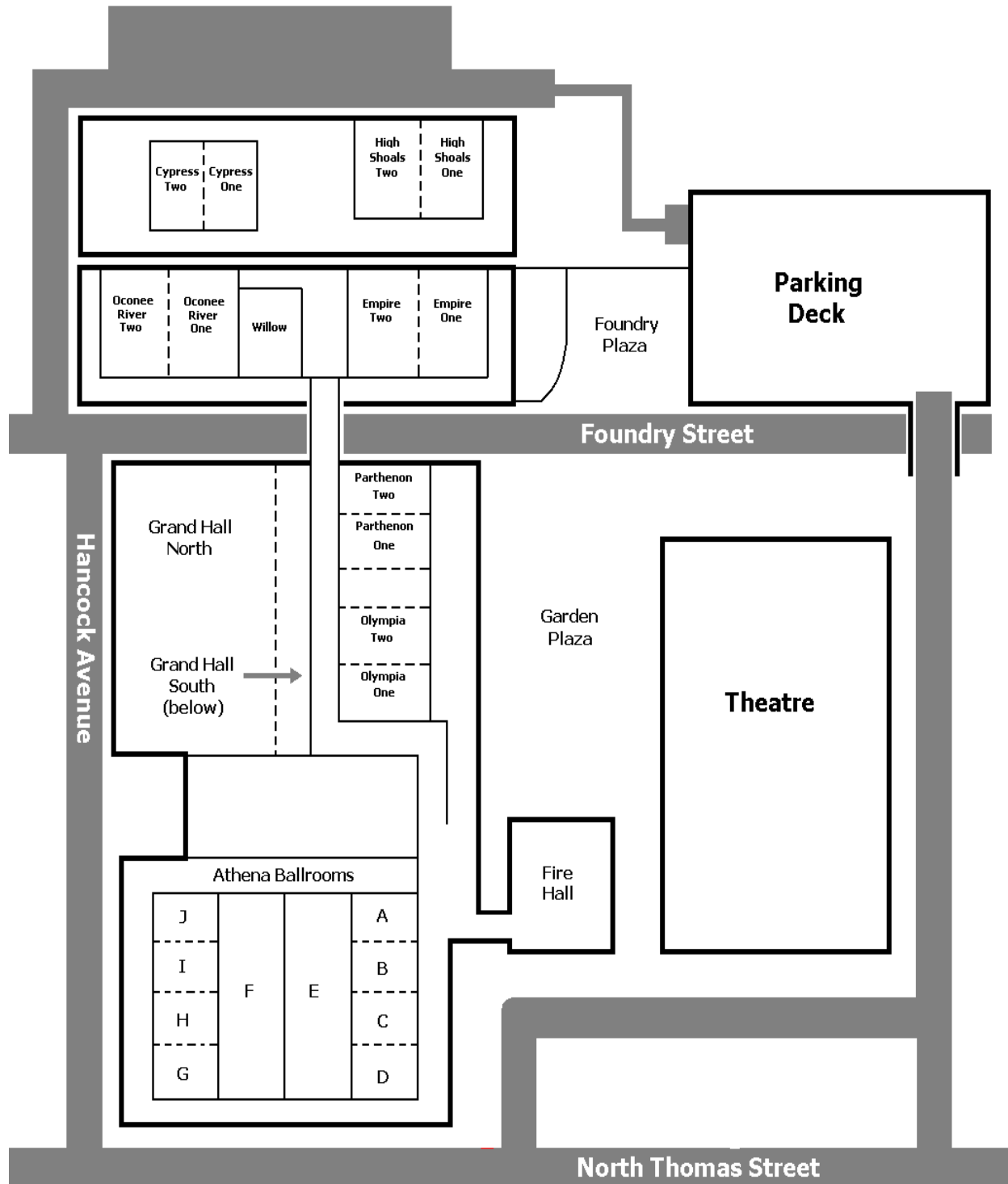
Additionally, work submitted to JURRO@GA must adhere to the following guidelines:

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 JURRO@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). JURRO@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 JURRO 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, March 29, 2010

<b>Begin registration of oral and poster 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, I	<b>12:20 p.m.</b>
<b>Concurrent Oral Sessions</b> Classic Center, Athena Breakout Rooms A, C, D, I, 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>Welcome and Opening Session</b> Classic Center, Athena Ballroom E	<b>4:00 p.m.</b> <b>Dr. David S. Williams</b> Director, Honors Program <b>Professor Jere W. Morehead</b> Senior Vice President for Academic Affairs and Provost
<b>Recognition of CURO Promising Scholars</b>	<b>Dr. Pamela B. Kleiber</b> Associate Director, Honors Program
<b>Introduction of Keynote Speaker</b>	<b>Matthew Sellers</b> Managing Editor, JURO 2009 CURO Summer Research Fellow English and Chemistry, 2012
<b>Keynote Address: <i>Conservation and the Global Search for Sustainability</i></b>	<b>Dr. Peter Brosius</b> Professor, Department of Anthropology Director, Center for Integrative Conservation Research
<b>Announcement of Excellence in Undergraduate Research Mentoring Award</b>	<b>Dr. David C. Lee</b> Vice President for Research

## *∞ Symposium At-A-Glance ∞*

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**Poster Session, Science as Art & Visual Art Exhibit** 5:00 p.m.  
Classic Center, Grand Hall South (downstairs)

**CURO Apprentice & Promising Scholars' Dinner** 6:15 p.m.  
Classic Center, Olympia Room

**Announcement of CURO Summer Research  
Fellows, CURO Scholars, UGA Libraries  
Undergraduate Research Awards, and  
Best Paper Awards** 6:15 p.m.  
Classic Center, Parthenon Room

**Dr. Pamela B. Kleiber**  
Associate Director, Honors Program  
**Ms. Caroline Barratt**  
Director, Miller Learning Center Library Commons  
**Ms. Deborah Dietzler**  
Executive Director, UGA Alumni Association

## *Program*

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**Monday, March 29, 2010**

### **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>Matt Sellers</b> Faculty Mentor	The Significance of Spiritual Experience in Robert Penn Warren's Poetry Dr. Hugh Ruppensburg, Department of English
	<b>Alexander Brown</b> Faculty Mentor	On a Generalization of the Frobenius Problem Dr. Dino Lorenzini, Department of Mathematics
	<b>Dillon Horne</b> Faculty Mentor	A Study of Predictive Modes of Thought with a Focus on Religion, Astrology, and Probability Theory Dr. Thomas Cerbu, Department of Comparative Literature
<b>Room B</b>	<b>Michael Slade</b> Faculty Mentor	Dialectic in Late Plato Dr. Frank Harrison, Department of Philosophy
	<b>Sarah Quinn</b> Faculty Mentor	Imagination and Institution: The Effects of Surrealism and Catholicism on the Work of Oscar Dominguez Dr. Janice Simon, Department of Art History
	<b>Jared La Croix</b> Faculty Mentor	The Old Made New: The Life and Work of Art Rosenbaum Dr. Robert Pratt, Department of History
<b>Room C</b>	<b>Sara Day</b> Faculty Mentor	Digital Proliferation: Discerning New Literary Genres Spawned by Digital Technology Dr. Elizabeth Davis, Department of English
	<b>Richard McKelvey</b> Faculty Mentor	The Skeleton Keyhole Prof. Andrew Zawacki, Department of English
	<b>Daniel Cellucci</b> Faculty Mentor	Remote Sensing as a Generative Tool in the Creation of Fine Art Prof. R. G. Brown, Department of Sculpture, Studio Foundations
<b>Room D</b>	<b>Lucas Puente</b> Faculty Mentor	Castro as a Capitalist: The Role of Foreign Investment in Cuba Dr. Maurits van der Veen, Department of International Affairs
	<b>Archil Japaridze</b> Faculty Mentor	Abandon Hope All Ye Who Enter: The Solution to the Cartel Crisis in Mexico Dr. Sergio Quesada, Department of Latin American and Caribbean Studies
	<b>John Seewoester</b> Faculty Mentor	Second Chances: Establishing an Administrative Expungement Procedure Dr. Ed Risler, School of Social Work

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<b>Room G</b>	<b>Ilana McQuinn</b>	Repression, Literature, and the Growth and Metamorphosis of Czech National Identity in the 20th Century
	Faculty Mentor	Dr. John Morrow, Department of History
	<b>David Malison</b>	Separate but not Equal: An Analysis of Segregation and Inequality in Georgia Public Schools
	Faculty Mentor	Dr. David Mustard, Department of Economics
	<b>JoyEllen Freeman</b>	Patriotism and Protest in Georgia's Civil Rights Movement: The 1971 Columbus Policemen's Strike
	Faculty Mentor	Dr. Barbara McCaskill, Department of English
<b>Room H</b>	<b>Jessica Alcorn</b>	Television News Coverage of the 2010 Tea Party: A Niche for Everyone?
	Faculty Mentor	Dr. Audrey Haynes, Department of Political Science
	<b>Katherine Cherry</b>	The Reinstatement of the USIA: Combating the Threat of Anti-Americanism in the Post 9/11 World
	Faculty Mentor	Dr. Howard Wiarda, Department of International Affairs
	<b>Bridget Mailley</b>	Answering the Call for Equity, Relevance, and Inclusion: Rethinking the Role of the Disciplinary Alternative Education in the Savannah-Chatham County Public School System
	Faculty Mentor	Dr. Amy Ross, Department of Geography
<b>Room J</b>	<b>Rebecca Kopp</b>	Effects of Social Institutions on Adolescent Alcohol Use
	Faculty Mentor	Dr. Thomas McNulty, Department of Sociology
	<b>Michael Thomas</b>	Breaking the Rules: A Qualitative Study of Academic Dishonesty at the University of Georgia
	Faculty Mentor	Dr. Mark Cooney, Department of Sociology
	<b>Mallory Roman</b>	The Importance of Peer Approval in the Sartorial Purchasing Patterns of University of Georgia Students
	Faculty Mentor	Dr. Katalin Medvedev, Department of Textiles, Merchandising & Interiors

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

Classic Center, Parthenon Room

<b>Table 1</b>	<b>Caroline Colden</b>	The Temporal Distribution of the Vesticular Stomatitis Virus in Experimentally Infected Cattle: An Immunohistochemical Study
	Faculty Mentor	Dr. Corrie Brown, Department of Pathology
	<b>Natasha Lee</b>	Complementation of Chromosomal Deletions in Mycobacteria
	Faculty Mentor	Dr. Russ Karls, Department of Infectious Diseases

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	<b>Jonathon Nolen</b>	Examination of Resuscitation-Promoting Factors in Potential Fish Pathogens in <i>Mycobacterium shottsii</i> and <i>M. pseudoshottsii</i>
	Faculty Mentor	Dr. Russ Karls, Department of Infectious Diseases
	<b>Margaret McDougal</b>	PAX6 Mutation Screen
	Faculty Mentor	Dr. James Lauderdale, Department of Cellular Biology
<b>Table 2</b>	<b>Marcus Hines</b>	Analyzing the Function of O-GlcNAc in the <i>Drosophila</i> Nervous System
	Faculty Mentor	Dr. Michael Tiemeyer, Department of Biochemistry & Molecular Biology
	<b>Susan Klodnicki</b>	Pediatric Seizures in Larval Zebrafish
	Faculty Mentor	Dr. James Lauderdale, Department of Cellular Biology
	<b>Lindel Krige</b>	Coagulation Factors Involved in the Pathology of Placental Malaria
	Faculty Mentors	Dr. Julie Moore, Department of Infectious Diseases
<b>Table 3</b>	<b>Sook Kyung Yoon</b>	The Effect of Online Communication and Social Support on Positive Emotion and Health Outcomes in Individuals Treated with Ileoanal Reservoir Surgery
	Faculty Mentor	Dr. Kimberly Clay, School of Social Work
	<b>Rebecca Feistritzer</b>	The Effects of Stress-Induced Analgesia and Peripherally-Administered Cannabinoid Receptor Antagonists on Formalin-Induced Pain Behavior
	Faculty Mentor	Dr. Andrea Hohmann, Department of Psychology
	<b>Manouela Valtcheva</b>	Brain Activity Analysis of Good and Poor Performers During Inhibitory Eye Movements
	Faculty Mentor	Dr. Jennifer McDowell, Department of Psychology
<b>Table 4</b>	<b>Ellyn Echols</b>	Inclusionary Zoning: Promoting Affordable Housing in the Southeastern United States
	Faculty Mentor	Dr. Andrew Carswell, Department of Housing & Consumer Economics
	<b>Kathryn McCabe</b>	Increasing Personal Finance Education in Athens-Clarke County High Schools
	Faculty Mentor	Dr. Michael Rupured, Department of Housing & Consumer Economics
	<b>Carolyn Crist</b>	Teaching Journalists to Cover Poverty: The Where, Why, and How
	Faculty Mentor	Prof. John Greenman, Department of Journalism

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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>Matthew Sellers</b> Faculty Mentor	Here and Queer: Creating Equal Protection for LGBTQ Students in Georgia Public High Schools Dr. Robert Hill, Department of Lifelong Education, Administration & Policy
	<b>Katie Deray</b> Faculty Mentor	Karma in America: The Rebirth of the Male Adolescent Indian into the American Hip-Hop Subculture Dr. Katalin Medvedev, Department of Textiles, Merchandising, & Interiors
	<b>Trenton Mize, Tré Myers</b> Faculty Mentor	Racial and Skin Tone Differences in Facial Thermography and Self-Reported Emotion in Response to Visual Stimuli Dr. Dawn Robinson, Department of Sociology
<b>Room B</b>	<b>Jenny Brickman</b> Faculty Mentor	Not So Pretty: The Need for Cosmetics Regulation Reform Dr. Jeffrey Fisher, Department of Environmental Health Sciences
	<b>Christine Akoh</b> Faculty Mentor	Effect of Cation Chelators on Biofilm Formation in a Prolific Versus Non Prolific Biofilm Forming Strain of <i>Listeria monocytogenes</i> Dr. Joseph Frank, Department of Food Science & Technology
	<b>Chris Harding</b> Faculty Mentor	Conjugal Transfer of Virulence in the Opportunistic Intracellular Actinomycete <i>Rhodococcus equi</i> Dr. Mary Hondalus, Department of Infectious Diseases
<b>Room C</b>	<b>Kema Hodge</b> Faculty Mentor	Trends in Reporting Sustainability Actions Dr. Richard Watson, Department of Management Information Systems
	<b>Juliet Allan</b> Faculty Mentor	Designing an Efficient and Effective Cap-and-Trade System Dr. Jeff Mullen, Department of Agricultural & Applied Economics
	<b>Emily Pierce</b> Faculty Mentor	The Genetic Alteration of Soybean to Promote the Production of Astaxanthin Dr. Wayne Parrott, Department of Crop & Soil Sciences
<b>Room D</b>	<b>Paul Moon</b> Faculty Mentors	The Local Weather: The Effects of Construal Level and Weather Self-Control Dr. Michelle vanDellen, Department of Psychology

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	<b>Andrea Borders, Blair Morton, Erin Gilstrap, Lauren Heard</b> Faculty Mentor	The Impact of Single-Parents and Their Disciplinary Strategies on Childhood Aggression  Dr. Tsu-Ming Chiang, Department of Psychology, Georgia College & State University
	<b>Amanda McKenley</b>  Faculty Mentor	Children's Attachment Security and Mothers' Separation Anxiety Dr. Hui-Chin Hsu, Department of Child & Family Development
<b>Room G</b>	<b>Bryn Murphy</b>  Faculty Mentor	Keeping PACE: Clean Energy Financing for Athens-Clarke County Dr. Andrew Carswell, Department of Housing & Consumer Economics
	<b>Christy Boudreau</b>  Faculty Mentor	Feeding the Energy Supply: The Market for Biodiesel in Costa Rica Dr. Rebecca Moore, Warnell School of Forestry & Natural Resources
	<b>Saptarsi Mukhopadhyay</b> Faculty Mentor	Energy Efficiency Funding in Athens-Clarke County  Dr. Tyra Byers, Odum School of Ecology
<b>Room H</b>	<b>Connor McCarthy, Robert Thrasher</b> Faculty Mentor	The Effect of Political and Economic Shifts on Private Charitable Giving Dr. David Mustard, Department of Economics
	<b>Stephen Earnest</b>  Faculty Mentor	The Medical Malpractice Crisis: A Proposed Radical Solution Prof. Thomas Eaton, School of Law
	<b>Ryan Prior</b> Faculty Mentor	Humanities in Medicine Dr. Katarzyana Jerzak, Department of Comparative Literature
<b>Room J</b>	<b>Harrison Grace</b>  Faculty Mentor	Exploring the Mechanisms of Neuron Specific Glycosylation in Embryonic <i>Drosophila melanogaster</i> Dr. Michael Tiemeyer, Department of Biochemistry & Molecular Biology
	<b>Rebecca Feistritzer</b>  Faculty Mentor	The Effects of Stress-Induced Analgesia and Peripherally-Administered Cannabinoid Receptor Antagonists on Formalin-Induced Pain Behavior Dr. Andrea Hohmann, Department of Psychology
	<b>Margaret McDougal</b> Faculty Mentor	PAX6 Mutation Screen Dr. James Lauderdale, Department of Cellular Biology

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

Classic Center, Parthenon Room

<b>Table 1</b>	<b>Amar Mirza</b> Faculty Mentor	A Tail's Tale: ErbB Structure, Evolution, and Function Dr. Natarajan Kannan, Department of Biochemistry & Molecular Biology
	<b>Shannon Cummins</b>  Faculty Mentor	Diminution of Concentrative Nucleoside Transporter 1 (CNT1) Activity in Human Ovarian Cancer Cells: Subtype-Dependent Gemcitabine Response to Exogenously Expressed hCNT1 Dr. Rajgopal Govindarajan, Department of Pharmaceutical & Biomedical Sciences
	<b>Yu Taniguchi</b> Faculty Mentor	DNA Methylation Related to Cancer Dr. Shaying Zhao, Department of Biochemistry & Molecular Biology
<b>Table 2</b>	<b>Joe Reynolds</b>  Faculty Mentor	Spiritual Life: Self-Transformation in the Ancient and Modern World Dr. Frank Harrison, Department of Philosophy
	<b>Josephine Kwon</b> Faculty Mentor	Public Views of Biculturalism Dr. Victoria Plaut, Department of Psychology
	<b>Mary Boyce Hicks</b>  Faculty Mentor	Gov. James McDowell and the Virginia Slavery Debate of 1831-1832 Dr. John Inscoe, Department of History
	<b>Laura McDonald</b> Faculty Mentor	A New Definition of Treason: The 1794 Treason Trials Dr. Kirk Willis, Department of History
<b>Table 3</b>	<b>Rebecca Faulkner</b>  Faculty Mentor	The Perfect Man: Reconstructing the Self Through the Prose and Poetry of Muhammad Iqbal Dr. Max Reinhart, Department of Germanic & Slavic Languages
	<b>Richard McKelvey</b> Faculty Mentor	The Skeleton Keyhole Prof. Andrew Zawacki, Department of English
	<b>Michael Slade</b> Faculty Mentor	Dialectic in Late Plato Dr. Frank Harrison, Department of Philosophy
	<b>Ilana McQuinn</b>  Faculty Mentor	Repression, Literature, and the Growth and Metamorphosis of Czech National Identity in the 20th Century Dr. John Morrow, Department of History
<b>Table 4</b>	<b>David Malison</b>  Faculty Mentor	Separate but not Equal: An Analysis of Segregation and Inequality in Georgia Public Schools Dr. David Mustard, Department of Economics

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	<b>Jeremy Akin</b>	Demystifying the Conflict Culture: Understanding the Effects of Zero Tolerance on Students in a Georgia Disciplinary Alternative Education Program
	Faculty Mentor	Dr. Larry Nackerud, School of Social Work
	<b>Rebecca Kopp</b>	Effects of Social Institutions on Adolescent Alcohol Use
	Faculty Mentor	Dr. Thomas McNulty, Department of Sociology
	<b>Emily Baggett</b>	Familial Predictors of Young Adult Romantic Relationship Functioning: A Closer Look at Boundary Dissolution
	Faculty Mentor	Dr. Anne Shaffer, Department of Psychology
<b>Table 5</b>	<b>Sharon McCoy</b>	The Success of Recent U.S. Foreign Policy in Latin America
	Faculty Mentor	Dr. Loch Johnson, Department of International Affairs
	<b>Ashley Doliber</b>	Somalia: Recommendations for Conflict Resolution Where Failure is the Norm
	Faculty Mentor	Dr. Jaroslav Tir, Department of International Affairs

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

Classic Center, Athena Breakout Rooms A, B, I

<b>Room A</b>	<b>Charles Ginn</b>	Charting the Legacy of Southern Womanhood in Southern Gothic Fiction
	Faculty Mentor	Dr. Hugh Ruppensburg, Department of English
	<b>Caylee Bale</b>	I Do, but I Don't: The Politics of Dress in Gay and Lesbian Commitment Ceremonies in the United States
	Faculty Mentor	Dr. Katalin Medvedev, Department of Department of Textiles, Merchandising & Interiors
	<b>Matthew Glass</b>	Deterministic Assumptions of Positive Freedom
	Faculty Mentor	Dr. Daniel Kapust, Department of Political Science
<b>Room B</b>	<b>Patrick Smith</b>	The Long Road to Zero: U.S. Declaratory Policy and Nonproliferation
	Faculty Mentor	Dr. Dmitriy Nikonov, Center for International Trade & Security
	<b>Joe Reynolds</b>	Spiritual Life: Self-Transformation in the Ancient and Modern World
	Faculty Mentors	Dr. Frank Harrison, Department of Philosophy
	<b>Tony Pelli</b>	Reining in the Drone Wars: Creating Criteria for the C.I.A. Drone Program in Pakistan
	Faculty Mentor	Dr. Fred Manget, Department of International Affairs
<b>Room I</b>	<b>Corbin Busby</b>	The Abandonment of Truth: Imaging Brad Pitt as a Celebrity Hero
	Faculty Mentor	Prof. Isabelle Wallace, Department of Art History

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**Joshua Dunn**  
Faculty Mentor      The Youth of Roswell Voices  
Dr. William Kretzschmar, Department of Linguistics

**Jane Rowden**  
Faculty Mentor      Writing in Conversation with the Traditional Narratives of  
Journey  
Prof. Reginald McKnight, Department of English

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

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

**Room A**      **Charles Blackburn**      Femininity, Freakishness, and Despair in the Novels of Harry  
Crews  
Faculty Mentor      Dr. Hugh Ruppensburg, Department of English

**Jill Moore**  
Faculty Mentor      Queens of Scream: The Making of Horror Film Heroines  
Dr. Katalin Medvedev, Institute for Women's Studies

**Julia Carpenter**  
Faculty Mentor      One Heart Flaming More than All the Rest: Considering  
Biography When Reading the Poetry of Lady Mary Wroth  
Dr. Fran Teague, Department of English

**Room C**      **Joe Fang**      Determination of Interferon Sensitivity of Wild-Type and  
Lab-Adapted Rabies Viruses  
Faculty Mentor      Dr. Zhen Fu, Department of Pathology

**Amanda Brouillette**  
Faculty Mentor      Time Resolved Photoelectron Spectroscopy and the  
Photoprotective Properties of Adenine  
Dr. Susanne Ullrich, Department of Physics & Astronomy

**Ammarah Mahmud**  
Faculty Mentor      Harboring an Ancient Killer: Restructuring Malaria Control in  
Nigeria  
Dr. Christopher Whalen, Department of Epidemiology

**Room D**      **Chadwick Peltier**      The Mixed Model of National Power and the Power Parity  
Between the United States and China  
Faculty Mentor      Dr. Brock Tessman, Department of International Affairs

**Aaron Sayama**  
Faculty Mentor      The Ties That Bind: How the Notion of Strategic Culture and  
Technological Advances Affect China and U.S. Perception  
Dr. Seema Gahlaut, Center for International Trade & Security

**Bethany McCain,  
Christopher Looft**  
Faculty Mentor      The Elemental Problem in Grand Strategy: A Principle  
Model of Analysis  
Dr. Brock Tessman, Department of International Affairs

**Room G**      **Nathaniel Edwards**      Civilian-Oriented Preparedness for Radiological Terrorism  
Faculty Mentor      Dr. Dmitriy Nikonov, Center for International Trade & Security

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	<b>Shayna Pollock</b>	Forbidden Fruit: Reforming the Penalties for the Importation and Distribution of Contaminated Produce
	Faculty Mentor	Dr. Lewell Gunter, Department of Agricultural & Applied Economics
	<b>Caroline Colden</b>	The Temporal Distribution of the Vesicular Stomatitis Virus in Experimentally Infected Cattle: An Immunohistochemical Study
	Faculty Mentor	Dr. Corrie Brown, Department of Pathology
<b>Room H</b>	<b>Kathryn McCabe</b>	Increasing Personal Finance Education in Athens-Clarke County High Schools
	Faculty Mentor	Prof. Michael Rupured, Department of Housing & Consumer Economics
	<b>Ellyn Echols</b>	Affordable Housing in Athens-Clarke County: A Two-Pronged Approach
	Faculty Mentor	Dr. Russell James, Department of Housing & Consumer Economics
	<b>Shanell Davis</b>	Constructed Wetlands and Southeast Waste Water Treatment Policy
	Faculty Mentor	Dr. Ronald Carroll, Odum School of Ecology
<b>Room I</b>	<b>Joseph Rimando</b>	Respiratory Syncytial Virus G Protein Heparin-Binding Domain Interaction with Cell Surface Glycosaminoglycans Facilitate CX3C Chemokine Receptor Mimicry
	Faculty Mentor	Dr. Ralph Tripp, Department of Infectious Diseases
	<b>Steve Hsieh</b>	Generation of a Mutant Core Streptavidin for Complexation with and Crystallization of Biotinylated Membrane Proteins
	Faculty Mentor	Dr. Raquel Lieberman, Department of Chemistry & Biochemistry, Georgia Institute of Technology
	<b>Sambita Basu</b>	Optimization of Techniques for Identification and Analysis of N-Linked Glycans Derived from Various Glycoprotein Mixtures
	Faculty Mentor	Dr. Michael Pierce, Department of Biochemistry & Molecular Biology
<b>Room J</b>	<b>Thomas Bailey</b>	Corpus-Based Analysis of Other-Directedness in Japanese
	Faculty Mentor	Dr. William Kretzschmar, Department of Linguistics
	<b>Kathryn Camp</b>	A Georgia High School and Technical College Dual Degree Program
	Faculty Mentor	Dr. John Schell, Department of Workforce Education, Leadership & Social Foundations
	<b>Elisabeth Bentley</b>	Open Textbooks and the Innovation of Education
	Faculty Mentor	Dr. Richard Watson, Department of Management Information Systems

## Program

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### 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>Krelin Naidu</b>	Epigenetic Effects of Bromate on p21 and Histone-2AX Expression in HEK293 Cells Dr. Brian Cummings, Department of Pharmacology & Toxicology
	Faculty Mentor	
	<b>Malin Dartnell, Shanell Davis</b>	Using the Public Value Mapping Model to Evaluate Groundwater Mining Dr. Barry Bozeman, Department of Public Administration & Policy
	Faculty Mentor	
<b>Room B</b>	<b>Leah Prestwood, Kiara Jones, Evin Winkelman</b>	The Impact of Speech Impairment on Head Start Children's Social Emotional Competence Dr. Tsu-Ming Chiang, Department of Psychology, Georgia College & State University
	<b>Valerie Bidwell</b>	Preschoolers' Understanding of Arrows as Directional Indicators Dr. Janet Frick, Department of Psychology
	Faculty Mentor	
	<b>Juliet Allan</b>	Building a Baby College in Athens-Clarke County Dr. Diane Bales, Department of Child & Family Development
	Faculty Mentor	
	<b>Meaghan Kelly, Kristina Housworth, Robert Gentry</b>	The Impact of Reading One-on-One to Head Start Children Dr. Tsu-Ming Chiang, Department of Psychology, Georgia College & State University
	Faculty Mentor	
<b>Room C</b>	<b>Jonathan Lee</b>	Renewable Biomass and Georgia: A Legislative Update Dr. Robert Izlar, Center for Forest Business
	<b>Rene Cieszewski</b>	Delayed Reproduction and Age/Class Structure in a Randomly Varying Environment Dr. Daniel Promislow, Department of Genetics
	Faculty Mentors	
	<b>Todd Pierson</b>	Estimating Detection Rates and Determining Site Occupancy of <i>Urspelerpes brucei</i> (the Patch-Nosed Salamander) Dr. John Maerz, Warnell School of Forestry & Natural Resources
	Faculty Mentor	
	<b>Kathryn Branscomb</b>	Land Tenure Change in Africa Dr. Bram Tucker, Department of Anthropology
	Faculty Mentor	
<b>Room D</b>	<b>Emily Myers</b>	The Effect of U.S. Military Aid on Recipient State Cooperation in Pakistan: A Case Study Dr. Patricia Sullivan, Department of International Affairs
	Faculty Mentor	

## Program

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	<b>Laura McDonald</b> Faculty Mentor	A New Definition of Treason: The 1794 Treason Trials Dr. Kirk Willis, Department of History
	<b>Irena Stevens</b> Faculty Mentor	Promoting Sharing of OSINT Analysis Between Expert Institutions and the Intelligence Community Dr. Loch Johnson, Department of International Affairs
<b>Room G</b>	<b>Jason Bowman</b> Faculty Mentor	Variability of Motion in Individuals with Ankle Instability During Single Leg Jump Landings Dr. Cathy Brown, Department of Kinesiology
	<b>Elodie Huguet</b> Faculty Mentor	Effects of Steel and Aluminum Shoes on Forelimb Kinematics in Stock Horses Dr. Kylee Duberstein, Department of Animal & Dairy Science
	<b>David Kim</b> Faculty Mentor	Ground Reaction Forces of Unicompartamental Knee Arthroplasty Patients During Stair Ascent Dr. Kathy Simpson, Department of Kinesiology
	<b>Jaharris Collier</b> Faculty Mentor	The Effects of Spinal Fusion on the Physical Function of Females with Adolescent Idiopathic Scoliosis Dr. Kathy Simpson, Department of Kinesiology
<b>Room H</b>	<b>Hannah Avram</b> Faculty Mentor	Nanotechnology: Science Meets the Apparel and Fashion Industry Dr. Ian Hardin, Department of Textiles, Merchandising & Interiors
	<b>Meagan Cauble</b> Faculty Mentor	Dispersion of Single-Walled Carbon Nanotubes in Aqueous Solution Dr. Marcus Lay, Department of Chemistry
	<b>Shelby Hipol</b> Faculty Mentor	The Multimethod Analyses of the Three Separated Parts of a Roman Sarcophagus with the Myth of Marsyas' Musical Contest with Apollo Dr. Frances Van Keuren, Department of Art History
	<b>Akanksha Rajeurs</b> Faculty Mentor	Development of a Modified System to Create Mutations in <i>Mycobacterium tuberculosis</i> Dr. Russell Karls, Department of Infectious Diseases
<b>Room J</b>	<b>Amar Mirza</b> Faculty Mentor	A Tail's Tale: ErbB Structure, Evolution, and Function Dr. Natarajan Kannan, Department of Biochemistry & Molecular Biology
	<b>Michael Burel</b> Faculty Mentor	Derivation of Neural Progenitors from Induced Pluripotent Stem Cells Dr. Steven Stice, Department of Animal & Dairy Science

## Program

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<b>Joanna Eldridge</b> Faculty Mentor	Genomic Profiling of Ovarian Cancer Cells in Response to a Gonadotropin Dr. David Puett, Department of Biochemistry & Molecular Biology
<b>Yu Taniguchi</b> Faculty Mentor	DNA Methylation Related to Cancer Dr. Shaying Zhao, Department of Biochemistry & Molecular Biology

### 4:00 p.m. Welcome and Opening Session

Classic Center, Athena Ballroom E

<b>Introductions and Welcome</b>	Dr. David S. Williams, Director, Honors Program Professor Jere W. Morehead, Senior Vice President for Academic Affairs and Provost
<b>Recognition of CURO Promising Scholars</b>	Dr. Pamela B. Kleiber, Associate Director, Honors Program
<b>Introduction of Keynote Speaker</b>	Matthew Sellers, Managing Editor, Journal for Undergraduate Research Opportunities (JURO), 2009 CURO Summer Research Fellow
<b>Keynote Address</b> <i>Conservation and the Global Search for Sustainability</i>	Dr. Peter Brosius, Department of Anthropology and Director, Center for Integrative Conservation Research
<b>Excellence in Undergraduate Research Mentoring Awards</b>	Dr. David C. Lee, Vice President for Research

### 5:00 p.m. Visual Art Exhibit

Classic Center, Grand Hall South (downstairs)

<b>Daniel Cellucci</b> Faculty Mentor	Remote Sensing as a Generative Tool in the Creation of Fine Art Prof. R. G. Brown, Department of Sculpture, Studio Foundations
<b>Archil Japaridze</b> Faculty Mentor	Abandon Hope All Ye Who Enter: The Solution to the Cartel Crisis in Mexico Dr. Sergio Quesada, Department of Latin American & Caribbean Studies

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

Classic Center, Grand Hall South (downstairs)

Science as Art Poster #31	<b>Michael Burel</b> Faculty Mentor	Derivation of Neural Progenitors from Induced Pluripotent Stem Cells Dr. Steven Stice, Department of Animal & Dairy Science
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## Program

Science as Art **Amar Mirza**  
Space #35 Faculty Mentor

A Tail's Tale: ErbB Structure, Evolution, and Function  
Dr. Natarajan Kannan, Department of Biochemistry & Molecular  
Biology

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

Classic Center, Grand Hall South (downstairs)

Poster #1	<b>Melissa Erickson, Rebecca Parker</b> Faculty Mentor	Effects on Blood Flow Velocity and Arterial Diameter Produced by Compression Therapy Dr. Kevin McCully, Department of Kinesiology
Poster #2	<b>Rejina Pumachcharige</b> Faculty Mentor	Blood Velocity at Rest and After Ischemia Dr. Kevin McCully, Department of Kinesiology
Poster #3	<b>Elizabeth Callaway, Kristen Battles</b> Faculty Mentor	Evaluation of Physical Activity, Spasms, and Diet After SCI Dr. Kevin McCully, Department of Kinesiology
Poster #4	<b>Leslie McConnell</b> Faculty Mentor	Serum Vitamin D and Bone Structural Development in Young Adult Females: A Three-Year Prospective Study Dr. Richard Lewis, Department of Foods & Nutrition
Poster #5	<b>Benjamin Wheeler, Destinee Ingrao</b> Faculty Mentor	Heart Rate Plateau in Response to Exercise Follows Exponential Kinetics Dr. James Hargrove, Department of Foods & Nutrition
Poster #6	<b>Puja Chebrolu</b> Faculty Mentor	Factors Affecting Cardiovascular Disease in the Third World Dr. Alex Anderson, Department of Foods & Nutrition
Poster #7	<b>Abby Wong</b> Faculty Mentor	Habitats of West Nile Virus Competent Mosquitoes: The Effects of Urbanization in New York City Dr. John Drake, Odum School of Ecology
Poster #8	<b>Ashley Roden</b> Faculty Mentor	Biogeography of <i>Triatoma sanguisuga</i> on two Barrier Islands off the Coast of Georgia, USA Dr. Brian Forschler, Department of Entomology
Poster #9	<b>Edward Lilla</b> Faculty Mentor	Rce1p Transmembrane Topology Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
Poster #10	<b>Ariel Chan</b> Faculty Mentor	Effect of GIPC-GAIP Coexpression on LPA Induced Signaling in CHO-K1 Cells Stably Expressing the LPA1 Receptor Dr. Shelley Pence, Department of Pharmaceutical & Biomedical Sciences
Poster #11	<b>Yu Taniguchi</b> Faculty Mentor	DNA Methylation Related to Cancer Dr. Shaying Zhao, Department of Biochemistry & Molecular Biology

## Program

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Poster #12	<b>Alice Weaver</b> Faculty Mentor	Involvement of DNA Damage Response Factors in the Proliferation of Cancer Cells Dr. Michael Terns, Department of Biochemistry & Molecular Biology
Poster #13	<b>Mary Burriss</b> Faculty Mentor	<i>C. elegans</i> IDE: Gene Annotation and Ability of Protein to Cleave A $\beta$ and a-factor Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
Poster #14	<b>Samar Aldrugh</b> Faculty Mentor	Developing a Hybrid Molecule A $\beta$ -a-factor to Study the Activity of IDE in Cleaving A $\beta$ Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
Poster #15	<b>Tiffany Hu</b> Faculty Mentor	Investigating a Novel Alternatively Edited Protein's Involvement in Mitochondrial DNA Maintenance Dr. Stephen Hajduk, Department of Biochemistry & Molecular Biology
Poster #16	<b>Susan Klodnicki</b> Faculty Mentor	Pediatric Seizures in Larval Zebrafish Dr. Patricia Wilson, Department of Mathematics & Science Education
Poster #17	<b>Fahad Khan</b> Faculty Mentor	Examining the Substrate and Inhibitor Properties of Protease Inhibitors and Statins with OATP Transport Proteins Dr. Jason Zastre, Department of Pharmaceutical & Biomedical Sciences
Poster #18	<b>Maximilian Klein</b> Faculty Mentor	Investigating the Early Developmental Expression of Lysosomal Enzymes in Zebrafish Dr. Richard Steet, Department of Biochemistry & Molecular Biology
Poster #19	<b>Craig Hayes</b> Faculty Mentor	MicroRNA let-7f Regulates STAT1 Activity in Human Lung Epithelial Cells Dr. Ralph Tripp, Department of Infectious Diseases
Poster #20	<b>Patricia Mitchell</b> Faculty Mentor	Using miRIDIAN miRNA Mimics and Inhibitors for Evaluating the Contribution of Host miRNA Regulation of Respiratory Syncytial Virus (RSV) Replication Dr. Ralph Tripp, Department of Infectious Diseases
Poster #21	<b>Natasha Lee</b> Faculty Mentor	Complementation of Chromosomal Deletions in Mycobacteria Dr. Russ Karls, Department of Infectious Diseases
Poster #22	<b>Lindel Krige</b> Faculty Mentor	Coagulation Factors Involved in the Pathology of Placental Malaria Dr. Julie Moore, Department of Infectious Diseases

## Program

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Poster #23	<b>Johnathon Nolen</b> Faculty Mentor	Examination of Resuscitation-Promoting Factors in Potential Fish Pathogens in <i>Mycobacterium shottsii</i> and <i>M. pseudoshottsii</i> Dr. Russell Karls, Department of Infectious Diseases
Poster #24	<b>Tatum Mortimer</b> Faculty Mentor	The Epidemiology of <i>Staphylococcus aureus</i> in Kentucky and Georgia from 1995 to 2003 Dr. Susan Sanchez, Department of Infectious Diseases
Poster #25	<b>Ariella Perry</b> Faculty Mentor	Identifying Human and Avian Influenza Binding Sites in Clam Tissue Dr. Elizabeth Howerth, Department of Pathology
Poster #26	<b>Carla Rutherford</b> Faculty Mentor	Human Resistance to Infection by African Trypanosomes Dr. Stephen Hajduk, Department of Biochemistry & Molecular Biology
Poster #27	<b>Nick Regenold, E. N. Foxhall III, S. Frimpong, O. Grey, M. Kallaoun, J. Mansour, N. Wang</b> Faculty Mentor	Primary Transmission of Salmonella Contamination in Poultry Meat Dr. John Maurer, Department of Microbiology
Poster #28	<b>Claire Stice</b> Faculty Mentor	Effects of Weighing Protocol on Corticosterone Concentrations in Leghorn Chickens Dr. Kristen Navara, Department of Poultry Science
Poster #29	<b>Emilia Tuck</b> Faculty Mentor	NCAMP-1: A Novel Host Danger Molecule in Catfish Dr. Liliana Jaso-Friendmann, Department of Infectious Diseases
Poster #30	<b>Kelly Cummings</b> Faculty Mentor	Differentiation of Natural and Post-Vaccinal Canine Distemper Virus Encephalomyelitis Dr. Scott Schatzberg, Department of Small Animal Medicine
Poster # 31	<b>Michael Burel</b> Faculty Mentor	Derivation of Neural Progenitors from Induced Pluripotent Stem Cells Dr. Steven Stice, Department of Animal & Dairy Science
Poster #32	<b>Shuyan Wei</b> Faculty Mentor	Development of Consensus-Degenerate Hybrid Oligonucleotide Primers for Retroviral Discovery Dr. Scott Schatzberg, Department of Small Animal Medicine
Poster #33	<b>Meagan Cauble</b> Faculty Mentor	Dispersion of Single-Walled Carbon Nanotubes in Aqueous Solution Dr. Marcus Lay, Department of Chemistry

## Program

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Poster #34	<b>Alexandra Walker</b> Faculty Mentor	Synthesis of a Robust Photoremovable Protecting Group for Photoactivation of Gene Expression Dr. Timothy Dore, Department of Chemistry
Poster #36	<b>Stephen Thompson</b> Faculty Mentor	Application of Protein Interface Footprinting via Hydroxyl Radical Oxidation to Endopolygalacturonase II Dr. Robert Woods, Complex Carbohydrate Center
Poster #37	<b>Nicholas Dallas, Michael McKain, James Leebens-Mack, Jeremy Rentsch</b> Faculty Mentor	Genetic Diversity of <i>Yucca filamentosa</i> and <i>Y. aloifolia</i> in Athens-Clarke County, Georgia Dr. Wendy Zomlefer, Department of Plant Biology
Poster #38	<b>Zijing Guo</b> Faculty Mentor	The Mystery of Telomere Recombination in Normal Yeast Cells Dr. Michael McEachern, Department of Genetics
Poster #39	<b>Kelly Darby</b> Faculty Mentor	Calcium Imaging of Nodose Ganglion Cells in Response to Gastrointestinal Signals: CCK and CP 55,940 Dr. Gaylen Edwards, Department of Physiology & Pharmacology
Poster #40	<b>John Taliaferro</b> Faculty Mentor	Novel Synergistic Inhibitors of Methicillin-Resistant <i>Staphylococcus aureus</i> (MRSA) Dr. Timothy Long, Department of Pharmaceutical & Biomedical Sciences
Poster #41	<b>Laura Zeidan</b> Faculty Mentor	Creation of a Reporter Molecule That Will Identify the Pathway Used to Degrade Isoprenylated Molecules Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
Poster #42	<b>Amarachi Anukam</b> Faculty Mentor	Creation of a Heme Biosensor Dr. Harry Dailey, Department of Biochemistry & Molecular Biology
Poster #43	<b>Soumya Vaish</b> Faculty Mentor	Glutamate Dehydrogenase and Its Role in <i>Helicobacter pylori</i> Dr. Robert Maier, Department of Microbiology
Poster #44	<b>Al W. Ray, III</b> Faculty Mentor	Epidemiology of <i>Salmonella enterica</i> Typhimurium in Songbirds in the Southeastern United States Dr. Susan Sanchez, Department of Infectious Diseases
Poster #45	<b>Francisco Marrero</b> Faculty Mentor	Water Droplet Generation in Ferrofluid-Based Magnetorheological Fluid Dr. Leidong Mao, Department of Engineering
Poster #46	<b>Amanda Brouillette</b> Faculty Mentor	Time Resolved Photoelectron Spectroscopy and the Photoprotective Properties of Adenine Dr. Susanne Ullrich, Department of Physics & Astronomy

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Poster #47	<b>Whitney Ingram</b> Faculty Mentor	The Scaling Relationship Between the Photocatalytic Decay Rate and Height of TiO <sub>2</sub> Nanorods Dr. Yiping Zhao, Department of Physics & Astronomy
Poster #48	<b>Sook Kyung Yoon</b> Faculty Mentor	The Effect of Online Communication and Social Support on Positive Emotion and Health Outcomes in Individuals Treated with Ileoanal Reservoir Surgery Dr. Kimberly Clay, School of Social Work
Poster #49	<b>Barrett Gold</b> Faculty Mentor	Health Care Around the World Dr. Brenda Cude, Department of Housing & Consumer Economics
Poster #50	<b>Ryan Jordan, Elizabeth Simpson</b> Faculty Mentor	How Broad Are Infants' Face Discrimination Abilities in the First Year of Life? Dr Janet Frick, Department Psychology
Poster #51	<b>Sarah Hutcheson</b> Faculty Mentor	Relationships Between Features of Infant Vocalizations and Later Language Development Dr. Suneeti Nathani Iyer, Department of Communication Sciences & Special Education
Poster #52	<b>Valerie Bidwell</b> Faculty Mentor	Preschoolers' Understanding of Arrows as Directional Indicators Dr. Janet Frick, Department of Psychology
Poster #53	<b>Marianne English</b> Faculty Mentor	Energy Expenditure and Gain of Nut-Cracking in Wild Capuchin Monkeys ( <i>Cebus libidinosus</i> ) in Piauí, Brazil Dr. Dorothy Fragaszy, Department of Psychology
Poster #54	<b>Jessi Crabbe, Madison Asef, Daniel Tim</b> Faculty Mentors	Macular Pigment and Its Relation to Body Fat Distribution Dr. Billy Hammond, Department of Psychology
Poster #55	<b>Shan Elahi, Caroline Cates</b> Faculty Mentor	An Examination of Motivation for Medication Adherence in Pediatric Patients with Inflammatory Bowel Disease and Parents Dr. Ronald Blount, Department of Psychology
Poster #56	<b>Hannah Barfield, Brittany Baker</b> Faculty Mentor	Effects of Witnessing Maternal Psychological Abuse Perpetration on Undergraduate Women's Abuse Perpetration Dr. Joan Jackson, Department of Psychology
Poster #57	<b>Theodore Story</b> Faculty Mentor	Best Practices in Graduated Driver's Licensing Dr. Don Bower, Department of Child & Family Development
Poster #58	<b>Rebecca Feistritzer</b> Faculty Mentor	The Effects of Stress-Induced Analgesia and Peripherally Administered Cannabinoid Receptor Antagonists on Formalin-Induced Pain Behavior Dr. Andrea Hohmann, Department of Psychology

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Poster #59	<b>Rachel Pocock</b> Faculty Mentor	Operation Span Task and the Ocular Motor Delayed Response Task Dr. Jennifer McDowell, Department of Psychology
Poster #60	<b>Manouela Valtcheva</b> Faculty Mentor	Brain Activity Analysis of Good and Poor Performers During Inhibitory Eye Movements Dr. Jennifer McDowell, Department of Psychology
Poster #61	<b>Laura Smart</b> Faculty Mentor	Awareness of Borderline Personality Disorder in a University Population Dr. Rich Suplita, Department of Psychology
Poster #62	<b>Erin Hansen</b> Faculty Mentor	Effects of Daily Saccade Practice on Behavioral Plasticity in Schizophrenia Dr. Jennifer McDowell, Department of Psychology
Poster #63	<b>Raha Sabet</b> Faculty Mentor	The Biggest Loser: Restoring Self-Control After Rejection Dr. Michelle vanDellen, Department of Psychology
Poster #64	<b>William Jordan</b> Faculty Mentor	Shaped Like Steiner: Biodynamic Farmers of Southern Germany Enacting a Century-Old Tradition of Sustainability Dr. Betty Jean Craige, Department of Comparative Literature
Poster #65	<b>Sara Day</b> Faculty Mentor	Digital Proliferation: Discerning New Literary Genres Spawned by Digital Technology Dr. Elizabeth Davis, Department of English
Poster #66	<b>Archil Japaridze</b> Faculty Mentor	Abandon Hope All Ye Who Enter: The Solution to the Cartel Crisis in Mexico Dr. Sergio Quesada, Department of Latin American & Caribbean Studies

### **6:15 p.m. Awards Ceremony**

Classic Center, Parthenon Room

**Presentation of CURO Summer Research Fellows, CURO Scholars, UGA Libraries Undergraduate Research Awards, and Best Paper Awards**

Dr. Pamela B. Kleiber, Associate Director, Honors Program  
Ms. Caroline Barratt, Director, Miller Learning Center  
Library Commons  
Ms. Deborah Dietzler, Executive Director, UGA Alumni Association

\*The Science as Art distinction denotes the interplay between science and art. Images were produced during the course of scientific research and chosen for their aesthetic excellence as well as scientific or technical interest.

# *∞ 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 CURO Symposium Awards Ceremony on Monday, March 29, 2010 at 4:00 p.m. in the Classic Center, Athena Ballroom E.

## *2010 Awards*

### **Early Career Faculty Award**

Dr. John C. Maerz, Assistant Professor, Warnell School of Forestry and Natural Resources

## *2009 Awards*

### **Early Career Faculty Award**

Dr. Brian S. Cummings, Assistant Professor of Pharmaceutical & Biomedical Sciences

Dr. Anna C. Karls, Associate Professor of Microbiology

Dr. Dawn T. Robinson, Associate Professor of Sociology

## *2008 Awards*

### **Master Level Faculty Award**

Dr. John J. Maurer, Professor of Population Health

### **Early Career Faculty Award**

Dr. Walter K. Schmidt, Assistant Professor of Biochemistry & Molecular Biology

### **Program Award**

Biomedical and Health Sciences Institute

## *2007 Awards*

### **Master Level Faculty Award**

Dr. Timothy Hoover, Associate Professor of Microbiology

### **Early Career Faculty Award**

Dr. Steven Stice, Professor of Animal & Dairy Science

## *2006 Awards*

### **Master Level Faculty Award**

Dr. Patricia Hunt-Hurst, Associate Professor of Textiles, Merchandising & Interiors

### **Early Career Faculty Award**

Dr. Rodney Mauricio, Associate Professor of Genetics

### **Graduate Student Award**

Christopher Anderson, PhD candidate in Ecology

### **Graduate Student Recognition**

Dawn Holligan, PhD student in Plant Biology

# *∞ Excellence in Undergraduate Research Mentoring Awards ∞*

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## *2005 Awards*

### **Faculty Awards**

Dr. Gary Barrett, Odum Professor of Ecology

Dr. Sidney Kushner, Professor of Genetics

### **Department Award**

Department of Cellular Biology

## *2004 Awards*

### **Faculty Award**

Dr. William S. Kisaalita, Associate Professor of Biological & Agricultural Engineering

## *2003 Awards*

### **Faculty Award**

Dr. Jody Clay-Warner, Assistant Professor 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, Professor

Dr. Marie-Michèle Cordonnier-Pratt, Senior Research Scientist

## *2002 Awards*

### **Faculty Awards**

Professor William D. Paul, Jr., Professor of Art

Dr. Katherine Kipp, Associate Professor of Psychology

### **Faculty Recognition**

Dr. Susan Sanchez, Assistant Professor of Infectious Diseases

### **Department Award**

Department of Biochemistry & Molecular Biology

Dr. J. David Puett, Department Head

### **Program Award**

“Physics Beyond the Boundaries”: National Science Foundation, REU Program

Dr. Loris Magnani, Principal Investigator, Professor of Physics & Astronomy

Dr. Heinz-Bernd Schuttler, Professor and Department Head of Physics & Astronomy

Dr. Jonathan Arnold, Professor of Genetics

Dr. Susmita Datta, Professor, Georgia State University

Dr. David Logan, Professor, Clark Atlanta University

Dr. William Steffans, Professor, Clark Atlanta University

# *∞ Excellence in Undergraduate Research Mentoring Awards ∞*

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## *2001 Awards*

### **Faculty Award**

Dr. Marcus Fechheimer, Professor of Cellular Biology

### **Faculty Recognition**

Dr. David MacIntosh, Associate Professor of Environmental Health Sciences

Dr. Dean Rojek, Associate Professor of Sociology

### **Department Award**

Department of Genetics

Dr. John MacDonald, Department Head and Professor

### **Program Award**

Savannah River Ecology Laboratory

Dr. Paul Bertsch, Director

## ❧ *Thanks and Acknowledgements* ❧

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### *Graduate Student Reviewers for CURO 2010 Symposium*

Ibrahim Aljuffali	Pharmaceutical & Biomedical Sciences
Michael Amlung	Psychology
Lauren Anderson	Infectious Diseases
Mollie Barnes	English
Ashley Barr	Sociology
Sonja Brannon	Entomology
Melissa Bright	Psychology
Adela Chen	Management Information Systems
Rebecca Cheney	Lifelong Education, Administration & Policy
Rich Christiana	Health Promotion
Melinda Cro	Romance Languages
Jayna DeVore	Warnell School of Forestry & Natural Resources
Jon Gabbard	Infectious Diseases
Jim Gigantino	History
Rachel Han	Psychology
Cassandra Heighington	Cellular Biology
Ren Hullender	Art Education
Erik Jacobson	Mathematics & Science Education
Marina Klimenko	Psychology
Yinzhi Lai	English
Lincoln Larson	Warnell School of Forestry & Natural Resources
Tina Latham	Health Promotion
NaJuana Lee	Art Education
Su Yee Lim	Entomology
Ben Liu	Management Information Systems
Jennifer Malto	History
Mitch McCoy	Romance Language
Victoria Meliopoulos	Infectious Diseases
Erica Miller	Microbiology
David Nelson	Statistics
Jenna Oberstaller	Genetics
John Parmer	Health Promotion
Polly Reid	English
Katie Robbins	Food Science & Technology
Elizabeth Simpson	Psychology
Jennifer Sinclair De Mello	Chemistry
Laura Singletary	Mathematics & Science Education
Herbert Ssegane	Engineering
Lina Wang	Engineering
Jennifer Wong	Psychology

### *Faculty Reviewers for Best Paper Awards*

Dr. Thomas Cerbu	Associate Professor, Comparative Literature
Dr. Delmer Delano Dunn	Professor Emeritus, Public Administration & Policy
Dr. Marcus Fechheimer	Professor, Cellular Biology
Dr. Stacey Kolomer	Associate Professor, Social Work
Dr. Leara Rhodes	Associate Professor, Journalism
Dr. J. Scott Shaw	Professor Emeritus, Physics & Astronomy
Dr. Karen Webber	Associate Professor, Institute of Higher Education

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## ❧ *Thanks and Acknowledgements* ❧

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

Dr. Timothy R. Hoover	Associate Professor and Associate Department Head, Microbiology, Franklin College of Arts & Sciences
Dr. Anna Karls	Associate Professor, Microbiology, Franklin College of Arts & Sciences
Dr. Pamela B. Kleiber	Associate Director, Honors Program
Dr. Sidney Kushner	Distinguished Research Professor, Genetics, Franklin College of Arts & Sciences
Dr. Susan Sanchez	Associate Professor, Infectious Diseases, College of Veterinary Medicine
Dr. Walter Schmidt	Assistant Professor, Biochemistry & Molecular Biology, Franklin College of Arts & Sciences
Dr. Jody Clay-Warner	Associate Professor, Sociology, Franklin College of Arts & Sciences

### *Reviewers for CURO Summer Research Fellowships*

Dr. Patricia Hunt Hurst	Professor, Textiles, Merchandising & Interiors
Dr. John Maerz	Assistant Professor, Warnell School of Forestry & Natural Resources
Dr. David Saltz	Professor and Head, Theatre & Film Studies
Dr. Paul A. Schroeder	Professor, Geology
Dr. Michael Tiemeyer	Associate Professor, Biochemistry & Molecular Biology, Complex Carbohydrate Research Center
Dr. Karen Webber	Associate Professor, Institute of Higher Education

### *2009-10 CURO Gateway Seminar Faculty*

Prof. Mark Callahan	Artistic Director, Ideas for Creative Exploration
Dr. Marcus Fechheimer	Professor, Cellular Biology
Dr. Erik Hofmeister	Assistant Professor, Department of Small Animal Medicine
Dr. Katarzyna Jerzak	Associate Professor, Comparative Literature
Dr. William Kretzschmar	Professor, English, Linguistics
Dr. John Maerz	Assistant Professor, Warnell School of Forestry & Natural Resources
Dr. Annette Poulsen	Sterne Professor and Department Head, Banking & Finance
Dr. Paul A. Schroeder	Professor, Geology

### *Thesis Roundtable Facilitators*

Dr. Jeanne Barsanti	Emerita Scholar, Veterinary Medicine
Dr. Carl Bergmann	Assistant Vice President for Research
Dr. Nancy Canolty	Emerita Scholar, Family and Consumer Sciences
Dr. Sylvia Hutchinson	Emerita Scholar, Reading Education and Higher Education
Dr. Ronald Simpson	Emeritus Scholar, Science Education

### *Thesis Roundtable Conveners*

Maria de Rocher	Honors Program staff
Jessica Hunt	Honors Program staff
Matthew Jordan	Honors Program staff
Lara Pacifici	Honors Program staff
Martin Rogers	Honors Program staff
Troy Smith	Honors Program staff

**Demystifying the Conflict Culture:  
Understanding the Effects of Zero Tolerance  
on Students in a Georgia Disciplinary  
Alternative Education Program**

Jeremy Akin

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

The students impacted by exclusionary discipline policies—e.g., suspension, expulsion, and/or placement at alternative schools—comprise an ever-increasing population in Savannah-Chatham County Public Schools. Over the past several years, fighting remained the number-one cause for suspensions and expulsions, and the recent 78 percent increase in students at the local alternative program over just four months in 2008 raises questions as to the long-term effects of the school system’s current application of “zero-tolerance.” Problems surrounding overcrowding, recidivism, and juvenile prison rates highlight a great need to understand and include students in the development of programs that affect them and, indirectly, society at large. Through interviews and surveys of students, parents, faculty, and administrators in the public school system, this study conducted between January and March 2010 sheds light on the following questions: What are the root causes of the “conflict culture”—defined as the social code that says fighting is the only viable means for peace—and how can these be addressed? Furthermore, how does the zero-tolerance strategy impact the conflict culture within local public schools? Results from each interview and survey have been summarized, catalogued, and analyzed via basic descriptive and correlational statistics. For quantitative data, frequency distributions and correlations were developed. Research findings will be made available to system administrators and will inform the curriculum of a peer mediation program in which students at seven area high schools mediate real-life conflicts involving their classmates.

**Effect of Cation Chelators on Biofilm  
Formation in a Prolific Versus Non Prolific  
Biofilm Forming Strain of *Listeria  
monocytogenes***

Christine Akoh – CURO Apprentice

Dr. Joseph Frank, Department of Food Science  
& Technology, University of Georgia

The mechanisms involved in *Listeria monocytogenes* biofilm formation are largely unknown. Previous studies involving other bacterial pathogens suggest cations contribute to biofilm formation. The goal of this study was to provide insight into some of the external factors that enable efficient biofilm formation and persistence of *L. monocytogenes* on food processing surfaces. This study determined the effect of the cation chelators EDTA and EGTA, a calcium specific chelator, during biofilm formation on stainless steel surfaces by *L. monocytogenes* strain 311 (prolific biofilm former) and ATCC 19115 (poor biofilm former). Epifluorescent microscopy was used for visualization and quantification of the biofilms, and bacterial counts were obtained using the spread plate method. Microscopy results indicated that the presence of 30 mM of the cation chelators EDTA and EGTA completely inhibited bacterial growth and attachment when added initially and after 6hr of biofilm growth. Chelating cations in the growth medium appeared to enhance biofilm formation once biofilms had formed after 24 or 48 hours. Plate counts showed 2-3 log decreases in bacterial growth of both strains following the addition of EDTA initially and after 6hr and 3-4 log decreases following the addition of EGTA but no significant difference after 24 and 48 hours. Collectively, the data suggest that cations, especially calcium, play an important role in bacterial attachment and the subsequent biofilm formation. The information obtained from this study will provide insight into the external factors that enable effective and efficient biofilm formation in *L. monocytogenes*. This information can then be used as a tool to formulate effective intervention strategies against this pathogen of extreme importance.

**Television News Coverage of the 2010 Tea Party: A Niche for Everyone?**

Jessica Alcorn – CURO Apprentice  
Dr. Audrey Haynes, Department of Political Science, University of Georgia

During its dominance, television news was viewed as a relatively homogenous product, catering and marketing to a rather large audience. However, as new forms of media challenged broadcast, primarily satellite and cable, and the major networks fought to retain their audience level, observers noted that “news” was changing. Simply the introduction of greater competition, competition that seemed to target a particular slice of the market, changed the nature of news. Many scholars began to discuss news as filtered through a prism, rather than a “fair and balanced” representation of “all you need to know.” I will attempt to test this theory of niche news by analyzing the coverage of a politically charged event, the Tea Party Convention. If this hypothesis is true, the expectation is that coverage among the major news outlets (ABC, CBS, NBC, FOX News, MSNBC, and CNN) will differ significantly in their presentation. In the end, I expect variation in 1) how the Convention is framed, 2) how much attention is given to the event, and 3) the positive and negative connotations of the words used to describe the event. I will conduct a content analysis of news transcripts from the days immediately surrounding the convention according to particular variables, such as sources, ideological bias, and attention. Most of the data analysis will be descriptive, with quantitative support from correlation and cross-tabulation analysis. My expectation is a confirmation of the niche hypothesis. News no longer represents reality but rather reality through a particular market perspective.

**Developing a Hybrid Molecule A $\beta$ -a-factor to Study the Activity of IDE in Cleaving A $\beta$**

Samar Aldrugh  
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Alzheimer’s disease (AD) is an irreversible, progressive neurodegenerative disease. One of the neuropathological hallmarks of AD is the accumulation of extracellular aggregates of A $\beta$  peptides. A $\beta$  peptides are generated via two-step proteolytic cleavage of a transmembrane protein (APP). A $\beta$  (1-42) peptides are highly fibrillogenic, thus they are associated primarily with AD. A $\beta$  is one of multiple substrates cleaved by insulin degrading enzyme (IDE). Expression of IDE in yeast promotes maturation and production of the a-factor mating pheromone, in the absence of the yeast enzymes, Ste23p and Axl1p. This observation indicates that the a-factor mating pheromone is a substrate of IDE. IDE cleaves A $\beta$  between F19 and F20, thus we are interested in fusing A $\beta$  (1-19) sequence to the mature a-factor. Our goal is to construct a yeast model as a tool to study the activity of IDE in cleaving A $\beta$ . We hypothesize that a fusion between A $\beta$  (1-19) sequence and the mature a-factor sequence should render a hybrid protein that is cleavable by IDE. This fusion is created via recombination cloning. We anticipate that if IDE is able to cleave A $\beta$ -mature a-factor fusion, mating will take place, thus linking the production of A $\beta$  to mating in yeast. The mating efficiency in yeast will be tested via mating assays. Using a yeast model to study the activity of IDE in cleaving A $\beta$  is expected to be more cost effective than using a mouse model. These findings will advance our knowledge and understanding of Alzheimer’s disease and guide potential therapeutic strategies.

**Building a Baby College in Athens-Clarke County**

Juliet Allan – Roosevelt at UGA  
Dr. Diane Bales, Department of Child & Family Development, University of Georgia

Children in Athens-Clarke County (ACC) disproportionately live in households characterized by a low household income, a single parent, or parents with low levels of academic achievement. Nationally, these household demographics are correlated with high dropout rates and with grades and test scores below the national average. Relevant

Athens statistics illustrate that student performance falls below national standards. The academic struggles of many Athens children are partially attributable to the deficit of responsive parenting that is correlated with at-risk households. Scientific research demonstrates that during the early years of a child's life, responsive parenting supports children's language, cognitive, and social-emotional development. Delays in these cognitive development areas have long-lasting academic repercussions, such as low test scores, grade repetition, increased likelihood of dropping out of high school, lasting literacy struggles, and low wages. This paper proposes that Athens-Clarke County implement a "Baby College," which provides responsive parenting workshops for at-risk families in ACC. Studies at universities across the country indicate that early childhood intervention results in tangible improvements in at-risk children's academic performance. A systematic analysis of this research reveals that both center-based enrichment programs, such as Early Head Start, and improvements in the home environment are necessary for a maximum improvement in students' academics. ACC already provides strong center-based enrichment programs for at-risk children, and a "Baby College" would address the home environment component of intervention, complementing existing Athens programs. Finally, to ensure effectiveness, the program would coordinate with faculty at UGA and ACC community leaders for program evaluation and curriculum design.

### **Designing an Efficient and Effective Cap-and-Trade System**

Juliet Allan – Roosevelt at UGA  
Dr. Jeff Mullen, Department of Agricultural & Applied Economics, University of Georgia

Cap-and-trade represents a promising policy for reducing greenhouse gases and slowing the rate of climate change. The basic premise of cap-and-trade is a cap on carbon emissions that becomes increasingly strict over time. The cap is enforced by distributing allowances to emitters of carbon dioxide and punishing those who pollute without an allowance. An economic

analysis of proposed cap-and-trade legislation, other cap-and-trade systems, and academic research on climate change policies reveals that a break from the traditional formula would improve the efficiency of the system and reduce its costs to the United States' economy. An upstream and economy-wide system would cap the amount of carbon-producing substances (such as oil, coal and gas) produced in or imported into the country as opposed to a cap on emissions. Upstream regulation allows for easier monitoring, reduced administrative costs, universal coverage of emissions in the country, and greater stability in the allowance market. Furthermore, an EPA-run auction of allowances, as opposed to free distribution, avoids windfall profits by carbon-intensive industries and would allow a redistribution of auction proceeds to American consumers. Methods for appropriate regulation of the auction, scientifically based reduction goals, and components such as offsets and banking of allowances are also discussed as ways to further increase the efficiency of the system. An efficient design of a cap-and-trade system is critical in minimizing short-term transition costs and ensures that the long-term benefits of improved air quality, technological innovation, and slowing climate change outweigh these costs in a cost-benefit analysis.

### **Creation of a Heme Biosensor**

Amarachi Anukam – CURO Apprentice  
Dr. Harry Dailey, Department of Biochemistry & Molecular Biology, University of Georgia

As a cofactor in gas-binding and electron transport proteins, heme is a vital molecule. Heme is also an important ligand for a number of regulatory proteins. Presently there is no way to determine heme concentrations in small samples, cells, or tissues. Using protein biosensors, it will be possible to detect and assess heme fluctuations. It would be beneficial to have a sensor that would permit us to detect cellular and tissue distribution of heme so that we can begin to understand heme transfer and heme fluxes in response to physiological stimuli. In addition, we would be able to follow heme distribution and flux during embryonic development. The protein *Serratia marcescens*

HasA was used to create the biosensor. The HasA DNA was replicated using PCR. The protein was then purified. Protein purification proved to be difficult. The best method found to purify the protein was to transform the protein into BL21 cells, grow the cells overnight, induce cells with IPTG, and allow cells to grow for another 3-4 hours. In the future, a better method will be found to purify the protein, after which, HasA will be expressed through protein expression.

**Nanotechnology: Science Meets the Apparel and Fashion Industry**

Hannah Avram

Dr. Ian Hardin, Department of Textiles, Merchandising & Interiors, University of Georgia

Nanotechnology is a relatively new and rapidly emerging science with tremendous potential. Nanotechnology aims to manipulate molecular matter—measured in billionths of a meter—to develop materials or devices. Applied properly, it may be able to improve quality of life in previously unimaginable ways, and create exciting commercial opportunities—opportunities that include the fashion industry. This research examines the potential uses of nanotechnology in the apparel and fashion worlds, and explores the risks that inevitably occur when dealing with molecules on this small scale (e.g., health issues). Part of the research will be to visit labs with nanotechnologists on the UGA campus to better understand the nature of nanotechnology treatments that can be applied to materials. Apparel and fashion companies that currently use nanotechnology will be contacted to discuss the products and processes they use, and the market potential they see. I am contacting retailers, presenting them with my findings, and determining their interest in selling products treated with or developed by the use of nanotechnology. In summary, my research assesses the current and future applications of this groundbreaking science, its fashion market potential, the risks that could pose barriers to its development, and ways to mitigate those risks. My conclusions will provide a more complete understanding of the

nanotechnology opportunities in the apparel and fashion industries and evaluate the potential that nanotechnology has for our future.

**Familial Predictors of Young Adult Romantic Relationship Functioning: A Closer Look at Boundary Dissolution**

Emily Baggett – CURO Scholar

Dr. Anne Shaffer, Department of Psychology, University of Georgia

There is a large body of empirical evidence supporting the idea that early experiences within the family can impact one's romantic relationship functioning during young adulthood. Many studies have investigated the role of attachment in these associations. The current study proposes to look beyond attachment style to see how other familial factors might affect romantic relationship outcomes. Specifically, we will investigate the relationships between general parenting styles and experiences of parental boundary dissolution growing up and one's recent experiences within a romantic relationship. Drawing from findings of Shaffer and Sroufe (2006), we expect that childhood experiences of boundary dissolution—the disintegration of normal parent-child roles in which the child fulfills the parent's emotional needs to an inappropriate degree (e.g., parentification, role-reversal, enmeshment)—will predict romantic relationship outcomes over and above the variance explained by general parenting. Because the literature indicates that experiences with mothers and fathers can have distinct influences for sons and daughters, we will explore possible moderating effects of gender, both the parent's and the child's, on these associations. Participants include 800+ undergraduate students who will complete online questionnaires about their experiences growing up and their current feelings within a romantic relationship. We are currently collecting data through the web site Survey Monkey. Data will be imported into SPSS 15.0 and analyzed first with bivariate correlations and then hierarchical regressions. General parenting style is measured by the authoritative subscale of the Parental Authority Questionnaire. Parental boundary dissolution is ascertained by the

enmeshment subscale of the Parental Boundary Scale. Romantic relationships outcomes include measures of security, satisfaction, disclosure, and idealization.

**Corpus-Based Analysis of Other-Directedness in Japanese**

Thomas Bailey

Dr. William Kretzschmar, Department of Linguistics, University of Georgia

A characteristic traditionally attributed to Japanese discourse by qualitative research is “other-directedness.” While this qualitative approach is not itself a problem, it is the responsibility of scholars to verify previous research. To this end, I sought to *quantitatively* evaluate this claim, as well as develop a concrete understanding of “other-directedness.” I compiled two comparable corpora, both comprised of interviews freely available online. One corpus contained interviews with Japanese-speaking musicians, the other with English-speaking musicians (for comparative purposes). The interviews with Japanese musicians had been translated into English when published. I used three methods of comparison: investigation of normalized word frequencies, collocate analysis (examination of what words frequently occur near one another), and direct scrutiny of context through concordancing software, after which I assigned words into context categories and examined the numerical distributions thereof. Four language use patterns characteristic of “other-directedness” were found when comparing the Japanese musician interviews with the English-language corpus: formality, manifested in scarcity of contractions and increased use of polite language (especially fixed phrases); presence of private predicates, demonstrated by the verbs found most often near *I*, *we*, and *you*; humility, shown by the rarity of positive words near words relating to the musicians’ in-groups; and finally, the importance of the group, exemplified in the presence of certain pronouns near *please*. This research is significant because it assesses accepted beliefs about Japanese speech, which impact wider attitudes toward the Japanese themselves. Furthermore, understanding of

Japanese communication has significant implications for international business, where miscommunications are disastrous and costly.

**I Do, but I Don’t: The Politics of Dress in Gay and Lesbian Commitment Ceremonies in the United States**

Caylee Bale

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

This paper explores the dress practices of gay and lesbian celebrants at commitment ceremonies. Dress includes all body modifications and body supplements that adorn a person. Homosexual celebrants’ commitment dress not only carries deep personal meanings for the celebrants but also acts as a powerful means of nonverbal communication to the society. With the aid of numerous scholarly and popular resources, I conducted a systematic analysis of the dress practices of commitment ceremonies in the United States. While unable to use homosexual couples as a primary resource, I used secondary resources such as photographs and first-person stories to analyze the meanings of their ceremony dress. From my analysis, I have concluded that the commitment ceremony dress worn by the celebrants is a common form of expression for homosexual couples that represents three different social and sartorial scripts: conformity, rebellion, and social reformation. In conformity commitment ceremonies, the celebrants strive to dress in a way in which they will gain acknowledgement from the overall society as a legitimate couple. Therefore, they choose to conform to American social norms in their dress. In contrast, celebrants of rebellious commitment ceremonies deliberately defy the dress stereotypes of American society through the use of a drag costume or non-mainstream wedding dress elements. Finally, new and old dress traditions mesh when a social reformation commitment ceremony is held. Each commitment ceremony dress has its own unique, personal characteristics. However, by conveying one of these three themes, homosexual couples are dressing their bodies not only to celebrate their

commitment to each other but also to express a political stance. Each commitment dress style expresses a strong desire for equal marriage rights for gays and straights alike. The three different social/sartorial scripts—conformity, rebellion and social reformation—showcase three different ways of fighting for social acceptance and represent distinct paths for changing the definition of the institution of marriage in the United States.

**Effects of Witnessing Maternal Psychological Abuse Perpetration on Undergraduate Women's Abuse Perpetration**

Hannah Barfield & Brittany Baker  
Dr. Joan Jackson, Department of Psychology,  
University of Georgia

Previous research indicates that children who witness domestic violence experience detrimental consequences. The present study examined how witnessing parental psychological abuse perpetration affects undergraduate women. Based on same sex modeling, we hypothesized that women who witnessed maternal psychological abuse perpetration during childhood would be more likely to perpetrate psychological abuse in their dating relationships. Women's perpetration of psychological abuse was measured using the Psychological Maltreatment of Women Inventory (PMWI). Exposure to parental perpetration of psychological abuse was measured by a composite of items used in prior research (Cronbach's  $\alpha$  maternal perpetration = .91;  $\alpha$  paternal perpetration = .94). In a sample of 167 undergraduate women, results of a multiple regression analysis indicated that exposure to paternal and maternal psychological abuse perpetration predicted women's emotional/verbal abuse perpetration in their dating relationships (accounting for 4% of variance),  $F(2,166) = 3.57, p = .03$ . As expected, maternal perpetration emerged as a unique predictor in the model ( $\beta = .19, p < .05$ ), and paternal perpetration was not significantly associated ( $\beta = .02, p = .81$ ). Witnessing parental psychological aggression did not predict women's psychological aggression as measured by the dominance/isolation subscale of the

PMWI (model  $p = .65$ ). In sum, witnessing maternal abuse perpetration was only associated with women's perpetration of verbal/emotional abuse. Although the effect was small, findings from this study provide qualified support for the modeling hypothesis and help explain the understudied phenomenon of women's violence and its consequences for children.

**Optimization of Techniques for Identification and Analysis of N-linked Glycans Derived from Various Glycoprotein Mixtures**

Sambita Basu – CURO Summer Research Fellow

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

The discovery that carbohydrates, in addition to gene sequences and proteins, serve as significant biomarkers presented important possibilities for the diagnosis and subsequent treatment of several diseases, such as mucopolidosis, muscular dystrophy, and cancer. Glycoproteomic analysis of serum has led to increased understanding of the development and detection of hepatocellular carcinoma. Efficient glycan identification can provide diagnostic tools and continue education of disease progression. The focus of my research was to optimize techniques for the identification and analysis of glycans from various glycoprotein mixtures. My experimentation involved 1) releasing and extracting N-linked glycan moieties from six mixtures with different proportions of ovalbumin and alpha 1-acid glycoprotein, 2) purifying the released glycans efficiently [purification techniques included solid phase extraction techniques with C-18 or graphite phases to separate glycans from detergents (or other interfering substances) from earlier cleavage stages], 3) permethylating the oligosaccharides for analysis by Maldi-Tof Mass Spectrometry, and 4) completing deuterium exchanges on the six samples for a better detection of anomeric signals by proton nuclear magnetic resonance (NMR) spectroscopy. Through analysis, I tried to determine whether my modifications to established glycoprotein identification techniques were successful. In addition to glycan purification, my research also

involved optimization of an existing peracetylation technique, which I used on egg yolk oligosaccharide samples, the ovalbumin/alpha 1-acid glycoprotein samples processed before, and human milk oligosaccharide samples to aid in the identification of different glycan moieties by NMR spectroscopy.

### **Open Textbooks and the Innovation of Education**

Elisabeth Bentley

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

This project focuses on discovering the academic, monetary, and social benefits of open textbooks, which are free digital textbooks provided digitally that can be remixed and edited by their adopters. The University of Georgia's Global Text Project serves as a model of an open textbook initiative for developing economies. The purpose of the research and its corresponding article is to determine the importance of open textbooks to university students, professors, and librarians and provide insights into effective practices for librarians in providing and disseminating information about such resources. Our research consisted of reviewing existing literature on the nascent field of open educational resources, conducting a focus group of university librarians, and interviewing the founder of the Global Text Project, Dr. Richard Watson, on how his initiative exemplifies the opportunities open textbooks provide to universities in developing countries. The resulting paper establishes the case for librarians in developing economies to take a leading role in deploying and managing open textbooks.

### **Preschoolers' Understanding of Arrows as Directional Indicators**

Valerie Bidwell

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

Arrows are commonly used as directional indicators for both adults and children. Research

has found that children are cued to look faster when cued by valid vs. invalid arrows. Yet, for such a common directional symbol, it is still largely unknown how children understand this directional indicator. They may be attending to the symbolic meaning of the arrow, or perhaps children are cued by more perceptual aspects like the visual weight of the arrow. This study presented 34 children with ten arrow stimuli that differed in direction and distribution of weight. We asked the children to use the arrow cue to find a hidden animal and recorded their eye movements as they were exposed to the various stimuli. Our results indicated that, on average, children three years and older were cued to look to the side indicated by the weight of the arrow but not to the side indicated by the direction. Children younger than three years of age were not cued by the weight or the direction of the arrow. These findings are consistent with past research on this topic and suggest that, though children at this age are cued by arrows, they may not necessarily be attending to the symbolic meaning arrows denote. These results demonstrate how perceptual processes can act as a foundation for the development of cognitive abilities like understanding written language and other abstract symbols.

### **Femininity, Freakishness, and Despair in the Novels of Harry Crews**

Charles Blackburn – CURO Scholar, CURO Summer Research Fellow

Dr. Hugh Ruppensburg, Department of English, University of Georgia

This presentation will address several novels by the Georgia-born writer Harry Crews. *Karate Is a Thing of the Spirit*, *Feast of Snakes*, and *Body* each involve comparable female characters and potentially anti-feminist commentaries. Whether the author intends to convey anti-feminist messages or merely to depict faithfully the attitudes of the male, "grit" inhabitants of the Wiregrass Region of southern Georgia and northern Florida remains unsettled in critical accounts. Absent from criticism is explicit analysis of the contribution of female characters to a larger theme of the loss of the traditional, agrarian South and, by extension, to a theme of

existential despair. Previous criticism also fails to explore a connection between women and another class of characters, Crews's freaks. It is possible that women and freaks perform similar roles in the novels and make similar contributions to the author's vision of modernity and fiction writing. Crews has said, "freaks are human beings who happen to be 'enterable.'" How does Crews access character through physical appearance? What problems arise from this approach? This presentation will attempt to establish new connections between issues formerly explicated independently and, in turn, to shed new light on the debate over anti-feminism in Crews's fiction.

**The Impact of Single-Parents and Their Disciplinary Strategies on Childhood Aggression**

Andrea Borders, Blair Morton, Erin Gilstrap & Lauren Heard

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

Current research on childhood aggression has shown significant relationships between the quality of maternal relationships and reporting external aggression in children during early childhood. Studies have shown that more aggressive and delinquent behavior is exhibited by children raised in single-parent homes than in two-parent homes. In studies of aggression in children, little evidence has been found to establish a relationship between the qualities of the parental relationship with the child to the likelihood of the child displaying excessive aggression. Furthermore, the few studies on relationships between children and their fathers are largely from middle-class samples, where the fathers are more likely to be married and committed to the child's mother. This study will examine the father-child relationship that exists in a different socioeconomic class since many of the children in this study do not reside within a two-parent home, or more frequently lack paternal guardianship. Therefore when investigating the results, the majority of children were raised by single mothers. This study examines whether externalized aggression was influenced by the absence of a second guardian.

In addition, parental disciplinary strategies and their effects on children's aggression were assessed. The data were collected from the local Head Start program in the southeastern U.S. Data consist of parental surveys and teachers' social/emotional evaluations using the SCBE form developed by Peter LaFreniere. The presentation will include discussion of the differences that were found in the data between boys and girls in displaying emotions and aggressions.

**Feeding the Energy Supply: The Market for Biodiesel in Costa Rica**

Christy Boudreau

Dr. Rebecca Moore, Warnell School of Forestry and Natural Resources, University of Georgia

This study investigates the financial feasibility of producing biodiesel at the University of Georgia campus in Costa Rica. The study examines biodiesel, not ethanol, because the campus vehicle fleet is run on diesel fuel, not gasoline. Palm oil is the feedstock of interest because it is recognized as an efficient fuel source in government policy, produced on a national level, and traded on international exchanges. Life cycle analysis indicates that jatropha and algae may prove to be more efficient feedstocks, but energy yields are not known with certainty, and further investigation into these feedstocks is beyond the scope of this project. The qualitative aspects of the biodiesel market are emphasized, but attempts are made to quantify biodiesel costs and benefits. A *pro forma* income statement is constructed for a hypothetical refinery. The biodiesel project is evaluated using a flow-to-equity discounted cash flow analysis, and an internal rate of return is calculated. According to this model, the net present value (NPV) of a \$640,000 equity investment in the hypothetical biodiesel refinery is \$145,087. Hence, UGA stakeholders will be advised against investing (today) in the construction and operation of a biodiesel plant and, therefore, will not suffer the losses of an unprofitable investment. Breakeven analysis shows that a small per-gallon tax credit could shift the project's NPV into positive territory, however, so if society values the environmental

benefits of biodiesel consumption, the populace could subsidize the industry to make production economically feasible.

**Variability of Motion in Individuals with Ankle Instability During Single Leg Jump Landings**

Jason Bowman – CURO Apprentice  
Dr. Cathy Brown, Department of Kinesiology,  
University of Georgia

Chronic ankle instability is a common condition prevalent in athletes and physically active individuals. Variability of motion may play a role in the development of ankle instability. The purpose of this study was to determine if there were significant differences in the coefficient of variation at the ankle, knee, and hip in three planes of motion during an anterior single leg jump landing. Eighty-eight participants were divided into four groups based on injury pathology criteria: mechanical ankle instability (MAI), functional ankle instability (FAI), copers, and controls. Participants wore reflective markers and performed 10 single leg landings while their joint motions and landing forces were measured. The coefficients of variation were calculated for each joint motion, a natural log transformation was performed on the data, and a one-way ANOVA tested for significant differences among groups with Tukey post-hoc testing at  $\alpha = .05$ . The control group demonstrated significantly greater variability ( $4.5 \pm 1.2$ ) than the FAI ( $3.8 \pm .5$ ) and MAI ( $3.8 \pm .6$ ) groups in hip frontal plane motion and than the FAI group in hip sagittal plane motion ( $4.3 \pm 1.2$  vs.  $3.6 \pm .4$ , respectively). The control group had significantly greater variability ( $2.5 \pm .6$ ) than the copers group ( $2.1 \pm .4$ ) in ankle frontal plane motion. Centrally mediated changes in lower extremity motion may cause individuals with chronic ankle instability to display limited joint motion variability during landing. A lack of flexible landing strategies may cause development of ankle instability and perpetuate the injury. Movement variability re-training at the hip, knee, and ankle may be an important component of rehabilitation following ankle injury.

**Land Tenure Change in Africa**

Kathryn Branscomb  
Dr. Bram Tucker, Department of Anthropology,  
University of Georgia

Contemporary economic development in Africa has tremendous implications for the continent's myriad indigenous land tenure systems. These systems have been evolving in response to changes in culture and economy for as long as people have carved out places for themselves on Earth. This paper argues that the privatization of land in Africa as part of economic development policies is incongruous with indigenous African land tenure and has inadvertent consequences for the land and people. The paper draws its conclusions from a breadth of studies by anthropologists and social scientists. Their arguments were analyzed and synthesized to investigate common characteristics of indigenous land tenure that are being impacted by development. The characteristics that do not mesh with privatization include the role of social hierarchy in determining people's level of access to the land, the multiplicity of rights to the same land, and tolerated ambiguity in land titles. The paper reveals the challenges of introducing foreign economic concepts into well-established cultural systems and compares formal neoclassical economics with substantivist views that economy is embedded in culture. It is difficult to gauge local peoples' reactions to the changes; the complexity of the impact on stakeholders' adds another dimension to the issue. As new paradigms change the basic economic goals of Africans, land tenure systems must adapt to these new economic goals and encompass the way a particular people approach the land.

**Not So Pretty: The Need for Cosmetics Regulation Reform**

Jenny Brickman – Roosevelt at UGA  
Dr. Jeffrey Fisher, Department Environmental  
Health Science, University of Georgia

Cosmetics represent a wide variety of products that are used by most, if not all, Americans. Even though 70 percent of chemicals placed on the skin can enter the bloodstream, the FDA

does not have the authority to ensure that the chemicals in cosmetics products on the market are safe for consumers. Due to this lack of government oversight, the U.S. relies on consumers to regulate the cosmetics industry. However, the lack of an adequate regulatory system has permitted the use of harmful toxins, such as carcinogens and neurotoxins, in cosmetics products that have the potential to cause negative health outcomes for Americans. This paper proposes that Congress create a new branch of the FDA, the Center for Cosmetics Evaluation and Research (CCER), to oversee cosmetics safety. The CCER will review and evaluate all existing cosmetics ingredients to ensure the safety of products on the market. The CCER will also create toxin-testing standards to test all new cosmetics ingredients. Finally, the CCER will review and evaluate all of these new ingredients for safety before use in products on the market. This will improve health outcomes for Americans by removing dangerous toxic ingredients from cosmetics. Based on the E.U. extended impact assessment of the Commission proposal for REACH (Registration, Evaluation, Authorization, and Restriction of Chemical Substances), a program to regulate the chemicals used by various industries, the health benefits of this proposed legislation can be estimated at 60 to 183 billion dollars over a 30-year generation from the reduction in cancer rates alone. Additionally, this legislation could make America's workforce more productive. A proper cosmetics regulation system is needed in the U.S. to improve health outcomes for Americans.

**Time Resolved Photoelectron Spectroscopy and the Photoprotective Properties of Adenine**

Amanda Brouillette

Dr. Susanne Ullrich, Department of Physics & Astronomy, University of Georgia

Pump-probe time-resolved photoelectron spectroscopy (TRPES) is used to study the electronic excited state lifetimes of the DNA base molecule adenine. Determination of these lifetimes leads to a greater understanding of the photostability of our genetic material under UV radiation. Photoion mass spectra and

photoelectron kinetic energy spectra were recorded for an excitation wavelength of 251 nm and an ionization wavelength of 200 nm. Excited state lifetimes were found by varying the pump-probe delay and following any changes in the photoelectron spectrum. Our experimental setup includes a femtosecond (fs) laser system, gas-jet molecular beam source, and photoelectron photoion coincidence (PEPICO) spectrometer. Our initial results identify the states  $S_2(\pi\pi^*)$  and  $S_1(n\pi^*)$  as participants in the electronic relaxation and determine that the initially excited  $S_2(\pi\pi^*)$  state quickly ( $\tau_1 = 71 \pm 16$  fs) decays to populate the  $S_1(n\pi^*)$  state, followed by a slow decay to  $S_0(\tau_2 = 950 \pm 50$  fs). These results agree generally with previously reported experiments attempting to determine the excited state lifetimes of adenine.

**On a Generalization of the Frobenius Problem**

Alexander Brown

Dr. Dino Lorenzini, Department of Mathematics, University of Georgia

In this research group and presentation, we consider a generalization of the Frobenius problem, where we seek the computation of the greatest integer having exactly  $j$  representations by a collection of positive relatively prime integers. This is a multidimensional generalization of the "stamp problem" in which one finds all achievable postages given two stamps of relatively prime values. It is known that larger than a certain (easily computable) number, all postages are possible. We expected to find and did prove an analogue of a theorem of Brauer and Shockley using the methods of elementary number theory. This theorem that we proved makes it easier to compute examples in dimensions higher than 2, and we show how it can be used for such computation.

**Derivation of Neural Progenitors from Induced Pluripotent Stem Cells**

Michael Burel – CURO Apprentice  
Science as Art

Dr. Steven Stice, Department of Animal & Dairy Science, University of Georgia

Human embryonic stem cells (hESCs) are pluripotent cells capable of becoming all human cell types. More specifically, hESCs have been shown to differentiate into neural progenitors (NPs), multipotent cells able to differentiate into neurons and neuroglia. Due to their more focused potential and viability *in vitro*, NPs are prime candidates for neurodegenerative disease studies and treatment options. However, hESC-derived NPs pose an ethical issue due to initial embryonic destruction and preclude therapeutic and disease study benefits from being realized. Patients may face immune rejection upon hESC-derived NP transplantation, and creating disease-specific cell lines with the genetic and epigenetic characteristics of a neurological disease proves difficult. This study attempts to circumvent these obstacles by differentiating NPs from induced pluripotent stem cells (iPSCs), genetically reprogrammed somatic cells with hESC-like characteristics. To derive NPs from iPSCs, IMR-90 human lung fibroblasts were subjected to lentiviral vectors encoded for transcription factors promoting pluripotency. The reprogrammed fibroblast cells (now iPSCs) were cultured using a three-phase process utilizing different media and dish coatings to direct iPSC to the neural fate and ultimately the NP identity. Initial immunocytochemical results show successful differentiation of NPs from iPSC with the expression of markers previously observed in hESC-derived NPs (Nestin, Musashi-1, and SOX2). iPSC-derived NPs were further differentiated into terminal neurons, where staining suggests the positive expression of Tuj1, a more mature neuronal marker. The NPs will be differentiated into neuroglia, and positive/negative controls against cell lines will be quantified with real-time PCR and flow cytometry. iPSC-derived NPs could fully actualize the clinical potential NPs possess, opening avenues for the reverse-engineering of neurodegenerative diseases like Parkinson's and Alzheimer's while providing feasible treatment options to curtail the symptoms that dominate affected patients' lives.

### ***C. elegans* IDE: Gene Annotation and Ability of Protein to Cleave A $\beta$ and a-factor**

Mary Burriss

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

Recently, the amyloid beta (A $\beta$ ) peptide has been the focus of research involving Alzheimer's disease (AD). A $\beta$  accumulation causes neurodegeneration. The insulin-degrading enzyme (IDE) breaks down insulin, A $\beta$ , and other biologically important peptides. If IDE activity, toward A $\beta$  specifically, could be enhanced, the accumulation of A $\beta$  would occur at a lower rate, delaying the progression of Alzheimer's. The Schmidt lab has identified eight compounds that activate rat IDE *in vitro*. For a cost efficient animal model to study IDE and its activators, we decided to utilize the *C. elegans* system. My aim was to create a *CeIDE* expression vector and purify the enzyme to assess its ability to cleave relevant substrates and study the effects of the activators. After cloning the gene into the expression vector, the sequencing results showed a 48 basepair deletion in the gene. When comparing my sequence of *CeIDE* with that predicted by the literature and with that of other species, the 48 basepair gap was present in the same location in all species examined except two orthologs of *CeIDE*. I hypothesize that the published *CeIDE* sequence is incorrectly annotated. To test this hypothesis, *CeIDE* was purified using cobalt-sepharose column chromatography and assayed for activity using fluorescence-based *in vitro* assays. The enzyme cleaved A $\beta$  and a-factor based substrates, so it is reasonable to believe the 48 missing basepairs do not affect the active site of the protein. If the compounds increase *CeIDE* cleavage of A $\beta$ , they could be used as therapeutic treatment of Alzheimer's disease.

**The Abandonment of Truth: Imaging Brad Pitt as a Celebrity Hero**

Corbin Busby – CURO Summer Research Fellow

Prof. Isabelle Wallace, Department of Art History, University of Georgia

Fashion photography is now being subjected to the kinds of analysis previously reserved for high art, with increasing but still limited numbers of books and articles published on the subjects of fashion photographers and their work. Emboldened by this trend, my research focuses on the photography of menswear in fashion editorials featuring celebrities. I will focus on editorials that were featured in fashion magazines such as *W* magazine, *GQ*, and *Vogue*. I also will also incorporate the films *Interview with a Vampire*, *Mr. and Mrs. Smith*, and *Fight Club*. The objective of the research is to do a close reading of several interrelated texts drawn from the fields of film, fashion photography, and entertainment news. What binds these texts together in my research is their reliance on Brad Pitt. The connections between these texts will be used for greater understanding of the separation and blending of Pitt's private and public life, and fictional and nonfiction characters and their development of his persona as a product available for consumption in a variety of mediums. Because Pitt is himself a product and because many photographers and filmmakers play with this idea while exploiting his capacity to sell, these texts are well suited to my goal of exploring the role of the celebrity in connection with mass culture and the consumer, as well as the gendering of capitalism and consumerism. Also at issue is the concept of intertextuality, which Vernon Hyde Minor defines as the inability of a work of art to be created in isolation because it has been influenced by earlier and contemporary works of art. When understood as a whole, these interrelated images exemplify and illuminate the phenomenon of *intertextuality*, which is in turn revolutionizing our relation to images and their meaning(s). This research has great implications for how the consumer interacts with the image and perception of self. The results of this research will benefit art historians' interpretations of

contemporary art, especially portraiture, and marketers and advertisers who use images of celebrities to sell products.

**Evaluation of Physical Activity, Spasms, and Diet After SCI**

Elizabeth Callaway & Kirsten Battles

Dr. Kevin McCully, Department of Kinesiology, University of Georgia

People with spinal cord injuries (SCI) are more prone to metabolic and cardiovascular diseases. Contributing factors to these diseases include poor diet and reduced physical activity. The purpose of the study is to evaluate physical activity, diet, spasm activity, and blood glucose levels in a people with complete SCI. After human subjects' approval was obtained, 30 patients will be recruited from the Shepherd Center in Atlanta. Subjects with SCI will complete a food frequency questionnaire, the Physical Activity Recall Assessment for People with Spinal Cord Injury, and the Penn Spasm Frequency Questionnaire to sum up information regarding their diet, physical activity, and frequency of spasticity. Blood glucose levels will be obtained via finger prick to evaluate the risk of developing diabetes. We hypothesize that people with SCI will score lower on diet and physical activity scores than able-bodied people and that high glucose levels will be associated with poor diet, low physical activity, and low spasm activity. If successful, this study will provide a baseline assessment of physical activity, spasm frequency, and diet in people with SCI located in the state of Georgia and the surrounding region. This information will be used to guide future studies designed to improve health in people with spinal cord injuries.

**A Georgia High School and Technical College Dual Degree Program**

Kathryn Camp – Roosevelt at UGA

Dr. John Schell, Department of Workforce Education, Leadership & Social Foundations, University of Georgia

Georgia is ranked 47th in the nation for high school education due to low test scores and high dropout rates. Currently, Georgia "tracks"

students into either a college preparatory (CP) track or a technical preparatory track in their ninth grade year. The technical track provides courses to develop vocational skills but does not require students to take vital college-bound courses. This setup means that students must make a crucial decision for their future when they are only 14 years old that they cannot change later. In fall 2010, Georgia will eliminate the technical prep diploma to close the education gap. This paper evaluates the impact of this policy and analyzes the potential consequences, including the lack of vocational skill accumulation by students who do not plan to continue their education past high school. As proven through multiple studies by the department of education and independent researchers, this policy risks higher dropout rates and greater unemployment levels for Georgia. To maximize the potential for all students to obtain success, this paper proposes that Georgia create a dual degree program allowing high school students to take traditional high school classes as well as career-oriented courses from a local technical college for graduation. This will lead to lower dropout rates, higher college matriculation, and lower unemployment in the state.

**One Heart Flaming More than All the Rest:  
Considering Biography When Reading the  
Poetry of Lady Mary Wroth**

Julia Carpenter

Dr. Fran Teague, Department of English,  
University of Georgia

How are readers to take the sonneteer's life into account when analyzing poetry? This paper will consider the possible influence of Lady Mary Wroth's own life events on the sonnet sequence *Pamphilia to Amphilanthus*. Lady Mary Wroth, niece of the famous Sir Philip Sidney, was the first Englishwoman to author a sonnet sequence. The structure and style of *Pamphilia to Amphilanthus* reflect her deep connections to her uncle, Sir Philip Sidney, and to her aunt, Countess of Pembroke. Her scandalous relationship with her cousin, William Herbert, Lord of Pembroke, provides the subject matter. Wroth adheres to Petrarchan form, as seen in her

uncle's poetry, and she follows a path blazed by her aunt, also a female poet writing in a time unreceptive to women authors. This paper will further examine why Wroth esteemed her familial ties so strongly. Lady Mary Wroth's poems have only recently been brought to modern light and thus have yet to be dissected ad nauseum. This paper will seek to elucidate further the circumstances that inspired Lady Wroth to write them as well as to investigate the possible bearing of her personal experiences on the meanings of *Pamphilia to Amphilanthus*. In analyzing the style of Wroth's and her uncle's poetry, inquiring into her relationships with the Countess of Pembroke, and immersively studying *Pamphilia to Amphilanthus*, this paper will explore how the unusual events of her life affected her poetic work.

**Dispersion of Single-Walled Carbon  
Nanotubes in Aqueous Solution**

Meagan Cauble

Dr. Marcus Lay, Department of Chemistry,  
University of Georgia

Single-walled carbon nanotubes (SWNTs) show great technological promise in a wide variety of electronic and structural applications. However, investigations and applications of individual SWNTs are severely limited by their insolubility in water caused by their strong inter-SWNT van der Waals attractions. Well-dispersed SWNT suspensions are imperative to the deposition of networks of SWNTs. In order to disperse individual SWNTs in an aqueous solution, surfactants must be used to form micelles around the tubes. In this study, a non-oxidizing purification method was used to remove any remaining bundles of SWNTs, carbonaceous impurities, and catalyst nanoparticles to form suspensions of undamaged, high-aspect ratio SWNTs. Transmission UV-Vis and near-IR spectroscopy were used to obtain extinction coefficients and to produce calibration curves for solutions produced under various conditions. Atomic force microscopy (AFM) was used to evaluate the effect of various suspensions on the average density of SWNTs deposited onto a substrate. This presentation will demonstrate that SWNT dispersion in solution is strongly

dependent upon the concentration of SDS and is not greatly affected by the initial concentration of SWNTs. As the SDS concentration increased, the amount of SWNTs in suspension increased. This was confirmed by AFM images because the density of SWNTs deposited onto substrates increased as the SDS concentration increased. Once the critical micelle concentration for SWNTs had been reached, however, increasing the SDS concentration had little effect on SWNT dispersion.

**Characterization and Detection of Non-Covalent Binding of Single-Stranded Oligonucleotides to Single-Walled Carbon Nanotubes**

Meagan Cauble

Dr. Marcus Lay, Department of Chemistry,  
University of Georgia

Studying the ways in which single-walled carbon nanotubes (SWNTs) interact with biological molecules is important as the mechanism of this interaction is poorly understood and is important for their utilization in biological systems. Furthermore, the effect of bound SWNTs on the stability of double stranded DNA has not been thoroughly investigated. In this study, single-stranded DNA (ssDNA) molecules were assembled to the SWNT surface after dialysis with a molecular weight cutoff of 20 kD to remove surfactant molecules used to disperse the nanotubes. Additional dialysis to remove non-bound ssDNA molecules resulted in a solution of ssDNA-SWNTs. The binding of ssDNA to SWNTs was visualized using UV-Vis, nIR, and Raman spectroscopy. nIR absorbance peaks shifted after ssDNA attached to the SWNTs. Furthermore, ssDNA was detected in the solution by UV-Vis spectroscopy, and SWNTs were detected in the solution using UV-Vis and Raman spectroscopy. Atomic Force Microscopy (AFM) was also used to characterize deposited solutions of ssDNA and solutions of SWNTs wrapped with ssDNA. Future experiments will detect the hybridization of complementary DNA strands to the ssDNA-SWNT complexes. Changes in concentration of unhybridized complementary DNA strands will be used to

calculate the rate constant of the hybridization reaction. Experiments will be done with various DNA strands to determine if the DNA sequence affects the hybridization kinetics. These results are important because understanding SWNT and ssDNA interactions and hybridization events at the SWNT surface will aid further research for the development of technologies for gene delivery, molecular probes, nano-scale biosensors, and molecular labeling of cells.

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

Daniel Cellucci

Prof. R. G. Brown, Lamar Dodd School of Art,  
University of Georgia

Assisting sculpture and studio foundations professor R. G. Brown with his artistic research, I have taken the data previously gathered from such instruments as Ground Penetrating Radar, Electromagnetic Conductivity, and SONAR, and seek now to use these samples to fabricate forms that can truthfully reflect the data from which they are derived. Building upon the results of a research project presented at the 2009 CURO Symposium involving applications of SONAR to underwater art, I will explore new opportunities presented by additional tools employed in the study of remote sensing to the area of sculpture. As defined by the National Aeronautics and Space Administration (NASA), "remote sensing," in the most generally accepted meaning, refers to instrument-based techniques employed in the acquisition and measurement of geographically distributed information. The aims of this research are twofold. The first aim is to create software tools that will convert the data into a format that can be read by machines which can precisely fabricate the necessary dimensions specified by the data. These tools hold value not only for the task at hand but also for future projects that require such translations. The second aim is to experiment with the machines that could be employed to create the sculpture and with the materials used for the sculpture itself. These tools will include, but are not limited to, metal fabrication, CNC router, and Rapid Prototyping devices.

**Effect of GIPC-GAIP Coexpression on LPA Induced Signaling in CHO-K1 Cells Stably Expressing the LPA1 Receptor**

Ariel Chan

Dr. Shelley Pence, Department of Pharmaceutical & Biomedical Sciences, University of Georgia

Ovarian cancer accounts for more deaths than any other cancer of the female reproductive system in the United States. Lysophosphatidic acid (LPA) serves as a signaling molecule that induces proliferation, metastasis, and migration of ovarian cancer cells through a set of G-protein-coupled receptors (GPCRs) and guanine nucleotide-binding proteins (G-proteins). Regulation of G-protein signaling (RGS) proteins plays a direct role in regulating signaling cascades initiated by GPCRs by accelerating the deactivation of the  $G\alpha$ -subunit of G-proteins. RGS proteins regulate LPA signaling in ovarian cancer cells. The exact process through which RGS proteins bind to  $G\alpha$ -subunits is unknown, however. Previous research suggests that the regulatory process is coordinated by G-proteins and GPCRs. The scaffold protein GIPC has been shown to interact with both RGS19/GAIP and the LPA1 receptor. Thus we hypothesized that GIPC regulates the interaction between LPA1 and RGS19/GAIP proteins. To investigate the relationship between LPA1, RGS19/GAIP, and GIPC, we tested the effect of expression of RGS19/GAIP and/or GIPC on LPA signaling in CHO-K1 cells stably expressing the LPA1 receptor. The ability of LPA to stimulate inhibition of adenylyl cyclase (cAMP) was measured in adenylyl cyclase activation assays. No consistent regulation of LPA stimulated *Gai* activity was observed, suggesting that RGS19/GAIP and/or GIPC do not significantly alter activation of this pathway. Future experiments will investigate alternative pathways and additional RGS candidates. Establishing a novel mechanism for LPA signaling has the potential to advance prevention and treatment methods for ovarian cancer.

**Factors Affecting Cardiovascular Disease in the Third World**

Puja Chebrolu

Dr. Alex Anderson, Department of Foods & Nutrition, University of Georgia

Historically, cardiovascular diseases (CVD) have affected mainly the western world. Evidence suggests, however, that CVD is increasing in developing countries. Growing economies such as Ghana are particularly affected by CVD because of the disability it causes in their working population. Also, countries such as these have to deal with the double burden of infectious disease, which poses yet another challenge to growth. The existing body of published research suggests that hypertension and diabetes are increasing in all areas of Ghana, partly because of the nutrition transition effect. The purpose of this research is to increase scientific knowledge about CVD in rural Ghana. Blood pressure and blood glucose data will be used as indicators for CVD. Statistical analysis will be performed on pre-collected data to identify the factors influencing high blood pressure and high blood glucose among 308 women in rural Ghana. Hypertension will be defined as systolic blood pressure of  $>140$  mmHg, prehypertension as 120-140 mmHg, and normal blood pressure as  $<120$  mmHg. Diabetes will be defined as fasting blood glucose levels greater than 140 mg/dl, and prediabetes as 120-140 mg/dl. The results will be discussed in terms of potential factors such as maternal education, family history, weight, geography, prevention or control of rising prevalence of CVD, and development of methods of early detection of risk for CVD. This study will provide a better understanding of risk factors for CVD in developing countries and aid in implementation of programs and services to lower the burden of chronic diseases.

**The Reinstatement of the USIA: Combating the Threat of Anti-Americanism in the Post 9/11 World**

Katherine Cherry – Roosevelt at UGA

Dr. Howard Wiarda, Department of International Affairs, University of Georgia

Following the Cold War, the United States emerged as a hegemon lacking a clearly defined enemy. As such, the U.S. lost sight of the critical importance of maintaining a strong public diplomacy front. The abolishment of the United States Information Agency (USIA) symbolizes a shift in American foreign policy. The Clinton Administration created the new position in the State Department, the Undersecretary for Public Diplomacy and Public Affairs, replacing the former Director of the USIA. The new Undersecretary lacks the tie directly to the President formerly held by the Director of the USIA and therefore lacks relevancy and influence in the White House. This has resulted in disjointed, unsupported, and ineffectual public diplomacy efforts. It has also led to an unprecedented rise in anti-Americanism abroad, posing major danger to U.S. national interests, a trend highlighted by the tragic events of 9/11. Over the course of fall 2009, I gathered primary and secondary data on public diplomacy, the USIA, and anti-Americanism with the Center for the Study of the Presidency and Congress. The result of this research is the following conclusion: In order to combat the threat of anti-Americanism, the smart power of public diplomacy must be used. The most effective means to reinvigorate U.S. public diplomacy is to reinstate the USIA. This reinstatement will bring the necessary relevancy and influence back to this crucial part of American foreign policy. The benefits of this policy include increased international understanding and exchange, decreased anti-Americanism, and increased U.S. security.

**Delayed Reproduction and Age/Class Structure in a Randomly Varying Environment**

Rene Cieszewski

Dr. Daniel Promislow, Department of Genetics, University of Georgia

Various biological populations have been shown to tend towards reproductive behavior that counters common ideas of how such natural populations might act. This reproductive strategy foregoes optimizing short-term reproductive yield in order to maximize long-

term reproductive fitness. In particular, these strategies have been extensively studied empirically and theoretically in plant populations. Here we intend to expand existing theoretical models in order to implement more detailed age and class structure in the population. Our model involves a population of seeds with the initial choice of reproducing or remaining as dormant seeds. The idea is that seeds do well when they germinate to become reproductive plants in a good environment but die if they germinate in a bad environment. A stochastic environmental variable determines a frequency of years that are either favorable or deleterious. A seed cannot predict whether it is germinating into a good or poor environment. Seeds that do not germinate have some constant probability of decay and death. Until now, most models have looked at populations where adults only live for one year, like dandelions. In our model, adult plants can delay reproduction and age further, or reproduce and die, though there is some risk that an adult will die without reproducing. We are attempting to derive an analytical solution for the optimal germination fraction using a set of algebraic equations. However, we may be unable to do so and may have to resolve the model with simulation or other numerical evaluations.

**The Temporal Distribution of the Vesicular Stomatitis Virus in Experimentally Infected Cattle: An Immunohistochemical Study**

Caroline Colden – CURO Scholar

Dr. Corrie Brown, Department of Pathology, University of Georgia

Vesicular stomatitis virus (VSV) is a single-stranded, negative-sense arbovirus in the Family Rhabdoviridae. Cattle, pigs, and horses can become infected. The virus settles in and causes damage to the surface tissues of the feet, tongue, snout, and teats, causing vesicular (blistering) lesions. Infection can have debilitating effects on the animals as they become reluctant to eat, nurse, or move around. They lose a great deal of weight, which diminishes their economic value. To devise effective control measures, it is important to understand how the virus spreads around the body and how it damages cells. In

this study, immunohistochemistry was used to detect the presence of the virus in tissues of cattle experimentally infected with VSV. Virus was inoculated into the skin at the top of the hoof (coronary band), and tissues were examined sequentially to envision presence of virus and associated damage. By immunohistochemistry, VSV was present in the coronary bands and draining lymph nodes 12, 24, 48, 72, 96, and 120 hours post-infection (hpi) with highest intensity in the coronary bands at 48 and 72hpi. Virus appeared predominantly in cells of the stratum spinosum layer, which exhibit unique intercellular bridges. Special staining for these intercellular bridges revealed a marked correlation between presence of this structure and replicating virus, indicating that the intercellular bridges may be functioning in viral entry or transport.

### **The Effects of Spinal Fusion on the Physical Function of Females with Adolescent Idiopathic Scoliosis**

Jaharris Collier – CURO Apprentice  
Dr. Kathy Simpson, Department of Kinesiology,  
University of Georgia

Adolescent Idiopathic Scoliosis (AIS) is a spinal deformity in which the spine curves left and right. The most widely used and accepted surgical procedure for scoliosis is spinal fusion. The exact limitations on physical functions that this procedure causes are currently unspecified. It is our goal to investigate what effect spinal fusion has on physical abilities. Females between the age of 16 and 25 with spinal fusion, with AIS, and with normal spines were compared to determine the effects of fusion on physical function. Radiographs to provide a visual of the spine were obtained from each participant. By using a Vicon machine to capture the movement of reflective markers strategically placed on the participants' body, the range of motion of the spine was determined for various physical tasks. A force platform was used to determine the balance and weight distribution of the participants as they executed certain basic tasks. The data from these test showed significant differences in the functioning of each test group. These differences indicate that

performances of daily tasks are noticeably affected by the spinal fusion procedure to a quantifiable amount. By quantifying these differences, a prediction regarding the approximate effects that spinal fusion will have on physical capabilities can be provided to future surgical candidates.

### **Macular Pigment and Its Relation to Body Fat Distribution**

Jessi Crabbe, Madison Asef & Daniel Tim  
Dr. Billy Hammond, Department of Psychology,  
University of Georgia

Lutein and zeaxanthin are two carotenoids found readily in green, leafy vegetables and 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 sex differences through an analysis of adipose tissue distribution among different body regions. Eighty-six 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 absorptiometry (DXA) scans assessed percentage body fat. Preliminary data indicate an inverse relationship between body fat percentage and macular pigment ( $p < .05$ ). Evaluating the specific distribution of body fat in both sexes could lead to the discovery of a biomarker for groups at risk for macular degeneration.

### **Teaching Journalists to Cover Poverty: The Where, Why, and How**

Carolyn Crist – CURO Scholar  
Prof. John Greenman, Department of  
Journalism, University of Georgia

“Sense of place” is the way people relate to their environment. This paper aims to help journalists

learn to convey information using local identities to explain poverty in persistently poor locations. Sense of place, historical characteristics, narratives, and tradition should be used to cover poverty in a way that will draw in readers. Community members should be able to form accurate ideas about their locale and know how poverty affects it through crime, health, business, and education. National statistics, surveys, and legislation can be used at a local level to explain poverty trends. This paper provides specific ideas to incorporate poverty coverage in beats across the newsroom. Journalists can include several beats in the coverage, however, and should not hesitate to follow other journalists' examples of coverage. The 21 tip sheets were created for the poverty web site to instruct journalists on how to generate exemplary stories about poverty in relation to financial services, family, race, education, health, housing, and politics. The final section discusses how to market the web site and make it effective and accessible for journalists in the field.

**Differentiation of Natural and Post-Vaccinal Canine Distemper Virus Encephalomyelitis**

Kelly Cummings – CURO Summer Research Fellow

Dr. Scott Schatzberg, Department of Small Animal Medicine, University of Georgia

Canine distemper virus (CDV) is a highly contagious and infectious disease that affects the respiratory, alimentary, and central nervous systems (CNS) of dogs, with the latter characterized by encephalomyelitis (EM). Since their introduction in the 1960s, modified-live CDV vaccines have been effective in decreasing the incidence of the disease. Rarely, there have been outbreaks of dogs exhibiting CDV EM shortly after vaccination. Differing brain lesion and viral inclusion patterns in such cases served as pathological evidence for post-vaccinal CDV EM, but no definitive molecular proof existed. In this study, genetic differences between the wild-type and the three most common vaccinal strains of CDV were used to determine the origin of disease in previous cases of CDV CNS infection. RNA was extracted from formalin-

fixed, paraffin-embedded brain tissue samples from nine dogs with suspected post-vaccinal CDV EM. Reverse transcription polymerase chain reaction (RT-PCR) performed with newly designed primers amplified regions of the phosphoprotein (P) gene identified as having the most genetic variability. DNA sequencing, sequence alignment, and phylogenetic analysis were used to confirm or disprove the presence of vaccinal nucleic acid in each clinical case. Research findings will allow for definitive discrimination between natural and post-vaccinal CDV encephalomyelitis and could aid in improving future vaccine development and disease treatment.

**Diminution of Concentrative Nucleoside Transporter 1 (CNT1) Activity in Human Ovarian Cancer Cells: Subtype-Dependent Gemcitabine Response to Exogenously Expressed hCNT1**

Shannon Cummins – CURO Scholar  
Dr. Rajgopal Govindarajan, Department of Pharmaceutical & Biomedical Sciences, University of Georgia

Ovarian cancer is the fifth leading cause of cancer-related death in women worldwide and has the highest mortality rate of any cancer of the female reproductive system. hCNT1 (human concentrative nucleoside transporter 1) has been indicated as a high-affinity transporter of anticancer drugs (e.g., gemcitabine) in solid tumors, but its efficacy in ovarian cancer is unknown. In this study, we examined the functional expression of hCNT1 in normal and cancerous ovarian cells and compared its contributions toward gemcitabine efficacy in various histological subtypes of ovarian cancer. Immunostaining indicated that, unlike normal ovarian cells (IOSE80), cancerous ovarian cells lack hCNT1 expression at the cell surface. 3H-gemcitabine transport studies also indicate a reduction in transport (3-10 fold) by the ovarian cancer cells compared to IOSE80. Stable retroviral expression of hCNT1 in various ovarian cancer cell lines showed variations in hCNT1 localization, 3H-gemcitabine transport, and drug sensitivities. hCNT1-expressing endometroid cancer cells showed the greatest

change in drug sensitivity tests in which their IC50 values decreased from their wild type around 140 fold, and hCNT1-expressing serous cells also had a moderate decrease of around 25 fold. The teratocarcinoma cells and clear cell carcinoma cells showed no change. The exogenously expressed hCNT1 was not recruited to the cell surface in either of these cell lines. In the clear cell carcinoma cell, it was misdirected to the Golgi. These data indicate that hCNT1 transportability is highly diminished in human ovarian cancers and that reintroduction of hCNT1 to regain gemcitabine sensitivity is subtype specific.

**Genetic Diversity of *Yucca filamentosa* and *Y. aloifolia* in Athens-Clarke County, Georgia**

Nicholas Dallas, Michael McKain, James Leebens-Mack, & Jeremy Rentsch  
Dr. Wendy Zomlefer, Department of Plant Biology, University of Georgia

*Yucca* is a genus of flowering plants in the agave family (Agavaceae) with approximately 40 species. Gene flow within and among *Yucca* species has been determined to be strongly affected by the particular breeding system. *Yucca filamentosa*, a native species, and *Y. aloifolia*, an exotic species, are both likely pollinated solely by the yucca moth, *Tegeticula yuccasella*. Since gene flow is restricted by the pollinator's limited range, we hypothesize more variation between populations than within populations. Five *Yucca* populations of these two species around Athens-Clarke County, Georgia were sampled to determine genetic variability between and within populations. Total DNA was extracted from frozen leaf tissue. Several plastid (e.g., *ycf1*) and three nuclear (e.g., *ef1a*) markers were chosen to capture the greatest amount of diversity among members of the population. These were amplified via PCR and Sanger-Sequencing methods. Sequences are being analyzed for variability, which will be quantified by several statistical methods such as the fixation index. Comparisons of plastid and nuclear DNA data will allow determination of the genetic diversity between populations versus within populations, clarifying conflicting data from previous studies.

This study will further the understanding of gene flow between *Yucca* species attributed to yucca moths and provide insight into the possibility of population segmentation.

**Calcium Imaging of Nodose Ganglion Cells in Response to Gastrointestinal Signals: CCK and CP 55,940**

Kelly Darby  
Dr. Gaylen Edwards, Department of Physiology & Pharmacology, University of Georgia

It has been demonstrated that fourth cerebroventricular application of cannabinoid agonist facilitates food intake at lower doses than effective doses injected in the lateral cerebroventricle. It has also been reported that direct injection of cannabinoid agonist into the lateral parabrachial nucleus facilitates food intake. These data indicate hindbrain endocannabinoid systems are important in the control of food intake. More recently, we have found that cannabinoid agonist injected into the fourth ventricle attenuates the elevation of cFos-immunoreactivity in the nucleus of the solitary tract after IP cholecystokinin injection. As an extension of those studies, we will focus on evaluating the activation of primary afferent neurons (nodose ganglion cells) by gastrointestinal hormones such as cholecystokinin (CCK) and the ability of cannabinoid agonists such as CP 55,940 to suppress this activation. Neuronal activation is evaluated by measuring calcium flux into the neuron with calcium-sensitive dyes. We expect to find that CCK will increase calcium flux into nodose ganglion cells and that CP 55,940 will decrease CCK-induced calcium flux. Our findings will be important in developing a better understanding of how neuromodulators like cannabinoids can influence afferent signaling from the gastrointestinal tract.

**Constructed Wetlands and Southeast Waste Water Treatment Policy**

Shanell Davis – Roosevelt at UGA  
Dr. Ronald Carroll, Odum School of Ecology, University of Georgia

This paper reviews existing policies concerning waste water treatment in the southeastern region of the United States. Research has shown that constructed wetlands (CW) are better able, when compared to conventional waste water treatment plants (CWWTP), to degrade pharmaceuticals, hormone disrupting chemicals, and persistent organic chemicals/pollutants that are becoming increasingly harmful to the environment due to bioaccumulation in the ecosystem. This analysis reviews current literature on constructed wetlands and waste water treatment policies in the states of the southeastern region of the U.S. It also identifies the financial, political, and infrastructural challenges associated with implementing constructed wetlands in the Southeast. The paper identifies “best management practices” for CW, such as tolerant vegetation and sediment characteristics, and provides suggestions to augment or change waste water treatment policies to result in cleaner water flowing through the Southeast and how these changes will improve wildlife conservation.

### **Using the Public Value Mapping Model to Evaluate Groundwater Mining**

Shanell Davis – Roosevelt at UGA  
Malin Dartnell

Dr. Barry Bozeman, Department of Public Administration & Policy, University of Georgia

Plant Washington, a proposed coal-fired power plant in Sandersville, Georgia, recently received draft permits to withdraw surface and groundwater from the Oconee and Ogeechee River basins. If approved, the plant will withdraw an average of 16.12 million gallons per day (MGD) from fifteen wells in a river basin that has experienced considerable stress over the past decade due to drought. The free and, arguably, excessive use of groundwater by utility companies in the state of Georgia is a perfect context in which to analyze public values using the Public Value Mapping model (PVM) developed by Dr. Barry Bozeman. PVM is a framework used to analyze public values in a context orthogonal to the current economic model by identifying how the market and private sector fail to meet public values, i.e. public

values failure. The economic rationale for groundwater usage by utilities will be identified and contrasted with the public values failure. This paper will use the PVM criteria to identify and analyze the public values failures and will recommend viable solutions.

### **Digital Proliferation: Discerning New Literary Genres Spawned by Digital Technology**

Sara Day

Dr. Elizabeth Davis, Department of English, University of Georgia

With the proliferation of digital technology in the past few decades, we have been bombarded by a superabundance of information. As a product of this proliferation, part of a cultural transformation that operates on a paradigm of hypertextuality, literature has changed extensively in form and presentation. While poetic and dramatic modes have evolved with advances in digital technology, the development of narrative, and transformations in narrative theory as a result of hypertext fiction, more generally represent broad innovations in literary genres. Narrative predominantly performs the work of marrying old print traditions with new digital media by revealing the effects of print literature on new electronic forms of fiction, as well as electronic influences on the print novel. As seen in Mark Danielewski’s *House of Leaves* and Jonathan Safran Foer’s *Extremely Loud and Incredibly Close*, the print novel has become a cross-referential collage woven from an infinite variety of information. Prompted by the call of N. Katherine Hayles in her book *Electronic Literature*, this study responds to the need “to attend to the specificity of networked and programmable media while still drawing on the rich traditions of print literature and criticism.” Following the approach of Walter J. Ong, who posited in the 1980s that the novel arose from the development of print technology and, to a greater extent, from the larger transformation of an entire worldview, this study answers the challenge of identifying new literary genres of narrative born from the intersection of print media and digital technology.

**Karma in America: The Rebirth of the Male Adolescent Indian Immigrant into the American Hip-Hop Subculture**

Katie Deray

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When immigrants move to the United States, they often shed their native identity and appropriate a new American one to afford a place in society. The large increase in the Asian Indian-American population has brought about a greater visibility and prominence of the Indian Diaspora. Rather than adopt the mainstream, Anglo-Saxon identity their parents have tried to assume, some male adolescent Indian immigrants (MAIIs) choose the identity of a marginal subculture, specifically the African-American hip-hop subculture, and visually express it through hip-hop dress. In a still racially polarized society, where one is either “white” or “black,” this MAII, who is “brown,” identifies with African-American subculture. The construction of his new identity is based on his cultural-political-economic context, formed by popular media, and involves the appropriation of the stereotypical black male attitude associated with hip-hop archetypes. From this identification, he derives defiance, aggressive pride, masculinity, and status. His hip-hop dress becomes a proper reflection of his environment—the urban metropolitan scene—and communicates the hypermasculinity he wishes to possess to counteract the emasculation he has experienced as an immigrant and because of his social position as “Other.” Based on personal observations, the insights of dress scholarship, and the findings of cultural studies on subcultures, this paper explores how hip-hop dress allows some MAIIs to be socialized into American society and fulfill an immediate social and affective need to belong in a new culture.

**Somalia: Recommendations for Conflict Resolution Where Failure is the Norm**

Ashley Doliber

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Conflict has gripped Somalia for decades with little to no end in sight. While many have tried to resolve the conflict, a sustainable and successful strategy remains elusive. As a failed state with a bitter past and tenuous future, there is a tactical and moral imperative for the region and the global community to bring stability to Somalia. With a moderate government, international attention, and an as-yet imperfect insurgency, there may never be a better opportunity to act than now. Based on analysis of the Somali conflict history and context, as well as research on conflict resolution and management methods, and attention to the consequences of each prescription, this study outlines a comprehensive and multifaceted approach to achieving long-term peace in Somalia. The research indicates taking the conflict of Somalia and the semi-autonomous region of Somaliland on a separate—though mutually informing—basis. For Somaliland, partition is recommended to remove the region from the danger of continued attachment to Somalia proper as well as to encourage nascent state, civil and democratic institutions in Somaliland. In Somalia proper, however, a two-pronged strategy is best. This policy consists of peace- and state-building via coordinated international intervention (e.g., UN, AU, regional actors), followed by negotiations between the government, insurgents, and any other important players (e.g., warlords, clan leaders). Through a careful and considered application of these prescriptions, the country has a chance to usher in an era of stability, security, and opportunity that the people of Somalia have seldom seen.

**The Youth of Roswell Voices**

Joshua Dunn – CURO Scholar

Dr. William Kretzschmar, Department of Linguistics, University of Georgia

My research is a continuation of the Roswell Voices project, a linguistic and oral history project begun in 2002 by Dr. William Kretzschmar and the Roswell, GA Folk and Heritage Bureau in an attempt to capture the reality of linguistic change in a dynamic environment. While the project originally

focused on the past and the interviewing of older residents, I investigate how the speech—phonetics, syntax, and lexicon—of inhabitants of Roswell ages 18 to 30 groups them together as a distinct community. I also endeavor to characterize how their speech fits into the large picture of dialect research in the American South and whether new patterns and categorizations are pertinent. To accomplish this task, I interview nine informants for one hour each, discussing life in Roswell, and each interview is fully transcribed. For comparison, I also look at interviews of older informants from previous stages of Roswell Voices. I look for common speech phrases and lines of discussion to point to a sense of community. To establish where my younger speakers fall in the spectrum of Southern dialectology, I consult the relevant literature to compile a discrete list of features and then perform a statistical analysis to determine the significant recurrence of these features in the speech of my informants. I also run a computer-based acoustical phonetic analysis to aid in determining the extent to which my informants follow the proposed Southern Vowel Chain Shift.

**The Medical Malpractice Crisis: A Proposed Radical Solution**

Stephen Earnest – Roosevelt at UGA  
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Medical malpractice cases are settled as torts through the civil court system. This method of compensating malpractice victims has been demonstrated to be ineffective, however, by the Harvard Medical Practice Study and two other similar supporting studies. These findings of these studies suggest that only about 1% of all patients injured by malpractice ever file a legal claim. Additionally, they revealed that older adults and low-income individuals were disproportionately less likely to file a claim. The court system is also undesirable from the perspective of most doctors. For both guilty and innocent physicians, trials are usually long, costly, and psychologically damaging, which may lead to lessened ability to provide care. To create a more effective system of compensating

victims of malpractice, this paper proposes that the state of Georgia establish a no-fault system of compensation by forming a new government agency to deal exclusively with malpractice disputes. This new agency would standardize payments based on specific types of injuries in a way similar to worker's compensation. This agency would train, authorize, and commission agents to investigate and assess malpractice claims using predetermined criteria and price schedules. Because this process would be far less expensive and time consuming per individual, a far greater number of deserving individuals could be compensated using the same amount of resources. In this way, the no-fault system would provide a fairer means of allocating funds to malpractice victims.

**Affordable Housing in Athens-Clarke County: A Two-Pronged Approach**

Ellyn Echols – CURO Scholar, Roosevelt at UGA  
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Across the United States, state and local governments are becoming increasingly aware of the need to provide affordable housing to their communities. The local government of Athens-Clarke County (ACC), Georgia has been one of many in the Southeast to add to these efforts. Affordable housing is widely defined as housing that costs a family no more than 30 to 35 percent of their annual income, including costs for taxes and utilities. In 2002, a Human and Economic Development study of Athens-Clarke County found that while there exists no real shortage of housing units in Athens, the affordability of these units continues to be a struggle for individuals earning 30 percent or less of the median family income in the area. Furthermore, the type of new development experienced in Athens has been mostly student driven by the large university presence, leading to households clustered together by economic class, and often race, limiting housing mobility and segregating communities. Providing affordable housing will require a comprehensive approach to bettering the lives of Athenians. This paper asserts that in order to provide

affordable housing to the community, zoning ordinances in ACC should be amended. Past zoning ordinances have served to segregate suburban neighborhoods and leave low- to median-income earners without access to affordable homes. By adopting inclusionary zoning (IZ) in Athens-Clarke County (ACC), the local government can promote the availability of housing for lower-income residents and integrate a socio-economically stratified community.

**Inclusionary Zoning: Promoting Affordable Housing in the Southeastern United States**

Ellyn Echols – CURO Scholar, Roosevelt at UGA

Dr. Andrew Carswell, Department of Housing & Consumer Economics, University of Georgia

Across the United States, state and local governments are becoming increasingly aware of the need to provide affordable housing to their communities. Affordable housing is widely defined as housing that costs a family no more than 30 to 35 percent of their annual income, including costs for taxes and utilities. Historically, the federal government has been the foremost enactor of policy to promote housing for low to mid-income individuals. Recently, however, local governments are utilizing inclusionary zoning (IZ) programs to provide a sustainable source of low-income housing. The local government of Athens-Clarke County (ACC), Georgia has been one of many in the southeast to add to these efforts. In 2002, an HED study of Athens-Clarke County found that while there exists no real shortage of housing units in Athens, the affordability of these units continues to be a struggle for those earning 30 percent or less of the median family income in the area. Furthermore, the type of new development experienced in Athens has been largely student driven, leading to households clustered together by economic class, and often race, limiting their housing mobility. This paper seeks to examine the use of IZ programs across the country and more

specifically in the southeast. Combining an examination of the current literature on IZ practices and using ACC as a case study, implications of adopting IZ ordinances are examined. Subsequently, implications for policy makers are discussed.

**Civilian-Oriented Preparedness for Radiological Terrorism**

Nathaniel Edwards – Roosevelt at UGA

Dr. Dmitriy Nikonov, Center for International Trade & Security, University of Georgia

American security analysts in 2002-2003 predicted an incident involving a dirty bomb (a radiological weapon) within a decade, the most likely form of non-conventional terrorism to occur. The majority of the impact of such an event is psychological. This paper analyzes the harmful effects of trauma from such an event, including psychological and physiological harms, mass fleeing, and an overwhelmed local healthcare infrastructure. Despite predictions of the high level of anticipated psychological trauma after an event, the current policy surrounding radiological attacks focuses mostly on rebuilding and responding to the physical damage. Physical and professional preparedness do not prevent or mediate the psychological impact (the most significant source of disruption and harm) resultant in a radiological attack. This paper proposes that the Department of Homeland Security (DHS) adopt a two-pronged civilian-oriented preparedness program focusing on an education campaign and municipal meetings in high-risk cities. This approach is designed to communicate the risks of radiation and radiological terrorism as well as the best means to respond to an incident. By educating the public and involving them in local preparedness, DHS can develop a culture of resilience among Americans. A resilient community suffers less trauma and, thus, less psychological harm. In turn, a resilient community also suffers less disruption. Less disruption enables the government to provide better care to more victims by avoiding overwhelming local infrastructures and mass fleeing of the contaminated area.

**An Examination of Motivation for Medication Adherence in Pediatric Patients with Inflammatory Bowel Disease and Parents**

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Inflammatory bowel disease (IBD) is an autoimmune condition of the digestive system affecting approximately 100,000 American adolescents. Symptoms include abdominal pain, nausea, diarrhea, vomiting, and weight loss. These symptoms are treated with several classes of medications. Medication nonadherence places an adolescent with IBD at risk for increased morbidity and mortality. Examining reasons why adolescents and their families are motivated to adhere to IBD medication regimens are vital to improve adherence. The purpose of this study is to explore the relationship between adolescents' and parents' motivation for medication adherence and levels of adherence to prescription and non-prescription medication. Eighty-three adolescents with IBD between the ages of 11 and 18 and their parents completed an interview assessing medication adherence and the Treatment Self Regulation Questionnaire. The TSRQ measures motivation for adherence on three subscales: the autonomous regulatory style (self motivation or a feeling of choice), the controlled regulatory style (motivation due to pressure by others), and amotivation (lack of motivation). Results revealed that responses on the TSRQ for both adolescents and their parents were correlated with adherence to prescription and nonprescription medication. In both adolescents and parents, a positive correlation was found between reports of an autonomous regulatory style and adherence to prescription medications. In parents only, a positive correlation was seen for self-report of an autonomous regulatory style and adherence to non-prescription medication. Results show that higher levels of autonomous motivation are related to improved adherence.

**Genomic Profiling of Ovarian Cancer Cells in Response to a Gonadotropin**

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Ovarian cancer is the most lethal gynecological cancer, due to the lack of methods for early diagnosis. High concentrations of the pituitary gonadotropin, luteinizing hormone (LH), and its receptor (LHR) have been found to precede and directly affect reproductive disorders that correlate to high incidences of ovarian cancer. Microarray analysis was used to test the hypothesis that LH may activate certain pathways favorable to tumor progression. This study determined acute effects of LH on the ovarian cancer genome by revealing differentially expressed genes that may result in a specific phenotype. A cell model was developed using human ovarian cancer cells (SKOV3) that do not express LHR (these LHR-cells serve as control), along with stable transformants expressing a known number of LH receptors (LHR+). LH was incubated with LHR+ SKOV3 cells, and following RNA isolation and reverse transcription of the cellular mRNAs, gene expression was measured at time intervals of 1, 2, 4, 8, and 20 hours and compared with ovarian cancer cells receiving no LH. Over 3,000 genes were differentially expressed at least 2-fold upon LH activation of LHR, and 16 pathways previously designated as essential to the survival of ovarian cancer were examined based on the temporal patterns of gene expression. Results indicated major variations in gene expression upon LHR activation, with some of the affected pathways being conducive to growth and others not. Additional studies are required to further delineate the biological meaning of these complex patterns of altered gene expression.

**Energy Expenditure and Gain of Nut-Cracking in Wild Capuchin Monkeys (*Cebus libidinosus*) in Piau, Brazil**

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Wild bearded capuchin monkeys use large stones to crack palm nuts. The benefits of nut-cracking are unclear, especially since the activity appears energetically costly and exposes the monkeys to increased risk of predation. We determined whether the energy expended to crack a *piçava* nut (*Orbignyia*), the toughest nut the monkeys crack, exceeds the caloric value of the nut. From video, we coded nut-cracking behavior in five individuals (2.03 – 4.28 kg) during 50 nut-cracking episodes (striking the nut with the stone). We obtained maximum downward velocity of the 1.42 kg stone to calculate the maximum kinetic energy (work output) produced by the monkeys. Using published estimates of Mechanical Efficiency, ME (% of energy expended that is transferred from precursor to object) for humans, we estimated the monkeys' ME (range = 5% to 35%). Then we used the work output and the ME to estimate energy expended and compared it to the energetic value of an average nut (162 KJ). Our findings suggest that even with a 5% ME, the monkeys gained energetically from nut-cracking. To exceed the caloric value of the nut, the monkeys would have to perform more than 549 strikes on one nut (the maximum we observed in our sample to date was 36). We conclude that nut-cracking is worth the monkeys' efforts, energetically, even if they are intermittently successful at opening a nut. Energy expenditure devoted to search and transport of the nuts (1 – 2 kJ/min) is not likely to change this conclusion.

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

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Cardiovascular disease is the leading cause of death and disability in the United States, but exercise may decrease the risks of developing cardiovascular problems. Risk factors associated with cardiovascular problems are more prevalent in spinal cord injury and multiple sclerosis populations. This study will explore the acute vascular benefits of compression therapy as an exercise alternative. Six able-bodied control

subjects completed two rounds of compression therapy—muscle pump (90mmHg @ 5s) and medium pressure (130 mmHg @ 10 s). Ultrasound velocity measurements of the femoral artery were taken during 3 minutes of baseline, 8 minutes of compression, and 2 minutes of recovery. Femoral artery diameter was recorded at baseline and immediately after compression ended. Resting velocities were calculated as average, positive, and negative velocities (10.7, +25.5, -12.3 cm/s, respectively). Velocities during “muscle pump” were 7.7, +30, -17.4 cm/s respectively. Velocities during “medium pressure” were 8.4, +32.3, -21.3 cm/s respectively. “Medium pressure” showed a greater change in positive and negative blood flow compared to baseline. Arterial diameter tended to increase after the “muscle pump” protocol, suggesting flow mediated dilation, a sign of a healthy vascular response. Preliminary evidence suggests that both compression therapy methods produce an augmentation in positive and negative flow but a decrease in net flow. Further testing is needed to determine if either protocol produces a healthy response in vascular dilation. Compression therapy holds promise for producing exercise-related vascular responses for individuals who cannot exercise.

### **Determination of Interferon Sensitivity of Wild-Type and Lab-Adapted Rabies Viruses**

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It has been reported that rabies virus (RABV) can evade the innate immune responses by interfering with interferon (IFN- $\alpha/\beta$ ) responses, particularly the activation of IRFs and with STAT signaling. However, only lab-adapted RABV has been used in such studies. It is not known if wild-type RABV also interferes with IFN- $\alpha/\beta$  responses. We propose to determine the differences in IFN sensitivity between wild-type and lab-adapted RABV by employing two cell lines and four RABV strains in this study. Mouse neuroblastoma (NA) cells are capable of producing IFN- $\alpha/\beta$ , while baby hamster kidney cells (BSR) are not. The RABV for this study includes two lab-adapted (B2C and L16) and

two wild-type RABV (DRV and SHBRV). The cells are treated with the same concentration of IFN- $\alpha/\beta$  and then infected with different RABV. At 24, 48, and 72 hr after infection, the supernatant is harvested for virus titration and cells for assessing viral RNA replication using a spectrophotometer. If a particular virus is sensitive to interferon, a marked decrease should be observed for virus replication and production. The results from this study are important for understanding how RABV develops ways to counteract a host's innate immune responses and may have implications in developing therapy for clinical rabies.

**The Perfect Man: Reconstructing the Self Through the Prose and Poetry of Muhammad Iqbal**

Rebecca Faulkner

Dr. Max Reinhart, Department of Germanic & Slavic Languages

Muhammad Iqbal develops the ideal of the Perfect Man within the framework of Islamic theology through prose in *Reconstruction of Religious Thought in Islam* and through poetry in *Secrets of the Self*. Iqbal's writing is immensely significant: his thought forms a singular connection between Western philosophical methods and Islamic theology of the East. Iqbal explicates his account of the ideal Self by the philosophical and theological discussion of consciousness, tension, and immortality in *Reconstruction*, which sets the stage for a creative exploration of the same concepts in poetry. Each notion thematically corresponds to a character in *Secrets*; consciousness, tension, and immortality correlate to Saki, Khizr, and Moses, respectively. The concepts map out Iqbal's arguments in *Reconstruction*, and their coinciding personalities accompany his poetic narrative in *Secrets*. Each of the two methods, prose and poetry, illuminates the multiple levels of meaning in Iqbal's account—the different types of analysis necessary to glean meaning from both prose and poetry lend the reader the means to acquire a holistic understanding of Iqbal's work as philosophy, theology, and literature. *Reconstruction* supports the rich

poetic palette of *Secrets*, allowing the interactive process of reading poetry to fill the spiritual gaps left by prose that must mesh with an established religious tradition. By examining Iqbal's conception of the Perfect Man, one opens an essential dialogue between East and West that provides opportunity for further scholarship in a largely under-researched field. This dialogue bridges cultures, religions, languages, and locations in an effort to spread understanding.

**The Effects of Stress-Induced Analgesia and Peripherally Administered Cannabinoid Receptor Antagonists on Formalin-Induced Pain Behavior**

Rebecca Feistritz – CURO Scholar

Dr. Andrea Hohmann, Department of Psychology, University of Georgia

Stress-induced analgesia occurs when neural systems naturally inhibit pain following exposure to stress in the environment. These pathways release cannabis-like substances in the body called endocannabinoids.

Endocannabinoids activate cannabinoid CB1 and CB2 receptors to suppress pain. The present studies evaluated the contribution of peripheral cannabinoid receptors, located outside the brain, in stress-induced analgesia. The formalin test was used to measure stress-induced analgesia in rats. Formalin injected into the rat paw produces pain behavior. It was measured in control rats as well as rats exposed to brief shock applied to the paws. Rats were exposed to footshock to create stress-induced analgesia before injection of varying concentrations of formalin. In both shocked and non-shocked rats, pain behavior increased with increasing formalin concentration. Pain behavior was lower overall in rats subjected to footshock. Thus, stress-induced analgesia suppressed formalin pain. The antagonists AM251 and SR144528 were administered locally in the paw before footshock and formalin administration to block cannabinoid CB1 and CB2 receptors, respectively. SR144528 increased formalin pain, implicating a role for peripheral CB2 receptors in stress-induced analgesia. AM251 produced a trend toward increased pain. Pain behavior of

rats pretreated with either antagonist resembled control rats without stress-induced analgesia. In summary, stress-induced analgesia reduces formalin pain, and blockade of peripheral cannabinoid receptors eliminates pain relief produced by exposure to footshock stress. Our studies suggest that endocannabinoids are released by exposure to footshock stress and activate peripherally located CB2 receptors to produce stress-induced analgesia. Stress-induced analgesia dampens formalin pain through activation of peripheral CB2 receptors.

**Patriotism and Protest in Georgia's Civil Rights Movement: The 1971 Columbus Policemen's Strike**

JoyEllen Freeman – CURO Apprentice  
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In the late 1960s and early 1970s, as many African Americans grew impatient with the tedious progression towards equality, the Civil Rights Movement became affected by an expression of black nationalism and the antiwar struggle. Influences such as Black Power and the Vietnam War affected the sentiments of many African Americans who still felt denied of equal rights. Using newspapers and court records, I investigated a representative example of the evolving Civil Rights Movement: the summer of racial tension in Columbus, Georgia during 1971. On May 31, 1971, seven African American policemen were arrested for ripping the American flags from their uniforms during a protest. The officers, all Vietnam veterans, claimed that racial discrimination prevailed throughout the police force, and they refused to wear the flag until they received racial justice. Their gesture triggered racial tension and violence, which reached its climax on July 31, 1971, when ninety-one African Americans protested outside of the police headquarters. My research reveals the influence of patriotic sentiments and Black Power ideology on Georgia's Civil Rights Movement. This event demonstrates how one Georgia city served as a microcosm of the heated feelings of impatience and racial power that brewed throughout the United States. Finally, the inclusion of my

research in the pedagogical materials of the Civil Rights Digital Library makes knowledge of historical events during this time period accessible to the public through the web.

**Charting the Legacy of Southern Womanhood in Southern Gothic Fiction**

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The Southern Gothic movement in American literature is characterized by its heightened sense of reality and grotesque characters, who are subjected to the stifling atmosphere of life in the South. The crumbling landscape of the post Civil War era provides the setting for readers to experience many horrifying realities. However, instead of utilizing the Gothic tradition to evoke instances of sheer terror, authors of the Southern Gothic genre use it to explore social issues and the lives of marginalized figures. This research endeavors to analyze the legacy of southern womanhood through a variety of female characters within the genre. Southern antebellum society levied burdensome expectations upon Caucasian women, forcing them to embody the chaste, virtuous ideal of the culture while limiting them to the domestic sphere. Yet Southern Gothic fiction throughout the twentieth century still portrays females who come in conflict with these limitations that originated in the antebellum period. Therefore, this research will chart female representation in relation to the traditional southern ideal of southern womanhood. The implications of race, class, and sexual orientation, in addition to gender, will also be analyzed in order to suggest that oppressive limitations plague a majority of southern female characters within Southern Gothic fiction, regardless of other defining qualities. Furthermore, this research will consult both early twentieth century and contemporary Southern Gothic writers such as Erskine Caldwell, William Faulkner, Eudora Welty, Carson McCullers, Flannery O'Connor, Toni Morrison, Alice Walker, Dorthy Allison, and Harry Crews.

**Deterministic Assumptions of Positive Freedom**

Matthew Glass

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Conceptions of positive freedom advanced by political philosophers such as Plato, Hegel, and Rousseau hold that free actions are those which conform to what Isaiah Berlin terms one's "true" self. That is, actions are only free when unconstrained by physical barriers and internal barriers such as ignorance and irrational thought. I will be continuing to examine the concept of positive freedom through a study of selected ancient, modern, and contemporary philosophical works, primarily including Plato's *Gorgias*, Rousseau's *On the Social Contract*, and Isaiah Berlin's *Two Concepts of Liberty*. I argue that the conception of positive freedom is self-contradictory and therefore impossible to hold logically. In order for an action to be free under the conception of positive freedom, the action must be perfectly rational. This implies that a perfectly rational action is possible. For this to be the case, the action must have knowable consequences. For actions to have knowable consequences, one must assume a kind of determinism. If any situation lacked causal determinism, then the consequences of the action would be unknowable and a person could not act freely. However, accepting determinism as true is self-defeating because determinism negates the possibility of choice and freedom as existent concepts. Positive freedom, then, assumes a concept which destroys it. It cannot be seen as a logical conception of freedom.

**Health Care Around the World**

Barrett Gold

Dr. Brenda Cude, Department of Housing & Consumer Economics, University of Georgia

There has been much political discussion in Washington about health care reform in the United States. The reform focuses on three main weaknesses of our current system: inequality in accessing health care, soaring administrative

costs, and lack of uniformity. As policymakers try to solve these problems it is important to identify the causes of each problem and explore different solutions. The purpose of this study is to survey the different healthcare systems around the world and identify strengths and weaknesses in each. Ideally, the strengths of foreign systems could be optimally combined with an influx of American innovative ideas to create a sensible proposal for healthcare reform. Through secondary research, this study identifies countries (specifically Japan, Germany, France, Switzerland, and Taiwan) that excel in certain aspects of the administration of health care and identifies certain recurring patterns among the systems ranked most favorably by the World Health Organization. By evaluating the development of health care in the United States and American culture and politics, this study attempts to integrate the successful commonalities that improve efficiency, equality, and costs found in other systems with unique American proposals to create an optimal health care system that would be embraced by the majority of the American public and legislators.

**Exploring the Mechanisms of Neuron Specific Glycosylation in Embryonic *Drosophila melanogaster***

Harrison Grace

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Glycoproteins are immensely important molecules that cover the surfaces of cells and mediate many important cell-cell interactions and tissue specific processes. Especially important in neural development, specific glycoproteins direct synaptic plasticity and axonal pathfinding. The mechanisms that regulate tissue-specific glycosylation, however, are relatively unknown. A genetic screen for mutations that affect tissue-specific glycosylation in the embryonic *Drosophila* nervous system identified a novel mutation, designated sugar-free frosting (Sff). The homozygous Sff mutation altered glycan expression and created neural defects in NMJ formation. This led to behavioral defects in

locomotion. To study the connection between altered glycosylation and phenotypic defects and to explore the process of tissue specific glycosylation in neural development, other steps in the Sff-mediated control pathway need to be explored. Toward these ends, a genetic interaction screen was developed and implemented to identify mutations that interact with Sff. The mutagenesis screen was designed to test for non-complementation of the locomotion deficit and the glycosylation defect of Sff mutants. Going through multiple generations, novel behavioral tests and *in situ* antibody staining processed thousands of initial random mutants. Four candidate mutants have been recovered that show significant interaction with the Sff mutation. These mutants will be further characterized and analyzed for their place in the neuron-specific glycosylation pathway by assessing their neural development, glycan expression, and interactions with other genes. Characterizing how these mutations work together will help to elucidate the mechanisms that regulate glycosylation and neural development.

### **The Mystery of Telomere Recombination in Normal Yeast Cells**

Zijing Guo

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Telomeres are protective caps at chromosome ends that are composed of direct repeats. These protective caps contribute to aging in humans. Most cells maintain telomeres by using the enzyme telomerase. If cells lack telomerase, however, they can sometimes elongate telomeres by utilizing homologous recombination. Previous research surprisingly 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 is 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, DNA circles containing a mutated telomere and a *URA3* gene is constructed. This is done by ligation of a tract of mutationally tagged telomeric repeats into a *URA3* gene-containing plasmid and then excision of the telomeres-*URA3* fragment with restriction enzymes followed by self-ligation into a circle. Next, the circles are transported into *URA3*-deficient *Kluyveromyces lactis* mutant cells, and only the cells with *URA3* genes are able to grow. The telomere structures will then be analyzed to see if wild-type-length telomeres are recombined with the telomeric circles. This study is significant because it could help us see how telomeres elongate using recombination, a process that occurs in a subset of human cancers.

### **Effects of Daily Saccade Practice on Behavioral Plasticity in Schizophrenia**

Erin Hansen – CURO Summer Research Fellow  
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Patients with schizophrenia often have difficulty with behaviors that require executive functioning, such as inhibition. The purpose of this study is to determine if practicing a task that requires inhibition could result in improved performance on other measures of executive control. Over a two-week trial, patients with schizophrenia (n = 30) and healthy control subjects (n = 30) were assigned to daily practice of a saccade task; 15 participants from each group practiced either a prosaccade task (redirection of gaze toward a peripheral cue) or an antisaccade task (inhibition of a gaze toward a peripheral cue and generation of gaze towards the mirror image location of the cue). At the beginning and end of the trial, participants also completed two tests of executive functioning—the Ocular Delayed Response (ODR) task and the Wisconsin Card Sorting Task (WCST). In the preliminary results, every group showed improvement on the practice task. The schizophrenia antisaccade group showed improvement on ODR and WCST, while the schizophrenia prosaccade group showed poorer performance. Although both the schizophrenia and healthy antisaccade practice groups showed

improvement on ODR and WCST, the healthy group showed greater improvement. These results indicate that executive control in schizophrenia may be less malleable than in healthy controls. Also, since the schizophrenia antisaccade group did show improvement on ODR and WCST, the results also suggest that purposeful practicing of executive control tasks could be used as a means of improving generalized executive function in schizophrenia.

### **Conjugal Transfer of Virulence in the Opportunistic Intracellular Actinomycete *Rhodococcus equi***

Chris Harding

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*Rhodococcus equi* is a soil-derived, facultative intracellular, Gram-positive actinomycete that can survive and replicate inside macrophages. It causes severe pyogranulomatous pneumonia in foals and immunocompromised humans. Strains isolated from foals and 30% of those from humans contain an 85-90kb virulence plasmid. Homology searches have shown the plasmid to contain genes with sequence similarly to those involved in conjugative DNA transfer in other organisms. Conjugative ability has been linked to bacterial biofilm formation, which can aid in the pathogenesis of an organism. The conjugative potential of the *R. equi* virulence plasmid has never been studied. This work addresses that deficiency and seeks to establish whether the virulence plasmid is conjugative as is hypothesized. A donor *R. equi* strain containing a marked virulence plasmid was mixed with a virulence plasmid-free recipient strain differentially marked on its chromosome. After incubation, bacteria were subjected to antibiotic selection plating specific for donor, recipient, and transconjugant strains. Putative transconjugants were recovered, and plasmid transfer frequencies were calculated using putative transconjugant/recipient values. Complete virulence plasmid transfer was verified by PCR analysis. Results show the virulence plasmid can be transferred from donor to recipient strains with a frequency ranging from  $1 \times 10^{-1}$  to  $1 \times 10^{-2}$ . Plasmid transfer was

minimally affected by the presence of DNase, required living cells, and prolonged cell to cell contact, factors consistent with conjugation as the means of transfer. If conjugation and biofilm formation are found to be linked, disruption of the former may prevent the latter and could alter disease transmission.

### **MicroRNA let-7f regulates STAT1 Activity in Human Lung Epithelial Cells**

Craig Hayes – CURO Apprentice

Dr. Ralph Tripp, Department of Infectious Diseases, University of Georgia

MicroRNAs (miRNA) are short ~22nt RNA sequences that govern host gene expression in part by binding to complementary sequences in the 3' UTR of target mRNAs, resulting in their silencing. Hundreds of miRNAs have been discovered or predicted and are believed to target and repress hundreds of targets each. Virus infection of host cells affects miRNA expression, and one such miRNA, termed let-7f, has recently been implicated as important in the response to respiratory syncytial virus (RSV) infection. One function of let-7f appears to be in post-transcriptional regulation of the Signal Transducer and Activator of Transcription (STAT1) gene. In this study, to evaluate the role of let-7f on STAT1 gene regulation, let-7f mimics and inhibitors were co-transfected with Metridia luciferase reporter plasmids controlled by a CMV promoter and containing the STAT1-3' UTR into human respiratory epithelial cells. The role for let-7f regulation of STAT-1 was determined via luciferase secreted in the cell supernatant, a technique that allows for evaluating the tempo of regulation via luciferase expression without lysing cells. The results showed that the let-7f mimic repressed luciferase expression while the let-7f inhibitor increased luciferase expression compared to mock transfected and non-targeting control transfected cells, confirming that let-7f is a regulator of STAT1 expression. Further studies are ongoing to determine other pathways affected by let-7f during RSV infection.

**Gov. James McDowell and the Virginia Slavery Debate of 1831-1832**

Mary Boyce Hicks – CURO Scholar  
Dr. John Inscoe, Department of History,  
University of Georgia

James McDowell (1795-1851) was a planter and politician who resided primarily in Rockbridge County in the Blue Ridge Mountains of western Virginia. Because he was from the western part of the state, McDowell was not as involved in the elite social classes found in the state's Tidewater or Piedmont, where slavery was far more prevalent than in the mountains. He was elected to the state House of Delegates (1831-35) and then in 1841 was elected Governor, serving a single term. In 1831, Virginians underwent a major debate over the future of slavery in the state. Triggered by Nat Turner's insurrection, this series of hearings was meant to discuss this evil—slavery. McDowell was a major player in these debates that ultimately accomplished little. He was an excellent orator and delivered two major speeches. My thesis will focus primarily on this debate and McDowell's contribution. Why was so little accomplished? What did Virginians of all classes think of slavery at the time, including McDowell's constituents? How did McDowell's status as a slave-holding westerner affect his opinion on slavery and free blacks? Finally, how did this debate influence the perception of slavery and impact the course of slavery in Virginia up to the Civil War? I have researched in McDowell's correspondence in the Special Collections libraries at University of Virginia and University of North Carolina at Chapel Hill; these along with transcripts and newspaper account of the debates will be the means by which I answer these questions.

**Analyzing the Function of O-GlcNAc in the *Drosophila* Nervous System**

Marcus Hines – CURO Scholar  
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of Georgia

A dynamic cycle of addition and removal of *O*-linked *N*-acetylglucosamine (*O*-GlcNAc) at

serine and threonine residues is emerging as a key regulator of intracellular protein activity. Like phosphorylation, the *O*-GlcNAc modification significantly changes the function of the proteins to which it is attached. In addition, the *O*-GlcNAc modification may compete with phosphorylation for certain Ser/Thr target sites. Although there has been considerable research on documenting the functional implications of phosphorylation, the functions for *O*-GlcNAc are just beginning to be understood. A significant amount of cancer and developmental biology research is focused on phosphorylation as a regulator of cell growth and differentiation, but relatively little attention has been paid to the involvement of *O*-GlcNAc in these processes. Like kinases and phosphatases, the enzymes of *O*-GlcNAc addition, *O*-GlcNAc transferase (OGT), and removal, *O*-GlcNAc case (OGA), are compartmentalized and regulated. We have capabilities to analyze the presence of *O*-GlcNAc on the intracellular protein. This project focuses on dissecting cell autonomous and non-autonomous functions of *O*-GlcNAc by altering the expression of OGT and OGA within specific cells of the *Drosophila melanogaster* embryo in an effort to better understand the function of *O*-GlcNAc. Preliminary results have hinted that the addition of more *O*-GlcNAc in the engrailed cells of the *Drosophila* nervous system may hinder the engrailed cells' natural secretion of wingless cells. Further research on the function of *O*-GlcNAc, especially in the *Drosophila melanogaster* embryo, will continue to be conducted to obtain a deeper understanding of the glycan.

**The Multimethod Analyses of the Three Separated Parts of a Roman Sarcophagus with the Myth of Marsyas' Musical Contest with Apollo**

Shelby Hipol – CURO Apprentice  
Dr. Frances Van Keuren, Department of Art  
History, University of Georgia

The identification of the quarry sources of marbles is important to art historians, geologists, and archaeologists. Two forms of analysis are commonly used: petrographic, the analysis of

the marbles' color and grain sizes, and isotopic, the measure of the marbles' Carbon 13 and Oxygen 18 isotope values. Although this dual method is more accurate than using a single form of analysis, it still often fails to limit the possible provenances to a single quarry. Therefore, Dr. Frances Van Keuren and I propose supplementing the usual two forms of analysis with Electron Paramagnetic Resonance (EPR). EPR is an analysis of the amount of magnesium in marbles' chemical compositions. When used in conjunction with the other two forms of analysis, it adds another element of distinction between the marble varieties. This project examines all the fragments from one of the sarcophagi in Dr. Van Keuren's larger project, Multi-Method Analyses of Twenty Sarcophagi in the Museo Nazionale Romano, Rome. The three fragments all show parts of the Marsyas myth and seem to join. Our EPR data show all the fragments as being of Proconnesian marble. Yet, our isotopic data indicate that the fragments are not of the same variety of Proconnesian marble. Using only isotopic and petrographic analyses would have yielded doubt as to our identification of the marble's quarry source. This study is significant because it shows that, occasionally, two varieties of marble can come together in a quarry and skew analysis results if a block is quarried in such an area.

#### **Trends in Reporting Sustainability Actions**

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Georgia

As consumers become more environmentally conscious, many businesses have begun acting sustainably. Government regulations have also been put in place to compel businesses to report on the decisions that could affect the health of our planet. As a result of societal demands and governmental regulations, the shift toward measuring the sustainability of a product or service, and thus a business, has become more pronounced in recent years. Consequently, many major global companies are willingly and proactively engaged in supporting this important trend of acting sustainably and reporting it.

Some companies are reluctant to comply with environmental guidelines, however, and some companies do not report their compliance or non-compliance. This research reports on trends among different information technology sectors. It is based on data available in the annual or sustainability reports from companies in the Technology Hardware, Computers, and Telecommunications sectors. The analysis comes from queries executed in MySQL and will report on different companies' compliance level of environmental guidelines, which section of the global reporting initiative index has the most compliance across the various sectors, which sectors have the highest compliance, and which countries have the highest level of compliance. The release of the findings should encourage more reporting and compliance across the board by corporations, because it will reveal to stakeholders and consumers which businesses are complying with environmental guidelines set by the government. The findings may also shed light on current business efforts to promote sustainability.

#### **A Study of Predictive Modes of Thought with a Focus on Religion, Astrology, and Probability Theory**

Dillon Horne – CURO Apprentice, CURO  
Summer Research Fellow  
Dr. Thomas Cerbu, Department of Comparative  
Literature, University of Georgia

How did predictive modes of thought become a viable tool with which to make predictions? The research begins with the idea of religion as a “first mover” in the explanation of the chain of events that made prediction a justifiable venture. It specifically deals with the concept of “belongingness” as a driving force in this progression of thought. From there, a focus on the 16th century figure of Gerolamo Cardano is placed. He holds special significance due to his early dealings with game theory, giving rise to precursors of modern concepts of probability. His work on astrology provides insight into the development of predictability and why it had such a stranglehold on humanity. Moreover, the esoteric nature of the topic at hand demands a critical analysis into what constitutes “secret”

information. From there follows a brief overview of the correspondence between Fermat and Pascal, but with a larger emphasis on probability as an emergent concept rather than an epochal shift. This leads into modern studies of economics, governmental policy, etc. In particular, what is the connection between predictability and persuasion, and did that relationship lead us into our current recession? This project will build upon other works of history of philosophy and mathematics by providing a more comprehensive focus on predictive modes of thought. In a world so caught up in numbers, the significance of an encompassing study on the development of probability will serve to provide a basis of credibility for acting on predictions.

**Generation of a Mutant Core Streptavidin for Complexation with and Crystallization of Biotinylated Membrane Proteins**

Steve Hsieh

Dr. Raquel Lieberman, Department of Biochemistry & Molecular Biology, Georgia Institute of Technology

There is a great need to facilitate the crystallization of membrane proteins because once the crystals are grown, the molecular structure can be determined by X-ray crystallography. Membrane proteins prove difficult to isolate and crystallize, however. Hydrophobic membrane proteins have limited hydrophilic interactions to stabilize the protein in its crystalline form, and the lipid membrane surrounding the protein must be replaced with a non-denaturing detergent. The overall goal of this project is to develop a new general procedure to facilitate the crystallization of membrane proteins. For our approach, we take advantage of the high affinity between biotin and streptavidin, a water soluble protein that crystallizes easily. We will crystallize the complex between streptavidin and a biotinylated membrane protein. To achieve this goal, we introduced four key mutations disrupting the streptavidin tetramer to generate a dimeric streptavidin construct with two biotin binding sites. Site directed mutagenesis, which encompassed primer design, PCR, DPN1 digest,

transformation, cell culture, plasmid isolation, and sequencing, were used to introduce each mutation. The mutant streptavidin was then expressed and purified. Our next step was to form the streptavidin-biotinylated membrane protein complex. We are testing our method on a biotinylated form of signal peptide peptidase, a membrane protein. The complex was isolated by affinity chromatography. Crystallization trails are currently being conducted. If the approach we are developing is successful and we are able to solve the crystal structure of biotinylated SPP with streptavidin, it will be widely applicable to the structure determination of other membrane proteins.

**Investigating a Novel Alternatively Edited Protein's Involvement in Mitochondrial DNA Maintenance**

Tiffany Hu – CURO Summer Research Fellow  
Dr. Stephen Hajduk, Department of Biochemistry & Molecular Biology, University of Georgia

*Trypanosoma brucei* is the causative agent of African trypanosomiasis (African sleeping sickness), a parasitic disease that affects humans and non-primate mammals. The parasite belongs to a unique class of protozoa called kinetoplastids, which contain a dense region of mitochondrial DNA named the kinetoplast. To form functional mRNAs, posttranscriptional modification is necessary for most of the kinetoplast-encoded genes found in *trypanosoma brucei*. Recently, alternative editing of the mitochondrial cytochrome oxidase III (COXIII) transcript was found to code for a novel membrane protein, alternatively edited protein 1 (AEP-1). AEP-1 stably associates with the tripartite attachment complex, a kinetoplast-flagellum linkage that is involved in mitochondrial DNA maintenance and segregation. Homology modeling of AEP-1 against the bovine COXIII crystal structure reveals that its N-terminus is positioned toward the mitochondrial matrix. We propose that AEP-1 interacts with the kinetoplast and is involved in its maintenance. In this study, dominant negative mutation was used to investigate the function of AEP-1 in the mitochondria. Cells

with truncated (mt-AEP-1(1-59)-GFP) and non-truncated AEP-1 (mt-GFP) expression were monitored for cell growth abnormalities, and the growth inhibition of mt-AEP-1(1-59)-GFP was stronger than that of mt-GFPs. Fluorescence microscopy revealed that the truncated protein localized to the kinetoplast region, and aberrant kinetoplast morphology or absence of the kinetoplast was observed. To further investigate AEP-1's involvement with the kinetoplast, we will recombinantly express the N-terminal region and perform electrophoretic mobility shift assays to determine its DNA-binding abilities. This study will help us understand the true function of RNA editing in the trypanosome mitochondria.

### **Effects of Steel and Aluminum Shoes on Forelimb Kinematics 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 common due to their durability, availability, and cost. Due to the importance of performance horses' gaits for competition and athletic purposes, however, lighter weight aluminum shoes have been implemented to accentuate foreleg action. Such shoes are seen to increase speed in horse racing by allowing for more reach and improve the quality of gaits in certain disciplines. By performing a 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 1969.13 meters at day 4, 18, and 32 of each cycle. Video footage was analyzed using gait analysis software (OnTrack Equine™) for each repetition. Average stride length and velocity remained constant between treatments and times. However, breakover speed increased over time. Knee action showed a trend toward difference between treatment groups, with a larger knee angle observed for horses wearing aluminum shoes as compared to steel. This effect was significant at day thirty-two of each

shoeing cycle, indicating that horses may show more treatment effect as they become acclimated to shoe type. This finding is of particular importance to performance horse disciplines for which ameliorated knee action is desirable. A follow-up study is being conducted to further examine the time effect and length of shoeing cycle as it pertains to knee action between shoe types.

### **Relationships Between Features of Infant Vocalizations and Later Language Development**

Sarah Hutcheson – CURO Scholar

Dr. Suneeti Nathani Iyer, Department of Communication Sciences & Special Education, University of Georgia

The purpose of the present study was to examine the development of directedness of vocalizations and canonical babbling in infancy and their possible relationships with later expressive language measures in toddlerhood. The results of this study could potentially help establish a basis for the identification of children at risk for speech and language disorders. As part of an ongoing longitudinal study, 10 typically developing infants were recorded in a laboratory setting from 5 to 30 months at weekly to monthly intervals. The directedness of vocalizations, i.e., whether the vocalizations were undirected or directed toward a person or object, was ascertained at 6 and 9 months using muted video recordings. The age of onset of canonical babbling, or the production of well-formed consonant vowel sequences, was also determined. These results will be compared to scores obtained at 18 and 30 months of age on standardized expressive language and vocabulary size measures. It was expected that vocalizations directed toward a person or object would increase from 6 to 9 months of age as the infants' communication became more intentional. Based on results of previous research, a positive correlation between person-directed vocalizations and expressive language scores and vocabulary size was also expected. However, the prediction was neutral regarding the correlation between earlier canonical babbling onset and those same measures, as

previous research had obtained contradictory results.

**The Scaling Relationship Between the Photocatalytic Decay Rate and Height of TiO<sub>2</sub> Nanorods**

Whitney Ingram – CURO Summer Research Fellow

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

Titanium dioxide nanostructures (TiO<sub>2</sub>) are excellent candidates for purification of water and air using UV light energy. In order to optimize TiO<sub>2</sub> photodegradation, numerous studies have been carried out to analyze the relationship between nanostructure and TiO<sub>2</sub>'s ability to decay organic material. The quantitative relationship between the decay rate of one particular nanostructure, called nanorods, and their height has not been established.

Through this study, we developed a systematic approach to relate the decay rate of TiO<sub>2</sub> as a function of nanorod height. A theoretical model was also proposed to explain the experimental data. We systematically deposited nanorod arrays of different length and tested their photocatalytic decay rate of an aqueous solution of methylene blue (MB). The decay rate was measured by plotting the normalized absorbance peak of MB ( $\lambda = 664$  nm) after regular UV-irradiation time intervals. It was found that the decay rate increased monotonically with nanorod height ( $h$ ) and fit the power law  $\kappa \propto Mh^{\xi+N}$ , where  $M$  and  $N$  are constants, and  $\xi = 1.0 \pm 0.5$ . A theoretical model was derived that illustrates a direct relationship between the photocatalytic behavior and the morphological structure of TiO<sub>2</sub>. Both our experimental data and theoretical model fit very well. Our theoretical model also gives a detailed relationship between the photocatalytic decay rate and other experimental parameters such as UV light intensity and illumination area. We believe this quantitative model could be used for other photocatalyst systems with nanostructured morphologies.

**Abandon Hope All Ye Who Enter: The Solution to the Cartel Crisis in Mexico**

Archil Japaridze

Dr. Sergio Quesada, Department of Latin American & Caribbean Studies, University of Georgia

Amid the myriad conflicts in the world, few seem as hopeless as the drug wars in Mexico. Since President Calderon's declaration of war on the cartels, security in Mexico has rapidly disintegrated. My research attempts to answer the question of how to remove the cartels from power and re-establish the rule of law. The significance of my research lies in the potential to find a solution to this endemic problem. In order to find the keys to defeating the drug cartels, case studies and historical examples will be employed. For my case studies I will use secondary academic sources and primary journalistic sources to examine: the 1920s Bootleggers, the 1980s Colombian cartels, and the modern drug-backed FARC revolutionaries. I believe these cases to be particularly applicable since they showcase the pretenses under which governments have triumphed over extremely strong criminal organizations. Although these studies present valid points, however, Mexico is plagued by unique circumstances, making it imperative to understand the conditions on the ground and apply the relevant methods. Combining Mexico-specific methods and using examples from these case studies, I will formulate a comprehensive drug policy for Mexico to ensure a reasonably peaceful end to the cartel war. I anticipate that the most viable solution to the cartel war is to legalize and heavily regulate drugs, similar to prohibition era alcohol, but with thorough research I will find what offers hope for the fragile state.

**How Broad Are Infants' Face Discrimination Abilities in the First Year of Life?**

Ryan Jordan & Elizabeth Simpson

Dr Janet Frick, Department Psychology, University of Georgia

At birth, visual perception is broadly tuned, allowing infants to discriminate a wide array of stimuli. Infants who have not yet undergone

perceptual narrowing—whereby visual perception narrows as a function of experience—should have broad face recognition abilities and therefore should recognize faces of humans and non-humans equally well. Infants whose visual perception has already narrowed should easily recognize human faces and show more difficulty in non-human facial recognition. To test this model, facial identity discrimination was measured in 4-6-month-olds ( $N = 89$ ), and 9-11-month-olds ( $N = 70$ ) for the faces of three species: humans (*Homo sapiens*), capuchin monkeys (*Cebus apella*), and sheep (*Ovis aries*). In addition, we measured 4-6-month-olds' ( $N=10$ ) discrimination of wasp (*Polistes fuscatus*) faces. These species are phylogenetically more distantly related to humans than species previously studied. A visual paired comparison task revealed that 4-6-month-olds discriminated all species' faces equally well ( $p > .05$ ), while 9-11 month-olds were best at discriminating human faces ( $p < .05$ ). These results reflect human infants' transition from being face generalists—broadly discriminating facial identity for numerous species—to being face specialists—becoming experts in discriminating human faces. This research contributes to a better understanding of the perceptual foundations of early social relationships.

### **Shaped Like Steiner: Biodynamic Farmers of Southern Germany Enacting a Century-Old Tradition of Sustainability**

William Jordan – CURO Summer Research Fellow

Dr. Betty Jean Craige, Department of Comparative Literature, University of Georgia

In southern Germany, the concept of a sustainable or self-sufficient farm was introduced and methodized by Rudolf Steiner in a series of lectures he gave in the summer of 1924. This was the beginning of what is known today as biodynamic farming, a tradition still active in southern Germany. While most of Steiner's methods are centered on treating the farm as a self-contained organism, some of his more specific instructions for soil treatment are best described as mystical: they are based on

knowledge that Steiner claims to have intuited. My project is an exposition of photography and journalistic writing about four biodynamic farms, all of which have different views on Steiner and implement his agricultural and philosophical guidelines in different ways. I give special attention to closed cycles of resources within these farms. In addition, I discuss how many ideas being presented today by Michael Pollan, an emerging leader in the U.S.'s sustainable agriculture movement, echo or complement those of Steiner.

### **The Impact of Reading One-on-One to Head Start Children**

Meaghan Kelly, Kristina Housworth & Robert Gentry

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

Children's reading abilities impact their academic learning and other aspects of life long after the initial stage of basic learning and development. The development of these reading abilities depends heavily on the literacy skills they acquire at an early age. For children to gain these crucial literacy skills, they have to first be exposed to, and gain interests in, books. Past research indicated that 47% of children had no books present in the homes receiving public aid. This sample of disadvantaged children made up a staggering, but not surprising, 35% of children who entered kindergarten unprepared to learn. Reading to children and other environmental conditions have been suggested to contribute to the development of literacy in preschool-aged children. The present study therefore examines the effects of reading on low-income children in terms of their interest in books. It is expected that one-on-one reading would increase the likelihood of children's selecting books as their favorite object. Forty-eight children ranging from 35 to 46 months old, from a larger study, were assessed before a one-on-one reading program began. Individual child's object selections from a toy box, including a small book, along with participating in a play session with 12 toys and a book, were recorded as a baseline. Twelve lessons including reading were administered. Two follow-up assessments were

made, eight months and a year, after the program concluded. The results showed that more children selected books as their favorite objects. Detailed results and implications will be shared at the CURO symposium.

**Examining the Substrate and Inhibitor Properties of Protease Inhibitors and Statins with OATP Transport Proteins**

Fahad Khan – CURO Summer Research Fellow  
Dr. Jason Zastre, Department of Pharmaceutical & Biomedical Sciences, University of Georgia

Protease inhibitors (PIs), which belong to Highly Active Antiretroviral Therapy, raise the likelihood of a heart attack by 26 %. The concomitant use of PIs and the cholesterol-lowering agents statins causes muscle toxicity and the disease rhabdomyolysis. The PI atazanavir is purported to be an inhibitor of the transporter OATP2B1, and pravastatin is its suggested substrate. We examined the substrate and inhibitor properties of atazanavir and pravastatin in OATP2B1 and their interaction with the transporter. Human embryonic kidney 293 (HEK293) and Chinese hamster ovary (CHO) cells were transfected to express OATP2B1. Model assessments and substrate/inhibition studies were performed with transport assays. Estrone-3-Sulfate (E3S), estradiol-17- $\beta$ -glucuronide (E17 $\beta$ G), and atazanavir solutions were tritium-labeled, and protein assays were performed to measure the final amount of radioactive solution. The OATP2B1 cells featured an average E3S uptake of 0.13 pmol/mg protein, and the control featured an uptake of 0.02 pmol/ mg protein. In the presence of atazanavir, uptake decreased  $\sim$  2.5-fold. Atazanavir uptake was not affected by E3S. Increasing concentrations of pravastatin reduced uptake of E3S. Increasing concentrations of pravastatin did not decrease atazanavir uptake by OATP2B1. Atazanavir reduced E3S uptake, but E3S did not affect atazanavir, so atazanavir is an allosteric inhibitor of OATP2B1. Pravastatin reduced E3S uptake, so pravastatin is a substrate of OATP2B1. Pravastatin did not affect the uptake of atazanavir, so atazanavir is not a substrate of OATP2B1. Atazanavir inhibits OATP2B1 and diminishes the amount of

pravastatin that can be taken up by hepatocytes, resulting in high bioavailability and muscle toxicity.

**Ground Reaction Forces of Unicompartamental Knee Arthroplasty Patients During Stair Ascent**

David Kim

Dr. Kathy Simpson, Department of Kinesiology, University of Georgia

Unicompartamental knee arthroplasty (UKA) is a surgical procedure during which only one side of the knee is replaced. Vertical ground reaction forces (VGRF) are applied to the foot from the ground in a vertical direction and affect knee joint loads and, thus, the length of time an UKA lasts. The purpose of this sub-study was to determine if VGRF were greater for the UKA compared to the non-UKA limb during stair ascent. Twenty-two unilateral UKA participants (age:  $66 \pm 13.6$  yrs; height:  $163 \pm 7.8$  cm; mass:  $73 \pm 12.3$  kg) walked up four steps while stepping on two force-measuring platforms; one mounted in the ground and another in the first step. No significant differences were detected (paired t-tests:  $p \geq .082$ ). Relative to body weight (BW), the maximum VGRF values for the UKA-limb and nonUKA-limb, respectively, were:  $1.14 \pm 0.09$  BW and  $1.17 \pm 0.09$  BW when the foot was on the ground and  $1.19 \pm 0.15$  BW and  $1.19 \pm 0.13$  BW during the first step. Surprisingly, however, more than 50% of the participants had higher VGRF values for their nonUKA-limb compared to their UKA-limb. Hence, many participants may have favored their nonoperated-limb, perhaps by shifting more of their weight to the nonUKA side of their body. Alternatively, these participants may have actively pushed against the ground with more force with their nonUKA limb. Physical therapists potentially should focus on reducing their UKA patients' uneven loading during rehabilitation.

**Investigating the Early Developmental Expression of Lysosomal Enzymes in Zebrafish**

Maximilian Klein – CURO Scholar, CURO Summer Research Fellow  
Dr. Richard Steet, Department of Biochemistry & Molecular Biology, University of Georgia

Proper breakdown of molecules within the lysosomal compartment is necessary to maintain the normal function of cells and their surrounding environment. The importance of this process in human health is stressed by a growing number of genetic diseases that involve defects in the proteins and enzymes responsible for this task. These diseases (termed lysosomal storage disorders or LSDs) have a diverse etiology and are one of the most frequently occurring genetic diseases affecting children in the U.S., with an estimated incidence of 1 in every 5000-7000 live births. Using zebrafish as a model system for developmental studies has many advantages, which include but are not limited to large-scale experiment replication, early developmental genetic manipulation via the use of morpholinos, and microscopic phenotype analysis in the early stages of embryogenesis. Surprisingly, there is little known regarding the early expression of lysosomal enzymes in zebrafish as well as overall yolk biology. To better gauge which lysosomal enzymes are best suited for morpholino-based gene knockdown, developmental expression and regulation of zebrafish lysosomal enzymes were characterized for enzymes that are well understood in human disease. Several enzymes were then selectively targeted for morpholino-based knockdown, and the phenotypic and biochemical effects were analyzed. Additionally, the nature of several of these zebrafish lysosomal enzymes was better characterized by establishing pH activity profiles, yolk deposition, and percent mannose 6-phosphorylation, which yielded some novel findings in zebrafish lysosomal biology. Further developing the zebrafish LSD model will be a groundbreaking step in opening many doors for therapeutic possibilities.

**Pediatric Seizures in Larval Zebrafish**

Susan Klodnicki – CURO Scholar, CURO Summer Research Fellow  
Dr. James Lauderdale, Department of Cellular Biology, University of Georgia

About 55,000 cases of pediatric epilepsy are diagnosed annually. Although there are seizure treatments for adults, there are no known effective treatments for childhood seizures. The reason is not well known and is the cause for our research. Study of neural mechanisms at a young age is necessary to provide knowledge that will allow other researchers to develop more effective drugs for childhood epilepsy. Epileptic episodes are characterized by recurrent unprovoked seizures that result from widespread abnormal brain activity with characteristic discharge patterns. The larval zebrafish is a useful organism that allows us to visualize seizures in a developing vertebrate using confocal imaging. These seizures have a similar pattern to that of children. Zebrafish transgenic for a calcium indicator can be used to monitor neural activity induced by chemoconvulsants. In imaging data, action potentials are sensed as calcium changes, and brain images are collected for further analysis. Using computational algebraic methods, individual seizures and neural pathways are detected, estimated and visualized. Prior to 5 days post fertilization (dpf) waves are characterized by short durations (33 sec/wave). After 5 dpf, cyclical wave patterns emerge, characterized by a series of short duration waves followed by a single long-duration wave (9 min/wave). These results show that the pattern and duration of seizure-induced neural activity change as a function of brain development. This work provides a better understanding of possible mechanisms involved in pediatric seizures that may lead to improved epilepsy treatment.

**Effects of Social Institutions on Adolescent Alcohol Use**

Rebecca Kopp  
Dr. Thomas McNulty, Department of Sociology, University of Georgia

Underage alcohol use is considered a growing social issue. Social scientists often look at the social environment and the institutions of family, school, and religion to understand the onset of adolescent alcohol abuse. By looking at data obtained from Waves I, II, and III of the National Longitudinal Study of Adolescent Health, this research tests the extent to which family, school, and religion affect adolescent alcohol use. For a simplistic test, this research utilizes a multi-regression model focusing specifically on the independent variables: school attachment, time involved in afterschool activities, the amount of religious attendance, and family attachment of an adolescent, while controlling for age, gender, race, economic status, and access to alcohol in the home. To be consistent with other research on the subject, it is expected that adolescents with less time spent with family, at religious services, and participating in extracurricular activities will have higher frequencies of alcohol use and drunkenness in the past 12 months. The results, however, are mixed. Here, there is a significant effect only in family attachment and school activities for adolescent alcohol use. In the model, religion did not have a significant role in predictive adolescent alcohol use. This study aims to use the Add. Health survey to add to the current research on social predictors of adolescent alcohol use. By adding to the current literature, policy makers may be able to develop better programs to aid adolescents. Future research includes coupling this model with qualitative methods to help provide insights into adolescent choices regarding alcohol.

**Coagulation Factors Involved in the Pathology of Placental Malaria**

Lindel Krige – CURO Scholar  
Dr. Julie Moore, Department of Infectious Diseases, University of Georgia

Pregnant women and children are most vulnerable to malarial infection. Malaria in pregnancy leads to intrauterine growth restriction and preterm deliveries, resulting in low-birthweight babies. The underlying mechanisms that lead to these poor birth outcomes are not well understood, but it is

known that severe inflammation in the placenta, together with excessive fibrin deposition, are common features of placental malaria and correlate with low birthweight. This inflammation and coagulation process in the placenta occur as an immunological response to the malaria infection. This study addresses the hypothesis that local malaria-induced inflammatory responses induce placental coagulopathy, which in turn leads to significant compromise in placental function and, therefore, fetal distress. This study will focus on the role of coagulation and immunological factors in the disease response process of mice. Murine placental malaria has proven to be an effective model for *P. falciparum* infection in humans. Mouse RNA has been isolated, and primers for each coagulation factor have been developed. Using these primers and isolated RNA, the next step will be to conduct real-time PCR to determine possible upregulation of the coagulation factors. Further research possibilities include determining whether fetal or maternal cells initiate this immunological response leading to inflammation and coagulation in the placenta. Identifying the role of coagulation factors involved in the immunological response to placental malaria will provide further understanding on malarial pathogenesis and ways to prevent fetal growth restriction.

**Public Views of Biculturalism**

Josephine Kwon  
Dr. Victoria Plaut, Department of Psychology, University of Georgia

As America becomes increasingly globalized, concepts such as multiculturalism and biculturalism are important to consider in public policy and social issues. Biculturalism in a psychological light refers to the process by which individuals consider two distinct ethnic cultures as integral to their ethnic identity and behave in a manner that expresses elements from both cultures. Bicultural individuals, generally from minority groups, will comprise an estimated 40% of the population by 2020. As such, considering biculturalism in a public light could illustrate existing attitudes in America.

Estimating the public opinion of biculturalism could indicate the type of social environment within which immigrants and their children live, as well as possible public issues in relation to globalization and biculturalism. To understand the public opinion of biculturalism today, we have composed a questionnaire to comprehensively determine if and what kind of public opinion exists regarding biculturalism. The questionnaire is meant to discern what kind of reaction the term biculturalism produces, how internalized the idea of biculturalism is, and how important biculturalism is perceived to be in America. The responses to this questionnaire could indicate any common attitude towards bicultural individuals in America.

### **The Old Made New: The Life and Work of Art Rosenbaum**

Jared La Croix

Dr. Robert Pratt, Department of History,  
University of Georgia

I first saw Art Rosenbaum play banjo in the summer of 2009. His talent and enthusiasm impressed me to the point that I began to research who this man is. After conducting numerous personal interviews with Mr. Rosenbaum, I concluded that Art's ability to capture and preserve American folk life distinguishes him as an artist and individual. More than mere historical preservation, however, is Art's ability to transform a folk tradition deeply rooted in the past into a living art form pertinent to the present. While this paper is biographical in the sense that I recorded a chronology of Rosenbaum's life, this paper seeks to push beyond the life of Mr. Rosenbaum himself by examining how, in the words of the artist, "the old is made new." I investigated Rosenbaum's philosophical outlook on art in addition to specific paintings that manifest such viewpoints. What I discovered is a synthesis of a contemporary exposure to a preserved folk culture through mediums of song, painting, and musical recording creates an original experience in its own right. I believe the worth in this project is equally weighted between my own conclusions, such as the synthesis I mention above, and the life of Mr. Rosenbaum himself.

In Shakespeare's *The Tempest*, Miranda says, "Your tale, sir, would cure deafness." Mr. Rosenbaum's life story exposes the relationship between who a man or woman *is* and what he or she *creates*, thus alerting his readers and listeners to their own inner passions while simultaneously inspiring external creations.

### **Renewable Biomass and Georgia: A Legislative Update**

Jonathan Lee – Roosevelt at UGA

Dr. Robert Izlar, Center for Forest Business,  
University of Georgia

The Energy Independence and Security Act of 2007 (EISA) reduces Georgia's ability to economically manufacture renewable liquid fuel from forest biomass. Georgia ranks first in the nation in its endowment of recoverable forest biomass and third in total available biomass. While Georgia possesses 24.7 million acres of recoverable forest biomass, however, the EISA definition qualifies only 7.5 million acres as a source for "renewable biomass" feedstock. The purpose of this presentation is to explain new legislation passed or pending in Congress on this issue since 2007. The purpose of this research is to suggest and support a definition that would better enable Georgia to establish a viable renewable fuels industry. This definition should be a broader, more scientific definition that includes any organic material available on a renewable, recurring basis. This definition would likely incorporate appropriate federal lands and all private forestland in compliance with current Georgia Best Management Practices for timber harvest. Naturally regenerated hardwoods and plantation-grown pines would likely be included regardless of when they were last harvested. With this broad renewable biomass definition, nearly 24 million forested acres of Georgia's 34 million acre total land base would qualify for use in the production of transportation fuel under EISA. Research is based on literature, including congressional testimony, trade association position statements, personal interviews, and newspaper articles. Forest inventory reports and scientific journals are included when appropriate. The research intends to show that

current law will not have the long-term effect of stabilizing the size of Georgia's forest cover and may, in fact, decrease Georgia's forested estate due to the suppression of consumptive forest markets. Furthermore, the definition as passed jeopardizes the establishment of a renewable fuels industry in the state, and, finally, that its language is based on a precautionary, yet misguided, philosophy of environmental protection.

### **Complementation of Chromosomal Deletions in Mycobacteria**

Natasha Lee – CURO Scholar

Dr. Russ Karls, Department of Infectious Diseases, University of Georgia

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis* (*Mtb*). The World Health Organization estimates that one third of the human population is latently infected with *Mtb*. Those infected carry a 10% risk of developing TB. Understanding how this pathogen survives within a host will aid in efforts to prevent, diagnose, and treat TB. Defining the relationship between different *Mtb* genes and virulence is typically achieved by characterizing mutants with altered target genes. To ensure that the resulting phenotype is associated with the mutated gene, the wild type phenotype must be complemented (restored by reintroducing the wild type gene). This can be performed by PCR amplification of the gene and cloning the gene onto a plasmid that can replicate in *Mtb*. The focus of my research is to complement a 16-kb deleted region of the *Mtb* genome. This region is thought to attribute to virulence. Plasmids containing portions of the region have been created and will help define the functions of the encoded genes. Reconstruction of a plasmid with the entire 16-kb region has been problematic, however, leading us to pursue a strategy to recover this region by homologous recombination. Efforts are in progress to generate a system to screen for plasmids in which the targeted region has been recombined onto them. This work is anticipated to allow the generation of complementation plasmids that have a low risk of PCR-induced mutations. This system will aid TB vaccine

research and facilitate studies identifying which *Mtb* genes encode virulence factors.

### **Rce1p Transmembrane Topology**

Edward Lilla

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

Uncontrolled proliferation and migration of transformed cells in the human body are two 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. 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 test has been performed on yeast strains carrying various mutants of Rce1p. These mutants containing point mutations were in cysteines that were modified to alanines or serines. The mating tests have verified that the yeast strains successfully express the desired mutant strains of Rce1p. 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 modification of Rce1p occurred. The combined results from these several mutants will help determine if our current topology map is correct or needs modifications.

### **Harboring an Ancient Killer: Restructuring Malaria Control in Nigeria**

Ammarah Mahmud – Roosevelt at UGA

Dr. Christopher Whalen, Department of Epidemiology, University of Georgia

With 90 percent of malaria cases occurring in Africa, malaria continues to be a fatal concern in developing countries. Nigeria accounts for one-fourth of incidents in the World Health Organization's Africa Region with severe effects on the nation's socio-economic infrastructure. Nigeria receives a yearly allotment from global aid groups and spends over \$85,000,000 on malaria control. Funding is poorly allocated, however, and the process lacks transparency. Only one-fourth of funding is directed toward the most necessary precautions against malaria. In similarly situated nations, cross-analysis reveals a correlation between a nation's financial assistance and effective control of malaria. This paper proposes that Nigeria restructure its funding system and allocate money to the most effective methods of disease control with consideration to Nigeria's particular economy and geography. Prevention methods should be simplified and taught to the population, with specific allotment to community clinics catering to rural populations. To assure transparency, this proposal envisions an oversight role for international organizations that contribute money to Nigeria's prevention campaign. Aid groups should stress that, in a mobile society, malaria in any part of the world is a threat to the international community. Thus, financial contributors have a right to oversee the maximum utility of supplies and distribution in areas still plagued with the disease. Health-focused groups should collaborate with other aid organizations currently engaged with Nigeria's government. Economic initiatives should incorporate requirements that Nigeria restructure its disease prevention program with greater transparency as part of an overarching development scheme.

**The U.S. and the ICC: How the United States Has Behaved Toward the Court and How It Should Behave in the Future**

Bridget Mailley – CURO Summer Research Fellow

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

The International Criminal Court (ICC) is the first permanent, international court that

prosecutes individuals for their actions during human rights atrocities. The U.S. and the ICC have claimed to have the same goals concerning justice. Throughout the U.S.'s ongoing relationship with the ICC, however, it has wavered from hostile, to acquiescent, to potentially an ally. According to my data, two of the main problems the U.S. has had with the ICC concern the breadth of the ICC's jurisdiction, and ICC's potential power to stall strategic American activities abroad. Although many steps were taken to impede the effects of the ICC on American power, including American Servicemembers' Protection Act, most of these steps have been rendered impotent since 2008. As of July 2009, statements from my interviews indicated that the Obama Administration was undergoing a policy review to understand what position the U.S. would take on the ICC in the future. Recent statements by Secretary of State Hillary Clinton and Ambassador to the UN Susan Rice have indicated friendly and more cooperative intentions from the U.S. One interviewee in particular, council to a Congressman dealing with the ICC issues, thought that even though the ICC is not currently a pressing issue for the government, the U.S. should become a collaborating party in order to protect American interests concerning the Court. My data suggest that the U.S. should adopt a more cooperative approach to the Court in order to rectify differences and ensure that the ICC can be a space for justice.

**Separate but Not Equal: An Analysis of Segregation and Inequality in Georgia Public Schools**

David Malison – CURO Scholar  
Dr. David Mustard, Department of Economics, University of Georgia

It has been more than fifty years since the Supreme Court delivered the landmark *Brown v. Board of Education* opinion, banning compulsory segregation in schools across America. Although overt racial discrimination remains prohibited by law, schools today find themselves increasingly divided across racial lines. This trend has left many low-income, minority students concentrated in urban schools

while more affluent, white students receive their education in suburban neighborhoods. How have these trends influenced the black-white performance gap on standardized tests in Georgia? Using data collected by the Georgia Department of Education, our study aims to answer this important question. We have recently assembled a database that contains detailed information on every Georgia public middle school over the past five school years. We plan to analyze these data first with cross-sectional ordinary least squares regressions, and then by using a linear fixed effects model. Our primary measure of school performance will be the percentage of students meeting statewide standards on the Criterion-Referenced Competency Test (CRCT). We expect to find that increasing segregation has caused the black-white achievement gap to expand, consistent with other recent findings in this area. In today's economy, the impact that schooling has on future earnings cannot be overemphasized. A growing gap in educational achievement will ultimately lead to increased inequality across racial lines. By calling attention to these problems, we hope to encourage the Georgia public school system to explore and adopt policies that mitigate the negative consequences that segregation may have on students today.

**Water Droplet Generation in Ferrofluid-Based Magnetorheological Fluid**

Francisco Marrero – CURO Apprentice, CURO Summer Research Fellow  
Dr. Leidong Mao, Department of Engineering, University of Georgia

Droplet generation is an important branch of microfluidics where micro- to femto-liter droplets are formed at the intersection of two immiscible liquids. Researchers have found various applications for these droplets in biology, chemistry, and pharmacy, where discrete and precise reaction chambers were generated at a high throughput. In a typical flow-focusing droplet generation device, the size of droplets is controlled by adjusting the flow rate ratio of continuous (usually oil) and discrete (usually water) phases. Droplet size is inversely proportional to flow rate ratio between

continuous and discrete phases, while droplet velocity is proportional to the flow rate of the discrete phase. Independent control of the droplet size and its velocity is important for droplet-based microfluidic analytical applications. In this paper, we have developed a novel method that uses external magnetic fields to adjust the viscosity of the continuous phase and therefore control the size of the generated droplets. We use a magnetorheological fluid and ferrofluid mixture as the continuous phase. Both contain suspended micro- and nano-sized magnetic particles, which under an external magnetic field induce chain-like aggregates inside the mixture that effectively increase the fluid viscosity. Preliminary results show that the water droplet size can be controlled by changing the amplitude of the field. Moreover, this scheme enables us to manipulate and position individual droplets as desired. In summary, we have developed a device that precisely controls droplet size and organization without affecting other variables. Applications include shortening prototyping phase, DNA amplification, study of crystal growth, and nanoparticle synthesis.

**Increasing Personal Finance Education in Athens-Clarke County High Schools**

Kathryn McCabe – Roosevelt at UGA  
Prof. Michael Rupured, Department of Housing & Consumer Economics, University of Georgia

Despite growing support for personal finance education and its lasting benefits, American high school students continue to show a lack of financial literacy. On a 2008 survey distributed by the Jump Start Coalition polled the literacy of over 5,000 high school students in financial matters, students scored an average of 48.3 percent correct. Furthermore, the National Bureau of Economic Research estimated that as much as one-third of credit fees are related to a lack of financial knowledge. These statistics and other financial research surveys suggest that students are leaving high school without adequate knowledge of financial matters, making them susceptible to poor financial decision making in the future. This paper is a commentary that pieces together statistical information from different research-based

sources on environmental education and financial knowledge to make a policy recommendation for financial education reform in Athens-Clarke County. The policy proposes that the Athens-Clarke County School Board implement a standardized and mandatory personal finance program for its school system that would incorporate specific financial curriculum into a 6- to 8-week time frame, separate from economics subjects. A task force consisting of teachers and administrators would be responsible for assembling in-depth, practical curricula from existing comprehensive financial programs. They would also create a process for teacher certification to ensure teacher expertise in financial subjects. If undertaken, this policy would benefit Athens' students, both advantaged and disadvantaged, by providing them with knowledge that will help them become more informed financial decision makers.

**The Elemental Problem in Grand Strategy: A Principle Model of Analysis**

Bethany McCain & Christopher Looft  
Dr. Brock Tessman, Department of International Affairs, University of Georgia

Grand strategy can be defined as a state's plan for the long-term connection of all available means toward the achievement of its fundamental goals. Past attempts at defining grand strategy rely too heavily upon the enunciation of hard power objectives as both a means for reaching goals and as the goals themselves. Our paper seeks to define grand strategy in a new, holistic, analytical model that recognizes the interrelated nature of the multitude of goals of any actor. This model is unique in its comprehensiveness and flexibility; it is not limited by perspective or time for analysis. This core model can therefore be applied to any actor at any time in history. Our tiered model rests upon the five principles of hard power, soft power, resource security, humanitarian leadership, and multilateralism, which together form the basic analytical lens for interpreting any event of grand strategic importance. From this analytical foundation stems the elemental layer, which consists of defense, diplomacy, resources and economics,

and ideology. These layers form the organizational basis for our paper and is essentially universal as interpretational mechanisms: they are flexible enough to interpret grand strategy from any perspective, be it modern Chinese goals or those of ancient Athens and Sparta.

**The Effect of Political and Economic Shifts on Private Charitable Giving**

Connor McCarthy & Robert Thrasher  
Dr. David Mustard, Department of Economics, University of Georgia

This paper will measure the effects of government economic policy on private charitable giving. We have three interrelated motivations for this study. First, we are personally convinced of the vast importance of private philanthropic giving to spur social progress in the United States. Second, we theorize that private philanthropic giving, much like private capitalist markets, tends to be more efficient than public funding. Third, given the current recession and the current administration's high level of spending, this study is relevant and timely. We use data from the Panel Study on Income Dynamics (PSID), a longitudinal survey begun in 1968 that tracks a representative sample of 7,400 U.S. households' economic, health, and social behavior, and from the Center on Philanthropy Panel Study, a component added to the PSID in 2001 to track philanthropic giving. Using the PSID, we control for household fixed effects, head of household and family demographics, and public and private financial status. We also include political, macroeconomic, and natural shocks as explanatory variables. In some cases, these are represented as dummy variables whereas others are numeric figures normalized to a base year. We complete the model using charitable giving and volunteering levels as the dependent variables regressed against these determinants. Our analysis includes discussion of the regression results as they differ between observed years and across sample groups. The purpose of this study is to determine the relationship between political and economic shifts and charitable giving. If a definitive

relationship is established, further research can assist in effective policymaking.

**Serum Vitamin D and Bone Structural Development in Young Adult Females: A Three-Year Prospective Study**

Leslie McConnell

Dr. Richard Lewis, Department of Foods & Nutrition, University of Georgia

Previous research has demonstrated the importance of vitamin D in bone health, but longitudinal studies in this area, especially in young adult populations, are lacking. The purpose of this study was to compare changes in vitamin D concentrations and bone strength of the tibia and radius in females ( $n = 69$  at baseline age  $18.2 \pm 0.4$ ;  $n = 66$  at 3-year follow-up, age  $21.3 \pm 0.4$ ). Lean mass, fat mass, and percent fat were measured using dual energy X-ray absorptiometry (DXA). Peripheral quantitative computed tomography (pQCT) assessed bone and muscle parameters at three different sites on the radius and tibia. Serum vitamin D [25(OH)D] levels in the blood were measured using a DiaSorin radioimmunoassay, and concentrations ranged from 45-150nmol/L at baseline and 48-168nmol/L at follow-up. Hypovitaminosis D ([25(OH)D] < 80nmol/L) was present in 35% and 30% of participants at baseline and follow-up, respectively. Paired samples *t*-tests demonstrated a significant increase ( $p = 0.004$ ) in 25(OH)D concentrations over time. Pearson and partial correlations (controlling for baseline height) revealed significant positive associations ( $p < 0.05$ ) between percent change 25(OH)D and percent change total cross-sectional area (CSA) at the tibia, but an inverse relationship ( $p = 0.003$ ) between percent change 25(OH)D and percent change cortical thickness at the tibia. Increasing levels of circulating vitamin D may be beneficial with respect to tibial size in young adults, as demonstrated by changes in CSA, but future supplementation trials may elucidate the role of 25(OH)D in bone strength indices more definitively.

**The Success of Recent U.S. Foreign Policy in Latin America**

Sharon McCoy – CURO Scholar

Dr. Loch Johnson, Department of International Affairs, University of Georgia

In 1973, the United States engaged its intelligence and economic resources in the overthrow of the democratically elected, socialist government of Chile. A manifestation of U.S. foreign policy throughout the Cold War, these actions adhered to the prevention and eradication of communist and socialist governments worldwide. Since the close of the Cold War, a different U.S. strategy has emerged: advocating the spread of U.S. economic principles and interests over political ones. This paper examines past and present U.S. foreign policies toward Latin America to evaluate the viability of the policies and their implications for future U.S.-Latin American relations. Currently, data have been collected from government, academic, and journalistic sources regarding former U.S. actions in Chile with further information being compiled on recent U.S. policy decisions in Venezuela. A comparison of these two data sets will focus on the specific methods of U.S. action in each country; the factors influencing U.S. decisions at the time; and the subsequent societal, governmental, and international effects of the policies. The expectation is that both foreign strategies—that of the Cold War era and its successor—have failed to yield sustainable improvements in U.S.-Latin American relations and have neglected to thoroughly consider the ramifications for Latin American countries. The ultimate intention of this paper is to put forth suggestions for enhancing U.S. relationships with its southern neighbors based upon analysis of the successes and failures of the past and current U.S. foreign policies in the region.

**A New Definition of Treason: The 1794 Treason Trials**

Laura McDonald

Dr. Kirk Willis, Department of History, University of Georgia

This paper examines the 1794 Treason Trials as a turning point in the British definition of treason and how this turning point sheds light on the transfer of state power from the king to the people. Without a written constitution, British state power relied on a carefully balanced relationship between the king, Parliament, and the people. The definition of treason, however, identified state power as residing solely in the person of the king; threats to the people or to Parliament were not considered attacks on the state. When the spread of radical ideology from the French Revolution made such attacks seem imminent, Prime Minister William Pitt and his attorney-general John Scott brought the reform leaders to trial for treason. Ultimately, the defense, led by Thomas Erskine, was able to prove that the defendants' attempts to reform Parliament in no way represented an attack on the person of the king and therefore did not qualify as treason. The acquittal of the defendants led to new legislation that redefined treason to include attacks or threats to Parliament, acknowledging that state power had shifted beyond the king. The research for this paper relies on a close reading of the transcripts of the treason trials, personal accounts from the defendants and the lawyers, and secondary source material. The paper seeks to demonstrate that the trials marked not only a shift to a new definition of treason but also a recognition of a new definition of the power and rights of the state.

#### **PAX6 Mutation Screen**

Margaret McDougal – CURO Scholar  
Dr. James Lauderdale, Department of Cellular Biology, University of Georgia

Aniridia is a rare congenital eye disorder characterized by partial or complete lack of iris. Additional defects include foveal hypoplasia, indicated by early infancy nystagmus, cataracts, corneal clouding, and glaucoma. The progressive nature of the disease leads to reduced visual acuity and blindness. Two-thirds of aniridic patients have heterozygous mutations in the *PAX6* gene. The *PAX6* protein is a highly conserved transcription factor crucial for normal eye development and cornea homeostasis. The

protein's exact molecular mechanism is still uncertain, however. Understanding the phenotypic variation caused by different *PAX6* mutations helps explain the molecular mechanism of the mutated protein and the complex role of *PAX6* in the eye. In this project, we screened the *PAX6* gene of 153 individuals, representing 56 aniridic families, by direct gene sequencing and conducted detailed ophthalmologic evaluations for each aniridic patient. A total of 37 mutations were identified, including 19 novel mutations. I compiled our results with the Human *PAX6* Allelic Variant Database to create a total of 547 independently ascertained variants in *PAX6*. Of these variants, 534 are associated with ocular malformations, and 444 are specifically causal for isolated aniridia. Further analysis of mutation type frequencies, distributions, and hotspots indicate that nonsense (39%), frame-shift (29%), and splice junction (19%) mutations are predominately associated with aniridia, whereas the majority of non-aniridia phenotypes are caused by missense mutations (75%). This compiled mutation spectrum continues to yield important insight into the molecular mechanism of the mutated protein and the likely phenotypic defects.

#### **The Skeleton Keyhole**

Richard McKelvey  
Prof. Andrew Zawacki, Department of English, University of Georgia

Problems arise in compromising the inherent and necessary difficulties of certain complex, opaque poetics in efforts to make such poetry more accessible to readers. The poetry, which I will term “contemporary American experimental poetry,” hardly fits under a single umbrella of categorization but shares in common an unavoidable inaccessibility. Refusing populist compromises, I believe such poetry could, however, be more engaging to more readers through collaborations with other artistic media, including music. I intend to use experimental poetry represented primarily by the work of Susan Howe, Rosemary Waldrop, and Nathaniel Mackey, as a starting point. From there, I hope to marry the inevitable difficulty of this poetry

with my own populist ideals through musical collaboration. Similar collaborations in the past have sought to push the poetry itself outward. Such collaborators include Steve Swallow with Robert Creeley, Nathaniel Mackey in numerous instances, Philip Glass with Allen Ginsberg, and David Grubbs with Susan Howe. I diverge from this foundation primarily through the intent of my collaborations. I am not a jazz musician and have no qualms with setting my demanding style of poetry to pop music to expand readership. This does not mean the music cannot interact critically with the poetry, but simply that the primary purpose of the music is to increase accessibility. The final product will consist of roughly 20 pages of poetry, a critical introduction, and a full album of the entire collection set to music through collaborations with local musicians, myself included.

#### **Children's Attachment Security and Mothers' Separation Anxiety**

Amanda McKenley – CURO Apprentice  
Dr. Hui-Chin Hsu, Department Child & Family Development, University of Georgia

The social environment in which a child is raised can greatly affect the quality of his or her attachment relationship, an enduring emotional bond with parents. The mother's emotional wellness, be it positive or negative, is an important aspect of a child's social environment. When mothers are unable to protect their children, they experience separation anxiety, which is an unpleasant state of guilt, worry, and sadness. The purpose of this study is to investigate whether a mother's separation anxiety is associated with a child's attachment security. It is expected that mothers' greater separation anxiety is correlated with lower quality in child attachment security. Using video data from a larger longitudinal research, 30 four-year-olds were observed interacting with their mothers and strangers and playing by themselves for more than two hours in a laboratory playroom. The quality of children's attachment security to their mothers was determined using the Q-sort method, which has 90-item descriptive statements of the style of child's behavior. An example of such a

descriptor would be "Child cries when mother leaves him/her with a babysitter." The rater sorted items into nine categories according to their relevance to the behavior of the child being assessed. Attachment security scores were obtained by correlating raw scores from the Q-sort with the standardized criterion scores. Also, levels of separation anxiety in the mothers were obtained when mothers filled out the Separation Anxiety Scale twice, at the time of the observation session as well as at a lab visit four years prior.

#### **Repression, Literature, and the Growth and Metamorphosis of Czech National Identity in the 20th Century**

Ilana McQuinn

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

Czechoslovakia in the 20th century followed a tumultuous path that led it to freedom from the three-hundred-year yoke of the Habsburg Empire, an existence as a small democratic nation surrounded by dictatorship, Nazi occupation twenty short years later, and finally total and complete de-individualization under Soviet communism. The Czechs were pushed to independence by frustration with a protracted existence as the "other," or the marginalized minority nation not in power, in the German-dominated Habsburg Empire. A large component of the formation of Czech identity depended on linguistic differences and the contrast with the German, and as such struggled to develop an identity independent of the crutch of the "other." Some have argued that the muted method of resistance that the Czechs employed through the majority of the Nazi and Communist control of Czechoslovakia weakened the Czech claim to a unified identity as a people. The ironic comedies of Jaroslav Hašek and Bohumil Hrabal, however, exemplify how crucial intellectual and literary figures became for solidifying the Czech national identity. This paper examines the manner in which Czech culture and national identity developed in the 20th century with special attention to *The Good Soldier Švejk*, *Closely Watched Trains*, and *Too Loud a Solitude* from the repressive periods of

World War I, World War II, and Communist control.

**A Tail's Tale: ErbB Structure, Evolution, and Function**

Amar Mirza – CURO Scholar, CURO Summer Research Fellow  
Science as Art  
Dr. Natarajan Kannan, Department of Biochemistry & Molecular Biology, University of Georgia

Epidermal Growth Factor Receptor (EGFR), a multi-domain receptor tyrosine kinase, is the most frequently mutated tyrosine kinase in all human cancers. Activation of the cytoplasmic tyrosine kinase domain involves ligand-induced dimerization, conformational changes in the activation-loop, movement of the C-Helix, interlobe movement, and myriad other events. Coordination of all of the aforementioned events is critical for kinase activity, but existing methods (NMR and MD simulations) are not yet powerful enough to provide an explanation. To tease apart the details of this protein's regulation, we have constructed contrast-hierarchical alignments to identify specific amino acids which are most critical for EGFR and related kinase function. The biological relevance of these amino acid residues was uncovered by mapping them onto existing crystal structures of EGFR. It was found that segments of the N and C-terminal tail flanking the kinase core are distinguishing features of EGFR that have co-evolved with the kinase domain and are now an integral part of the kinase core. These flanking segments were found to be critical for controlling interlobe movement, ATP-binding, C-Helix positioning, symmetric and asymmetric dimerization, and activation-loop stabilization. These results elucidate previous experimental data that pointed toward a regulatory role for these regions. The results of this work have laid the ground-work for the development of novel allosteric inhibitors for the treatment of cancer, and this investigation has further characterized the effect of one of the most frequent mutations found in cancerous tissue.

**Using miRIDIAN miRNA Mimics and Inhibitors for Evaluating the Contribution of Host miRNA Regulation of Respiratory Syncytial Virus (RSV) Replication**

Patricia Mitchell – CURO Apprentice  
Dr. Ralph Tripp, Department of Infectious Diseases, University of Georgia

Respiratory syncytial virus (RSV) infection causes substantial morbidity and some deaths in the young and elderly worldwide. There is currently no safe and effective vaccine available. RSV causes repeat infections throughout life, a feature in part attributed to virus gene regulation of the host immune response. Little is known about the host gene response to RSV infection, or the mechanism by which host genes are regulated. Recently, microRNAs (miRNA) have been shown to have a critical role in host gene regulation, cell differentiation, proliferation, and apoptosis. In this study, miRNA regulation of the host gene response to RSV infection was investigated using a panel of miRNA agonists and antagonists. Human respiratory epithelial cells (A549 cells) were transfected with specific miRNA mimics and inhibitors that were indicated by our experimentation using microarray analysis to be important in the response to RSV infection, specifically let-7f, miR 26b, miR 595, miR 24, miR 198, miR 224, and miR 337. The results confirm that some of these miRNAs are important in the host response to RSV infection and offer new insights into disease intervention strategies to control RSV-mediated disease pathogenesis. Recently it has been shown that miRNA could have a role in the treatment of pancreatic cancer and heart disease.

**Racial and Skin Tone Differences in Facial Thermography and Self-Reported Emotion in Response to Visual Stimuli**

Trenton Mize & Tré Myers  
Dr. Dawn Robinson, Department of Sociology, University of Georgia

An emerging technique for studying emotions involves the measurement of facial temperature using infrared thermography. We focus on possible systematic differences in facial temperature as a function of participant's race.

This study used data from 82 women and 68 men who participated in a study of “Pictures and Feelings.” Sixty-one participants self-reported as “white,” and 21 self-reported as “black.” Participants viewed images and completed self-report emotional measurements while their facial temperature was measured using infrared thermography. Images varied systematically in their capacity to elicit feelings of potency and activity in a 2 (potency: high, low) x 2 (activity: high, low) factorial design. The emotion manipulations were derived from the International Affective Picture System (IAPS). Based on previous literature, we predicted some differences in emotion as a function of self-reported race. These predictions were not supported. We analyzed differences in facial temperature throughout the experiment as a function of self-reported race. We found consistent differences in facial temperature by race across all images and all facial regions, with no interactions by facial region or image set. We also found a few differences in self-reported emotion by race but no differences that would explain the consistent temperatures differences. We believe that the facial temperature differences observed were due to different skin tone emissivities, which would cause lighter or darker skin tones to be read at different temperatures by the infrared camera. We present further analyses to test this possibility. These results could be important to consider when studying emotions across races and ethnicities.

### **The Local Weather: The Effects of Construal Level and Weather on Self-Control**

Paul Moon

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

Research on Construal Level Theory indicates that people process information on two levels: local and global. Locally, people are concerned with immediate consequences of behavior, whereas globally, people are concerned with future consequences. We were interested in whether construal level might affect how people process positive and negative information when they need to exert self-control and whether these decisions would be affected by situational

factors. We recruited participants to complete a study regarding self-control decisions and recorded the weather each day of data collection. Through a Navon letters task, participants were randomly assigned to process information globally or locally. Afterward, they read a text that either highlighted the consequences or benefits of taking a zinc tablet. Trying zinc is an approach version of self-control because its benefits are at odds with its consequences. Next, participants rated their opinions of zinc and were asked if they would like to try the zinc. We had zinc available for those who wanted to try it. Results indicated that weather on the day of experimental session moderated the effect of construal level on participants’ likelihood of trying the zinc. Participants were more likely to accept zinc if they had been locally primed and if it was raining that day. These results suggest that self-control could be based on environmental conditions and also construal level. This may be because when focused locally and when weather was bad, participants were more aware of the potential of getting a cold due to the rain.

### **Queens of Scream: The Making of Horror Film Heroines**

Jill Moore

Dr. Katalin Medvedev, Institute for Women’s Studies, University of Georgia

Since its inception, the film industry has greatly influenced fashion and society in America. Movies provide a recorded history of the culture that produces them. The way we view characters in film also speaks to our culture’s preconceptions about gender roles. Out of all film genres, horror generates the most controversy. Horror pushes the boundaries of what is socially acceptable and forces the viewer to face the darkest facets of human nature. The visual portrayal of characters is much more important in horror films than in any other film genre because dialogue and character development are less important. How are women depicted in scary movies, and why? What does the portrayal of women in horror films say about expected gender roles in American society, and how does it challenge them? How have female

characters in horror films changed over time? These are the questions that I am exploring through the examination of “slasher” films. I chose this type of horror film because they depict real people more accurately than other horror subgenres. Many critics in the field of women’s studies contend that horror films are misogynistic and exploitative towards women. In my paper, I hope to propose a different perspective and show how horror films may actually empower them. To write my paper, I have reviewed numerous sources on film theory, gender studies, and director perspectives and applied their theoretical frameworks to the most important films in the “slasher” genre.

### **The Epidemiology of *Staphylococcus aureus* in Kentucky and Georgia from 1995 to 2003**

Tatum Mortimer

Dr. Susan Sanchez, Department of Infectious Diseases, University of Georgia

Methicillin-resistant *Staphylococcus aureus*, MRSA, is a growing problem in medical and veterinary fields as antibiotic resistant infections can be difficult to treat. The epidemiology of equine MRSA has been little studied to date. Our purpose was to study the epidemiology of equine *S. aureus* from Kentucky, where the racing industry predominates, and from Georgia’s primarily recreational population. Clinical isolates of *S. aureus* were collected from horses in Kentucky and Georgia from 1995 to 2003. Pulsed field gel electrophoresis was used to create patterns of digested DNA from the isolates, which were compared to each other and twelve known human controls. We found that 65% of Kentucky isolates were MRSA compared to 18% in Georgia. The differences between the patterns were counted, and BioNumerics was used to create dendrograms of the samples. Analysis revealed that 60% of the MRSA isolates were closely related and 25% of the MRSA isolates were possibly related to the strain type USA500. Methicillin-sensitive *S. aureus* isolates showed a greater genetic variety, and only 10% of those isolates were possibly related to USA500. Urinary and reproductive isolates from Kentucky had the highest incidence of MRSA at 70%. The genetic

resemblance of the MRSA isolates suggests that many of the isolates have a similar source, possibly the USA500 strain that presents itself in the human population. The markedly higher frequency of MRSA in the Kentucky isolates indicates that the husbandry and management of the racing horses aided in spreading MRSA more effectively than that of individually owned leisure horses.

### **Energy Efficiency Funding in Athens-Clarke County**

Saptarsi Mukhopadhyay – Roosevelt at UGA  
Dr. Tyra Byers, Odum School of Ecology,  
University of Georgia

Athens-Clarke County’s (ACC) tax revenues have shrunk dramatically due to the weak economy. Consequently, ACC needs to reduce expenses to balance its budget as mandated by state laws. Energy costs are an ideal target for reducing overall costs. They are embedded in the costs of providing all services and can be cut with little adverse effect on the quality or extent of services provided. Through the implementation of various types of economically efficient energy upgrades, energy usage and costs can be reduced. To realize potential energy usage and cost savings fully, all upgrades need to be conducted simultaneously. The nature of energy efficiency projects is synergistic; different upgrades working in conjunction conserve more energy and money than would seem to be indicated simply by the sum of their individual effects. Hence, if all of these projects are not pursued in parallel, maximum potential savings simply cannot be realized.

Unfortunately, ACC currently does not realize the maximum potential savings in energy costs due to its current piecemeal method of funding these projects. ACC should create a \$500,000 “Energy Bank” based on a similar plan in place at Chapel Hill, NC through the issuing of municipal bonds and a process to use this fund for energy efficiency upgrades in public buildings to address these policy failures. This sustainable and stable source of long-term funding should allow all economically efficient energy efficiency upgrades to be implemented to achieve maximal cost savings, reducing the cost

of proving services and ultimately increasing social welfare.

**Keeping PACE: Clean Energy Financing for Athens-Clarke County**

Bryn Murphy – Roosevelt at UGA

Dr. Andrew Carswell, Department of Family & Consumer Sciences, University of Georgia

The Property Assessed Clean Energy (“PACE”) financing program is a financial tool designed to make clean energy home improvements more accessible to homeowners. Through the PACE program, participating state and local governments offer funding through a municipal bond to eligible homeowners to cover the up-front costs of home energy retrofits.

Homeowners then repay their loans through an additional periodic assessment on their property taxes. These energy retrofits not only lower a household’s carbon emissions but also produce savings on homeowners’ water and energy bills by ensuring that anticipated utility bill savings outweigh anticipated additional property tax assessments. This research seeks to determine the level of interest in the PACE program in Athens-Clarke County, and, if such interest is present, to adapt the program to better fit local concerns and conditions. Participants in a local class for new homebuyers were surveyed on their level of interest in the PACE program and level of attraction or aversion to specific components of the program (quantitative). Their specific comments and suggestions were also elicited (qualitative). The anticipated results of the survey include general interest in the PACE program but concern with specific components of the program, such as eligibility requirements, potential financial risk to homeowners, and perceived incompatibility of the PACE program with Athens-Clarke County’s high percentage of renter-occupied property. An adaptation of the PACE program to meet local people’s concerns has the potential to increase access to the benefits of clean energy in Athens-Clarke County and in demographically similar communities nationwide.

**The Effect of U.S. Military Aid on Recipient State Cooperation in Pakistan: A Case Study**

Emily Myers – CURO Summer Research Fellow

Dr. Patricia Sullivan, Department of International Affairs, University of Georgia

What is the effect of U.S. military aid on Pakistan’s cooperation with United States foreign policy? If Pakistan does not always cooperate with the U.S. foreign policy objectives, why does the U.S. continue to fund them with massive amounts of military assistance? This study seeks to explain the phenomenon that as the United States gives Pakistan more military aid, Pakistan becomes less willing to cooperate with U.S. foreign policy goals. Key sources are U.S. legislation, transcripts of congressional hearings, Congressional Research Service (CRS) Reports, news articles from *The New York Times* and other major newspapers, and existing literature on U.S. military aid. These sources are used to analyze the relationship between the United States and Pakistan by explaining how U.S. military aid is generally allocated and how the U.S. government justifies giving aid, describing how U.S. military assistance to Pakistan has changed over time, tracking U.S. legislation, and discussing past problems the U.S. has encountered with countries to whom it has provided aid.

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

Krelin Naidu

Dr. Brian Cummings, Department of Pharmacology & Toxicology, University of Georgia

The epigenetic effects of bromate (BrO<sub>3</sub>-) exposure in human embryonic kidney 293 (HEK293) cells were investigated. BrO<sub>3</sub>- 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. BrO<sub>3</sub>- treatment (10 – 200 ppm) causes damage to HEK293 cells based on cell death assays and significant increases in specific regulatory proteins (e.g., p53, cdc2) in HEK 293 cells over

72 hours. Additionally, bromate-induced epigenetic changes were assessed by increased expression of phosphorylated histone-2AX (H2AX), a histone correlated with DNA damage that facilitates DNA repair. BrO<sub>3</sub><sup>-</sup> 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 for 48-hour low concentrations (1 – 100 ppm) showed similar trends in protein expression levels. This suggests that bromate's toxicity may lead to epigenetic alterations. To confirm the epigenetic changes, methylation specific PCR after bisulfite conversion will be conducted to assess the suspected methylation of specific cell cycle regulation proteins such as p21. Preliminary studies demonstrate that bromate treatment of human embryonic kidney 293 cells alters the methylation status of p21 and increases in the phosphorylation of H2AX. These modifications in DNA methylation and histone expression levels support the hypothesis that bromate, at low levels, induces epigenetic changes in both *in vivo* and *in vitro* models of toxicity.

**Examination of Resuscitation-Promoting Factors in Potential Fish Pathogens in *Mycobacterium shottsii* and *M. pseudoshottsii***

Johnathon Nolen

Dr. Russell Karls, Department of Infectious Diseases, University of Georgia

Defining mechanisms of gene regulation is critical for understanding how pathogenic mycobacteria survive in diverse environments and to identify novel drug targets. For the human pathogen *Mycobacterium tuberculosis*, resuscitation factors are believed to play an important role in primary infections as well as for reactivation of latent infections. The main goal of the project is to identify the inter-species conservation and function of an important resuscitation-promoting factor (Rpf) from recently identified potential fish pathogens *Mycobacterium shottsii* and *Mycobacterium pseudoshottsii*. A significant impediment in mycobacterial research is the slow growth of these microbes *in vitro*, necessitating very long incubations that sometimes take months for

appreciable growth. This research investigates whether RpfB proteins accelerate growth *in vitro* and whether Rpf proteins from one *Mycobacterium* species impact the growth of others. As proteins from this class are secreted into culture media, culture filtrates from aged bacterial cultures are tested for growth stimulation of low-density mycobacterial cultures. Recently, RpfB from *M. tuberculosis* H37Rv was over-expressed in *E. coli* strain CH3λDE3 and purified using Ni<sup>2+</sup>-NTA chromatography. Further tests for growth stimulation are in progress. This research is beneficial in that Rpf proteins could potentially be used as a diagnostic marker for *M. tuberculosis* infection and may be helpful for diagnosing latent infections. Also, use of purified Rpf proteins may help accelerate culture of *M. tuberculosis* in sputum, thereby aiding in more-rapid diagnosis and treatment.

**Reining in the Drone Wars: Creating Criteria for the C.I.A. Drone Program in Pakistan**

Tony Pelli – Roosevelt at UGA

Dr. Fred Manget, Department of International Affairs, University of Georgia

In 2006, the United States Central Intelligence Agency (C.I.A.) began a covert action campaign, authorized by the President, to eliminate Al Qaeda and Taliban leadership in western Pakistan using armed unmanned aerial vehicles, commonly referred to as drone strikes. The C.I.A. chooses targets and executes the strikes with little oversight from other governmental bodies. This paper analyzes the efficacy and efficiency of the U.S. drone program and the corresponding number of unintended civilian deaths, as well as the change in those numbers since 2006. Examining arguments about the nature of conflict in Pakistan and clandestine action, as well as the aforementioned trends in casualty numbers from counterinsurgency and intelligence experts and legal scholars, this paper determines that the C.I.A. drone program needs greater oversight to be effective. The paper proposes that Congress separate the program's budget from the normal covert action budget, giving Congress greater oversight, and articulates specific criteria for the

targeting of drone strikes, most importantly ensuring that the target list for the strikes is restricted to leaders of Al Qaeda and the Taliban. Finally, this paper proposes a system—roughly following existing guidelines for other covert actions—by which certain, selected members of Congress will be informed of individual drone strikes. These changes will ensure that drone strikes are used sparingly to target only the most high-value targets, reducing Pakistani opposition to American goals in the region. Decreasing Pakistani resistance will enhance U.S. anti-terror strategies in one of the most crucial regions in America’s struggle against transnational terrorism. Additionally, proposed changes will allow for greater democratic accountability and oversight of a previously clandestine program.

**The Mixed Model of National Power and the Power Parity between the United States and China**

Chadwick Peltier

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

Power Transition Theory suggests that the likelihood of conflict is greatest when the ratio of the challenging state’s capabilities to those of the dominant state’s is within 20 percent. Have the United States and China reached this critical range of power parity? In this study I will describe the relative powers of the United States and China as well as the relative power of the Group of Twenty (G20) member states in the year 2001. After assessing the strengths and weaknesses of each historical paradigm for understanding power, I propose a new model, called the Mixed Model of National Power, which is based upon two principles. First, each variable measures a distinct aspect of national power statistically and conceptually. Second, the formula seeks an appropriate tradeoff between accuracy in measurement and parsimony in the number of variables. Because univariate measures fail to capture all of a state’s capabilities, six variables—GDP, healthy life expectancy, total population, urban population, total internet users, and environmental sustainability scores—are used that cover

elements of hard and soft power, incorporate size and development variables, and balance between economic and military strengths but avoid the use of hundreds of variables. Based upon my results, I conclude that China and the United States have reached the critical point of relative power parity where conflict is most likely, and I explore the reasons and implications of this find to policy makers.

**Identifying Human and Avian Influenza Binding Sites in Clam Tissue**

Ariella Perry

Dr. Elizabeth Howerth, Department of Pathology, University of Georgia

Clams can remove large quantities of avian influenza virus from water within a small interval of time, leading to total water purification. However, how removal occurs is unknown, nor why clams themselves do not develop signs of infection. The goal of this project was to determine if clams have cell-surface receptors that will bind avian and/or human influenza viruses and could account for water purification. Via lectin immunofluorescence and immunohistochemistry techniques, we evaluated the presence of sialic acids in the alpha-2,6 linkage (human influenza virus receptor) with *Sambucus nigra* and sialic acids in the alpha-2,3 linkage (avian influenza virus receptor) with *Maackia amurensis* I and *Maackia amurensis* II in clam tissue. The results suggest that lectins attached to cillia covering the foot, mantle, and gills of individual Asiatic clams, indicating that removal of avian influenza from contaminated water is through attachment to ciliated surfaces. Verification that avian, but not human, influenza virus attach to these specific surfaces is pending. In the identification and attachment of the avian influenza virus, further understanding can be rendered as to the process of clams’ purification of the water. These techniques could be implemented in the future for the purification of avian influenza virus from various media.

**The Genetic Alteration of Soybean to Promote the Production of Astaxanthin**

Emily Pierce – CURO Summer Research Fellow  
Dr. Wayne Parrott, Department of Crop & Soil Sciences, University of Georgia

Carotenoids are pigments that range in color from yellow to red and that provide health benefits and coloration to a variety of organisms. Animals cannot synthesize carotenoids and must obtain them from their diet. Astaxanthin is one of the more important carotenoids and is added to the feed of salmon, shrimp, chickens and layer hens. However, astaxanthin supplements can account for 15 to 25% of the producers' feed costs. Since these animals are fed soy concentrate, the goal of this research is to genetically engineer soybean to produce astaxanthin and thus reduce producers' costs. The genes for astaxanthin production were obtained from two astaxanthin-producing bacteria and a yeast. The first gene (*crtB*) allows soybean to form  $\beta$ -carotene. Then, astaxanthin is produced from  $\beta$ -carotene via the action of genes *crtW* and *crtZ*, or alternatively, via another gene called *crtS*. Both of these alternatives are being tested in soybean. Analysis of the engineered soybean using thin-layer chromatography showed they produce  $\beta$ -carotene but not astaxanthin. Therefore, current work is trying to determine why there is a lack of astaxanthin formation. Results of this research should be economically valuable and may provide insight into metabolic engineering of soybean.

**Estimating Detection Rates and Determining Site Occupancy of *Urspelerpes brucei* (the Patch-Nosed Salamander)**

Todd Pierson  
Dr. John Maerz, Warnell School of Forestry & Natural Resources, University of Georgia

In March 2007, University of Georgia researchers stumbled upon a new species of Plethodontid salamander, *Urspelerpes brucei* (the Patch-Nosed Salamander), in the Appalachian foothills of northern Georgia. While the discovery of the salamander is impressive in itself, very little additional

knowledge has been gathered about its life history. So far, this species is known from only a handful of sites, all of which are within a several-mile radius of the type locale. To develop a plan of management for this new species, a better understanding of its life history and range must be gained. However, the presence of *U. brucei* at a given site can often be difficult to determine due to its secretive nature, and a system for determining site occupancy is in need of development. Because this small, cryptic species is often hard to detect, we will use a combination of leaf-litter traps and dip netting to estimate detection rates of *U. brucei* over time in streams that it is known to inhabit. Quantifying and understanding imperfect detection rates of *U. brucei* will allow us to effectively survey new sites for the species and determine occupancy across its potential range. Obtaining a more complete understanding of stream occupancy and range of *U. brucei* is critical in developing a plan of management for its conservation.

**Measures of Working Memory: The Relationship Between Performance on the Operation Span Task and the Ocular Motor Delayed Response Task**

Rachel Pocock  
Dr. Jennifer McDowell, Department of Psychology, University of Georgia

Working memory (WM) is an important aspect of daily life and is associated with various measures of academic success, such as reading comprehension and reasoning ability. One standard measure of WM is the operation-span (OSPAN) task, which requires participants to complete a series of math operations while simultaneously remembering a particular sequence of letters. WM also can be evaluated by certain eye movement tasks, specifically an ocular motor delayed response (ODR) task. An ODR task requires that subjects remember the location of a target during a delay period and then move their eyes to the remembered location (i.e., "memory saccade"). Performance can be assessed by 1) evaluating the spatial accuracy of the memory saccade and 2) the frequency of saccades made before the delay period is over

(“anticipatory saccades”) using a video-based eye tracking system. Performance on the OSPAN task can predict performance on other eye movement tasks, but its relation to ODR is yet to be determined. Data from the OSPAN and ODR tasks will be collected from 40 undergraduate students at the University of Georgia. It is hypothesized that scores on the OSPAN task will be correlated with performance on the ODR task. Specifically, high OSPAN scores (indicating greater WM capacity) will be associated with better performance on the ODR task, as indicated by higher spatial accuracy and fewer anticipatory errors. These results may help researchers determine which tasks to use when assessing WM of participants with and without memory problems and may also explain the differences in results from studies utilizing different measures of WM.

**Forbidden Fruit: Reforming the Penalties for the Importation and Distribution of Contaminated Produce**

Shayna Pollock – Roosevelt at UGA  
Dr. Lewell Gunter, Department of Agricultural & Applied Economics, University of Georgia

From 1993 to 2008, the U.S. saw an increase in the importation of fresh fruit from 10 percent to 32 percent of all domestically consumed produce. The Food and Drug Administration (FDA) and U.S. Customs monitor imports by randomly testing 5 percent of all produce, but they cannot control the pesticides used in other countries. Thus, the safety of imports is unreliable. According to the FDA, six percent of imports contain illegal pesticide residues, but the current system of bonds is ineffective in keeping this produce away from consumers. A 1992 Government Accountability Office report shows that 60 percent of all tainted imported produce reaches grocery stores despite knowledge of contamination. Based on an extrapolation using current import size, approximately 400-480 thousand metric tons of contaminated produce reached Americans in 2006. However, only 17 percent of the companies distributing tainted food paid damages. Thus, current regulations do not deter companies. After a literature review and analysis of current policy failures, this paper

proposes that Congress should grant the FDA the ability to implement a system of civil fines. The fine schedule should consist of two sets of fines: one for the importation of a tainted good and a second for the distribution of contaminated produce. This civil fine system will promote self-regulation. While this new regulatory framework will result in potentially higher costs, this paper demonstrates methods for evaluating the significant social health benefits of reduced pesticide exposure. Further, a stricter system will lead to more sustainable international agriculture.

**The Impact of Speech Impairment on Head Start Children’s Social Emotional Competence**

Leah Prestwood, Kiara Jones & Evin Winkelman  
Dr. Tsu-Ming Chiang, Department of Psychology, Georgia College & State University

Specific Language Impairment (SLI) is a language disorder that is not related to or caused by other developmental disorders such as hearing loss or acquired brain injury. Pragmatic difficulties that negatively influence effective social interactions have been found to be experienced by children with language impairments. Children with SLI experienced more difficulty in recognizing what emotion a social scenario might elicit in an inference task and pose greater risks for social problems. The current study is thus designed to examine the impact of SLI on young children’s social emotional competence. Data from 21 Head Start children (7 girls) with ages ranging from 35 months to 47 months, collected by a larger study, were analyzed in the present study. Among these children nominated by their teachers in displaying a wide range of social emotional issues, nine children’s language ability was below average. Teachers were asked to fill out Social Competence Behavioral Evaluations (SCBE) developed by LaFreniere. The results showed children who lack speech ability were more likely to be reported as timid sad/withdrawn ( $r = .573, p = .016$ ) and to be rated by teachers using SCBE as isolated ( $r = .553, p = .026$ ) and less social ( $r = .504, p =$

.046). ANOVA results also revealed that speech significantly placed these children at risk of being isolated [ $F(1, 18) = 6.83, p = .018$ ], dependent [ $F(1, 18) = 7.432, p = .014$ ] and less social [ $F(1, 18) = 8.297, p = .01$ ]. Implications and future steps will be addressed at the Symposium.

### Humanities in Medicine

Ryan Prior

Dr. Katarzyna Jerzak, Department of Comparative Literature, University of Georgia

In his book, *Hot, Flat, and Crowded*, Thomas Friedman discusses how in traditional South African societies, those with chronic illness who sought treatment from healers were not instructed to take elixirs or remedies but were instead instructed to cook a meal for the entire village. The idea was that patients could help themselves by helping others. These societies realized that chronic illnesses were often the result of problems of the heart and successfully managed them in ways that might confuse the traditional Western medical establishment. Most people today think of medicine in terms of pills, surgery, and needles, but a survey of various civilizations' health traditions reveals highly sophisticated and surprisingly accurate ideas about how the human body works and how it can be treated that range from yogic meditation to herbal tea remedies. Like Western medicine, Chinese Traditional Medicine and Indian Ayurvedic medicine have developed over thousands of years. Practitioners of these systems glean their insights not so much with CAT scans and T-cell counts, however, as they do by examining the color and shape of a patient's tongue. This project began as an intended research paper but gradually evolved into a creative work that melded personal narrative and literary analysis to the initial philosophical questions. Because the quest for healing does not stop with scientific medicine but requires moral and spiritual satisfaction as well it is only through telling our own stories that we can ultimately find the healing we seek.

### Castro as a Capitalist: The Role of Foreign Investment in Cuba

Lucas Puente

Dr. Maurits van der Veen, Department of International Affairs, University of Georgia

The collapse of the U.S.S.R. and the subsequent dissolving of its Council for Mutual Economic Assistance led to Cuba's "Special Period," in which investment in the domestic economy and access to foreign exchange disappeared. This forced the Castro regime to reevaluate its development policy and, for the first time, actively seek and promote foreign direct investment (FDI). Nevertheless, Cuba has refrained from providing a laissez-faire marketplace for foreign firms and investors; on the contrary, the Castro regime has been determined to regulate and control this investment as much as possible. As per the existing literature, this strategy is imprudent as FDI has been shown to have had a generally positive influence on several economic and political factors, such as growth, wages, civil liberties, and political empowerment. Given these self-imposed constraints, FDI's ability to engender change is expected to have produced much less impressive results in Cuba. Although I expect to find that this expansion of FDI has been a net positive in terms of promoting economic growth, its capacity to improve domestic human development and expand political freedoms appears to have been hindered. To determine the precise nature of this impact, I am examining sub-national data sets regarding the current nature of foreign investment in Cuba. Regression analysis will also be utilized to better understand the changes resulting from inflows of FDI.

### Blood Velocity at Rest and After Ischemia

Rejina Pumachcharige

Dr. Kevin McCully, Department of Kinesiology, University of Georgia

Flow mediated dilation (FMD) is commonly used to measure vascular disease. FMD assumes that the blood velocity profile across the artery is constant. However, blood viscosity and wall "stickiness" can change with vascular disease.

This study will evaluate changes in the velocity profile of the femoral artery in healthy humans before and after a high-fat meal. The high-fat meal is hypothesized to alter the blood velocity profile. IRB approval will be obtained (under review), and healthy subjects (18-35 years old) will be recruited into the study. Eight subjects will rest for 10 minutes prior to resting measurements of the femoral artery velocity and diameter using an ultrasound unit. A cuff will then be placed below the subject's knee and be inflated for five minutes to occlude blood flow. The cuff will then be released and velocity and diameter will be measured during hyperemia. After the baseline measurement, the subjects will eat a high-fat meal consisting of "fast food" containing 1 gram of fat per 1 kilogram of body weight. The ultrasound measurements will be repeated two and three hours after the meal. The hypothesis is that fat in the blood will cause an increase in the standard deviation of instantaneous velocity measurements (the velocity profile).

### **Imagination and Institution: The Effects of Surrealism and Catholicism on the Work of Oscar Dominguez**

Sarah Quinn

Dr. Janice Simon, Department of Art History, University of Georgia

The surrealist art movement emerged during the 1920s. Building on the previous Dada period, this style drew from numerous sources. Contemporary Freudian philosophy's investigation of the dynamic between the conscious and unconscious mind most notably figured in the development of the surrealist aesthetic. The work of the Spanish surrealist artist Oscar Dominguez exhibits these qualities while also proposing a unique intersection of cultural influences. Dominguez worked primarily in Paris, the center of Dadaism and home to the prominent surrealist theorist Andre Breton, but was born and raised in the traditionally Catholic country of Spain. This research aims to investigate the extent of Catholicism's influence on Dominguez's surrealist art through his implementation of symbols, motifs, theoretical references, and

formal decisions. Previous research aligns surrealist philosophy and practice with the ancient concept of the sacred and the meditative capacity of mysticism. Catholicism's specific influence on the development of surrealist imagery, however, has yet to be examined in depth. Because of the paradoxical interconnectedness of the Freudian imagination, an idea perpetuated in France, and the institution of religion, supported by Spain, Dominguez's art could potentially serve as a unique visual union of progressive surrealist thought and traditional Catholic belief. A close examination of Breton's *Surrealist Manifesto*, Freud's *Interpretation of Dreams*, 20th century Catholic doctrine, and other relevant texts could provide greater insight into the enigmatic visual representations of surrealist thought.

### **Development of a Modified System to Create Mutations in *Mycobacterium tuberculosis***

Akanksha Rajeurs – CURO Apprentice, CURO Summer Research Fellow

Dr. Russell Karls, Department of Infectious Diseases, University of Georgia

One-third of the world population is infected with *Mycobacterium tuberculosis*. Annually, seven to nine million infected individuals suffer from active tuberculosis disease (TB), resulting in ~two 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 likely require deletion of multiple virulence factor genes from the chromosome. Current selection systems to delete genes from this bacterium replace the 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, our hypothesis is that we can develop a modified system to 1) replace a chromosomal gene with a gene cassette that will facilitate the study of the resulting mutants and 2) utilize a feature of the cassette to select for mutants that have deleted the cassette from the chromosome. This is a multi-step process to generate a pair of plasmids with

specific features. To develop these plasmids, multiple DNA cloning steps and PCR amplifications were performed. After each cloning step, plasmid DNAs were isolated and screened by restriction analysis. DNA sequencing was used for confirmation. Efforts are in progress to modify the plasmids 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.

### **Epidemiology of *Salmonella enterica* Typhimurium in Songbirds in the Southeastern United States**

Al W. Ray III – CURO Apprentice, CURO Summer Research Fellow

Dr. Susan Sanchez, Department of Infectious Diseases, University of Georgia

*Salmonella enterica* serovar Typhimurium outbreaks of unknown origin have plagued passerines, more commonly known as songbirds, for years, causing significant mortality in the wild. The illness is marked by enteritis with esophageal lesions, generally a clinical presentation not seen in other avian groups, including psittacines or gallinaceous birds—chickens and turkeys. These outbreaks have a devastating ecological impact on bird populations and might prove a significant threat to public health. These epizootic outbreaks are seasonal, occurring most frequently in winter and early spring. We do not know how *Salmonella* Typhimurium is transmitted in the wild bird population, the environmental reservoir, or factors responsible for these wild bird die-offs. During 2009, we observed a significant epizootic outbreak of *S. Typhimurium* in songbirds, especially in Pine Siskins. By Pulsed-Field Gel Electrophoresis (PFGE), we identified the same *S. Typhimurium* strain isolated from Pine Siskins and other passerines in multiple Southeastern states including Georgia, Tennessee, and North Carolina. In a retrospective comparison of this *S. Typhimurium* strain to an archival collection of *S. Typhimurium* from multiple animal sources, we found PFGE matches with songbird isolates from as far back as 1996. This strain appeared to

be unrelated to *S. Typhimurium* strains isolated from other avian species, most notably psittacines and gallinaceous birds, and cattle.

### **Primary Transmission of *Salmonella* Contamination in Poultry Meat**

Nick Regenold, E. N. Foxhall III, S. Frimpong, O. Grey, M. Kallaoun, J. Mansour & N. Wang  
Dr. John Maurer, Department of Microbiology, University of Georgia

*Salmonella* is the leading cause of human food borne illnesses in the United States. Poultry has been implicated through multiple epidemiological studies as the major source of *Salmonella* outbreaks. In the United States, individual poultry companies control production from the parent flocks to their progeny to the slaughterhouse. *Salmonella* can be transmitted horizontally or vertically. Horizontal transmission occurs when the bird acquires *Salmonella* through direct interactions with its environment at any stage in poultry production. Vertical transmission occurs when *Salmonella* is passed from an infected parent to its progeny. We hypothesized that *Salmonella* contamination of chicken carcasses is due mainly to the vertical transmission of *Salmonella* from the primary parent flocks. *Salmonella* isolates were collected from poultry farms, contracted with two different companies, to identify the source of chicken carcass contamination within this poultry production system. Pulsed-Field Gel Electrophoresis (PFGE) are being performed to compare DNA fingerprints of specific *Salmonella* isolates from parent flocks and progeny to determine the type of transmission involved in carcass contamination. A total of 7630 samples were collected, from which 1642 were *Salmonella* positive. Statistical analyses indicate a strong role of vertical transmission in *Salmonella* dissemination within the companies. Quantification will be possible when PFGE profiles are available for all samples. After evaluation of our results, we can determine where to implement intervention strategies to limit *Salmonella* transmission. Further analyses can be done with the PFGE fingerprint databases at the Centers for Disease Control and Prevention (CDC) to determine the link between

poultry contamination with *Salmonella* and human disease.

**Spiritual Life: Self-Transformation in the Ancient and Modern World**

Joe Reynolds – CURO Scholar, CURO Summer Research Fellow

Dr. Frank Harrison, Department of Philosophy, University of Georgia

With the human population continuing to expand, a global society is on the horizon, if it is not already here. Global peace is a genuine concern, and religious fundamentalists and extremists threaten it in the name of their beliefs. The question then becomes—how can a global society exist and maintain peace when it contains religions with disruptive beliefs? This research intends to focus on one major religion, Christianity, and will explore writings of influential leaders in the Church to determine if the actions of fundamentalists are justified. First, it will discuss the rise of fundamentalism in modern Christianity. Then, it will discuss the position of Christianity in history, and especially how it was preceded and shaped by the Platonic tradition. Following this, it will look at the work of Pierre Hadot, a modern philosopher who claims the Platonic and Christian tradition are united in their spiritual exercises. Spirituality, from Hadot's point of view, is focused on the transformation of the entire human being, including her desire, intentions, and outlook on life. Finally, the research will determine if this viewpoint is justified by looking at the role of sin in separating us from God and how God transcends any symbol or conception. The research will emphasize the need for a re-evaluation of the role of spirituality in modern society, not as a set of beliefs but as a process of maintaining the human spirit. This is especially relevant given the mental health issues that currently plague our youth.

**Respiratory Syncytial Virus G Protein Heparin-Binding Domain Interaction with Cell Surface Glycosaminoglycans Facilitate CX3C Chemokine Receptor Mimicry**

Joseph Rimando

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Respiratory syncytial virus (RSV) is a primary cause of severe lower respiratory illness in infants and children worldwide, also causing substantial disease in the elderly and immune-compromised populations. Previous research has shown that the RSV attachment (G) protein interacts with the CX3C chemokine receptor (CX3CR1) during the infection process to modify anti-viral immunity linked to the activities of fractalkine (CX3CL1), the natural ligand of CX3CR1. Evidence suggests that the G protein-CX3CR1 interaction is mediated in part by heparin-binding domains (HBD) on the G protein with glycosaminoglycans (GAG) on the host cell membrane. In this study, we investigate the role that several important members of the GAG family have in facilitating G protein binding to CX3CR1. The studies examine HBD-GAG interaction using flow cytometry to measure the level of G protein binding to CX3CR1 expressed on both wild type Chinese hamster ovary (CHO) cell lines and on multiple mutant CHO cell lines lacking certain GAGs. The preliminary results suggest that higher levels of RSV G protein bind to CX3CR1 expressed on wild type CHO cells than to CX3CR1 expressed on the mutant CHO cells. These preliminary results suggest that the G protein-CX3CR1 interaction is dependent on HBD-GAG association and that several GAG family members may be more important than others in facilitating the G protein-CX3CR1 interaction. Evidence from previous studies suggests that prevention of the RSV G protein-CX3CR1 interaction reduces RSV replication, and thus these GAG domains can be targeted as a novel disease intervention strategy to mitigate RSV disease pathogenesis.

**Biogeography of *Triatoma sanguisuga* on two Barrier Islands off the Coast of Georgia, USA**

Ashley Roden

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*Triatoma sanguisuga* is a known vector of *Trypanosoma cruzi*, the causal agent of Chagas' disease. Thirty-three *T. sanguisuga* adults and nymphs were collected at five sites on Cumberland Island and two sites on Sapelo Island in June and July 2009. The full length (699 base pairs) of the cytochrome oxidase II mitochondrial gene was sequenced for each specimen. Twelve unique haplotypes were identified, nine from Cumberland Island and three from Sapelo Island. Neighbor-joining and maximum parsimony analyses were used to establish phylogenetic relationships among the haplotypes. The analyses provided similar phylogenetic topologies with no distinct clades devoted to haplotypes from a single island. Nested clade analysis was also used to determine the haplotype network structure. Two haplotype networks were defined, and one contained only specimens found on Cumberland Island. The other network was a composite of specimens from both islands, with the ancestral haplotype from Sapelo Island. This pilot study is the first to illuminate relationships of *Triatoma* populations in the southeastern United States using the cytochrome oxidase II mitochondrial gene, while hinting at a cryptic species along the Georgia Coast.

**The Importance of Peer Approval in the Sartorial Purchasing Patterns of University of Georgia Students**

Mallory Roman

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Georgia

There is ample evidence that peer approval and group acceptance play a role in many social phenomena. This influence can manifest itself through the bystander effect, peer pressure, social facilitation, and in many other ways. However, dress as a means of social influence has been largely ignored. This study was

designed to determine whether peer approval and group acceptance influence the sartorial purchases of college students and their participation in popular apparel trends on campus. The hypothesis, derived from Social Comparison theory and Social Impact theory, was that students' sartorial purchasing habits are considerably influenced by peers. To test this hypothesis, a survey was developed around 14 brand-name apparel items popular at UGA that solicited student response on the significance of peer approval in personal decision-making, perceptions of peers' purchasing motivations, personal feelings about peer approval, and personal involvement in popular trends. Results were analyzed using frequency statistics and categorization of responses. The majority of the respondents (85.96%) owned at least one item, and all respondents were aware of the popularity of the 14 items. In general, students were more likely to rate the behavior of others as more conforming than their own, which suggested that participation in the popular sartorial trends on campus is viewed as being driven by conformity. These results may hold significance for retailers in college towns making retail-buying decisions and serve as further evidence that peer approval can act as motivation for conforming behavior.

**Writing in Conversation with the Traditional Narratives of Journey**

Jane Rowden

Prof. Reginald McKnight, Department of  
English, University of Georgia

My research this semester focuses on the tradition of telling the story of one's travels and the significance that the journey holds for the traveler. My objective is to write my own creative work in a conversation with the existing literary canon. I am reading narratives of travel, from the *Epic of Gilgamesh* to Jack Kerouac's classic road novel, *On the Road*, with the research questions "What common themes and tropes are used in traditional narratives of journey, and how should I utilize them in my own work?" and "What are the common authorial voices in these traditional works, and how can I contribute to this literary

conversation?” I anticipate that each of these narratives will focus on the growth and change of the hero, and I intend to write a short story in which the hero’s experiences impact his or her perspective toward the home. In my presentation, I will outline some of the common tropes (e.g., the road, the vehicle, obstacles) and explain their presentation in a few select pieces. I will address these questions in my presentation in addition to reading an excerpt from my piece.

### **Human Resistance to Infection by African Trypanosomes**

Carla Rutherford

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*Trypanosoma brucei brucei* is a eukaryotic parasite that infects cattle and other mammals but is unable to infect humans due to the cytotoxic activity of a minor subclass of serum high-density lipoprotein called Trypanosome Lytic Factor (TLF). The mechanism of *T.b. brucei* killing by TLF is poorly understood. The cellular morphology of human serum or TLF-treated trypanosomes suggests two distinct phenotypes associated with cell death. To elucidate the mechanism of trypanosome killing by TLF, we undertook an analysis of the morphological changes associated with TLF treatment. Morphological changes associated with serum killing were examined using fixed cell imaging and time-lapse microscopy of live cells. Trypanosomes treated with freshly collected, high specific activity, human serum change rapidly in morphology, becoming “kite-shaped” prior to lysis. Treatment with serum having low killing activity, produced by prolonged storage or incubation at 62°C, resulted in the gradual formation of a large cytoplasmic vacuole and a delay in trypanosome killing (~16hrs). Immunofluorescence microscopy of cells treated with low activity serum suggests the vacuole is formed within endosomes and not lysosomes as previously reported. These studies support the hypothesis that TLF killing of trypanosomes involves the activity of multiple proteins and that one of these proteins may be selectively inactivated by

heat treatment or storage, resulting in the distinct morphologies observed. Analysis of the morphological phenotypes of killing of the individual protein components of TLF may lead to a better understanding of the mechanisms underlying trypanosome killing by human serum.

### **The Biggest Loser: Restoring Self-Control After Rejection**

Raha Sabet

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

Previous research has indicated that social rejection leads to decreased self-control. Past research also suggests that after rejection, people become motivated to restore social connections. The hypothesis of this study was that motivation for social reconnection leads to increased performance on self-control tasks after rejection, if people think the tasks provide a chance to demonstrate social competence. We recruited participants from an undergraduate subject pool. When participants arrived, they were asked to complete a personality inventory. After completion, an experimenter supposedly scored the inventory. Participants then received accurate information about their level of extraversion. The experimenter also falsely informed participants that they would either live alone and have few social relationships or be unhappy in their future career. After receiving feedback, participants completed a self-control task that was either diagnostic or not diagnostic of social skills. The task they completed was the Stroop test, which is a color-reading test where individuals read the color ink in which words are written instead of the actual words. The printed words are color words whose semantic meaning distract from the ink color and make the test difficult. Finally, all participants were debriefed. Our findings supported our hypothesis. Among the rejected participants who believed the Stroop test diagnosed social skills, we found increased self-control and reduced negative affect. The findings have implications for understanding how we can help people cope with social rejection. Connecting social values to tasks that

may involve self-control may improve motivation and decrease self-control failure.

**The Ties That Bind: How the Notion of Strategic Culture and Technological Advances Affect China and U.S. Perception**

Aaron Sayama – Roosevelt at UGA  
Dr. Seema Gahlaut, Center for International Trade & Security, University of Georgia

Strategy is the pervasive element within a nation's decisions; it is the motivating factor from domestic to foreign policy. One nation that takes the notion of strategy to the extreme is the People's Republic of China (PRC). For scholars and laymen, the PRC represents the ultimate enigma with regards to foreign policy and military doctrine—distilling some type of strategy remains elusive to policymakers. Yet, the world is beginning to notice the PRC's increase in investment in its military, and governments have started looking into possible reasons and outcomes for this seemingly sudden shift in Chinese military policy. Connecting political moves of other nations to broad strategic theory is one way scholars and policymakers address and identify problems in American foreign policy. My research attempts to connect defense acquisitions made by the PRC to strategic theory in an effort to improve American foreign policy regarding the PRC. Through a systematic exploration of the PRC's technology industry, paying special attention to their high-tech defense technology acquisitions, I attempt to present the explicit links between technology, security, and prestige in the PRC. I subsequently identify three major areas in which the PRC is competing with the U.S. Furthermore, I provide an analysis of their motivating factors and how current events fit under the PRC's strategic culture and discuss their political ramifications on global security.

**Second Chances: Establishing an Administrative Expungement Procedure**

John Seewoester – Roosevelt at UGA  
Prof. Ed Risler, School of Social Work, University of Georgia

A Georgia Department of Corrections survey found that 36 percent of prisoners released from Georgia prisons in 2000 had reoffended within three years of their release. An analysis of relevant research suggests former criminals have difficulty obtaining gainful employment, accessing valuable state and federal welfare programs, and exercising their civil rights. In concert, these negative effects make it difficult for former criminals to reintegrate into society. Successful reintegration into society is critical to reducing former offenders' propensity to reoffend. This paper examines Georgia's current programs that encourage or facilitate reintegration and finds that the few programs that exist are insufficient because they lack clarity, simplicity, and ease of access. To address this insufficiency, this paper proposes that the Georgia State Legislature enacts an administrative expungement procedure that allows individuals convicted of certain crimes to clear their record if they complete a set of requirements designed to ensure rehabilitation. This paper examines the research supporting each of the proposed requirements and includes analysis of expected benefits and possible challenges associated with such a program.

**The Significance of Spiritual Experience in Robert Penn Warren's Poetry**

Matthew Sellers – CURO Summer Research Fellow, Roosevelt at UGA  
Dr. Hugh Ruppensburg, Department of English, University of Georgia

Robert Penn Warren embarks on a spiritual journey beginning with his early poems and running through his later work, raising questions about the nature of transcendence, humanity's relationship with the natural world, and the impact personal, individual history (as opposed to a collective national identity) has on the individual. His journey culminates in *Altitudes and Extensions: Poems 1980-1984*, his crowning spiritual achievement. Though no critic has failed to note the spiritual side of Warren's work, few have treated the vacillation between the breathless anticipation of transcendental self-realization of poems like "Delusion—No!" and despondent crises of spiritual identity as in

“Covered Bridge,” a defining characteristic of his last collection. This investigation probes the nuances of Warren’s indecisive conclusions on the nature of spirituality and its relation to personal history and identity. Ultimately, the poet balances humanity’s craving for spiritual fulfillment and surety against the weighty guilt of memory and conscience, the guilt “of forgetting the crime.” An intense, incisive reading of his work illustrates that, in poetry, Warren recognizes his hopes and dreams alongside his failures and despairs; he grounds his outlook in human history, human intelligence, and human experience rather than divine beings or dogma. The iterative return to faith from its utter rejection marks the path by which Warren finds understanding. More importantly, doubt represents one of the ways Warren realizes identity. By considering the weight of past experiences and spiritual isolation, Warren suggests the necessity of spiritual transcendence to a meaningful quest for self-actualization.

**Here and Queer: Creating Equal Protection for LGBTQ Students in Georgia Public High Schools**

Matthew Sellers – CURO Summer Research Fellow, Roosevelt at UGA  
Dr. Robert Hill, Department of Lifelong Education, Administration & Policy, University of Georgia

Lesbian, gay, bisexual, transgender, and queer (LGBTQ) students face harassment and bullying on a daily basis. A study by the Gay, Lesbian, and Straight Education Network (GLSEN) found that 86.2 percent of LGBTQ students reported harassment in the past year. Using a review of the literature and policy statements, the current project investigates the extent to which LGBTQ students are affected by harassment and assesses methods to mitigate its negative effects. According to survey data collected by the GLSEN, students who report harassment and violence based on sexuality or gender identity experience decreased educational and psychological outcomes, including lower GPAs, increased absenteeism and attrition, diminished post-secondary aspirations, and heightened risk

of drug abuse and suicide. Moreover, these students later grapple with depression and insecurity in their adult lives. Faculty and staff play a significant role in the perpetuation of this harassment as they often ignore instances of harassment and bullying that merit intervention. The paper proposes the creation of a task force aimed at educating faculty and staff state-wide to increase efficacy in palliating the negative effects of harassment and bullying, including absenteeism; schools with supportive faculty who regularly intervene demonstrate half as much absenteeism as schools without supportive faculty. In addition to educating school employees, the policy suggests adapting anti-harassment and anti-discrimination policies to include sexuality and gender identity specifically since comprehensive policies successfully lower mean victimization scores by 12.5 percent. The paper finally explores the benefits of such a policy based on the correlation between lowered discrimination, harassment, bullying, and victimization and improved educational and psychological outcomes for LGBTQ students.

**Dialectic in Late Plato**

Michael Slade – CURO Scholar, CURO Summer Research Fellow  
Dr. Frank Harrison, Department of Philosophy, University of Georgia

Questions of unity and plurality dominate Plato’s late works. Nowhere is this more prevalent than his literary trilogy, *Theaetetus*, *Sophist*, and *Statesman*. Famous for its procedural asides, ethical digressions, and metaphysical flourishes, the trilogy engages an unrivaled spectrum of topics. But what is it that unifies the incredible variation in this particular group of writings? Upon a careful reading of certain key passages in *The Republic* and the beginning of *Theaetetus*, it becomes evident that Plato intended the trilogy to serve as an introduction to the dialectical science. When this idea is grasped, the once seemingly haphazard construction of the dialogues begins to neatly fall into a structured discourse on dialectical praxis and method. A demonstration is offered of both the “upward” and “downward” paths of philosophical process, complete with a running

commentary on the proper logical procedure for arriving at sound conclusions. The views propounded in the trilogy do not, as so many scholars believe, refute Plato's earlier philosophical orientation. Instead, we see in Plato's late technical works a consummation of his middle period metaphysics, offered with subtlety and sophistication.

**The Philosopher's Progress: Eros, Dialectic, and Reality in Plato**

Michael Slade – CURO Scholar, CURO

Summer Research Fellow

Dr. Frank Harrison, Department of Philosophy, University of Georgia

The goal of my Honors thesis is to integrate previous Platonic research in CURO courses with a deeper understanding of the metaphysical reality in which Plato perceives the human being and, in particular, the philosopher operating. The dialectical and erotic approaches to the highest reality (be it the Good, the Beautiful, the One, etc.) seem, however, to often be at odds with one another. Given the association of these two concepts with the very nature of the philosopher and their proximity to some of the most important passages within the Platonic corpus, their seeming inconsistency is troubling indeed. The discovery of this incongruity has spurred me in two, opposite directions in regards to Plato's writing. On the one hand, I am driven back to the old, Socratic questions: What is virtue and, more specifically, what is human virtue? Further, how is individual practice of virtue connected to and influenced by the political practice of virtue? On the other hand, I find myself reaching upward toward the newer, Academic issues: What are the fundamental constituents of reality? What role do the Forms play (if any)? And, finally, how do these highest metaphysical realities affect the human being as such? While the two sets questions initially appear quite distant from each other, upon reflection it becomes evident that the answers to both sets together form the "playing field" within which human affairs are conducted and the twin processes of dialectic and Eros function. The characterization of this space of activity and the reconciliation of it with the

philosopher's mode of existence is the primary goal of my thesis work.

**Awareness of Borderline Personality Disorder in a University Population**

Laura Smart

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Borderline personality disorder (BPD) is a psychiatric diagnosis that features instability of affect, identity, and relationships. It is estimated that 1-2% of the population has BPD. People with BPD often harm themselves and/or complete suicide. Despite the deleterious effects the disorder has on individuals, very few people are aware of its symptoms, and no empirical studies have examined public awareness of the disorder. The current study sought to test the hypothesis that undergraduates would not be able to identify the symptoms of BPD in vignettes describing persons with mental illnesses. Participants were recruited from the research pool and presented with several vignettes, each describing a person with a different psychiatric disorder, and asked to indicate what diagnosis (if any) they would give the person described. Results showed that none of the participants surveyed was able to identify symptoms of BPD, whereas a majority of the participants were able to identify schizophrenia, bipolar disorder, depression, an eating disorder, and substance abuse. These data indicate that BPD is a less known and therefore less understood disorder among the general population. Because previous research indicates that awareness and education decrease stigma of mental illness, interventions are needed to educate the public on BPD.

**The Long Road to Zero: U.S. Declaratory Policy and Nonproliferation**

Patrick Smith – Roosevelt at UGA

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Early in his term, President Obama made the elimination of all nuclear weapons worldwide a goal of his administration in a major speech in Prague. Rogue state nuclearization, the constant

specter of accidental launch, and the declining legitimacy of the Nuclear Non-Proliferation Treaty (NPT) make this issue of capital importance. Moreover, the upcoming 2009 Nuclear Posture Review and 2010 NPT review conference afford the President and other leaders the opportunity to fundamentally address this issue. If the United States is serious about averting a “nuclear tipping point,” Obama must follow through on his promise to reduce the role of nuclear weapons in our national security strategy. This paper proposes that the United States pursue a critical confidence-building measure that shifts our declaratory policy to one stating that the sole purpose of nuclear weapons is to deter a nuclear attack on the U.S., its forces, and its allies. While there is some support in the international community for this policy change, few realize the extent to which this move would aid nonproliferation goals. An in-depth review of the current literature reveals a strong need for a change in U.S. nuclear weapons policy and indicates that a “no first use” policy will be beneficial. Jump starting the process of delegitimizing nuclear weapons will help strengthen the NPT regime, reduce incentives for nuclear proliferation, and foster greater international cooperation on solving this transnational problem.

**Promoting Sharing of OSINT Analysis Between Expert Institutions and the Intelligence Community**

Irena Stevens – Roosevelt at UGA  
Dr. Loch Johnson, Department of International Affairs, University of Georgia

As technology and general education continue to improve, open source intelligence (OSINT) is the fastest spreading, but most underutilized, form of information by intelligence operatives. The collection and processing of OSINT will become an insurmountable problem for the intelligence community (IC) without a venue for accessing the expertise of the academic, corporate, and research institutions on a need or demand basis. Since most of the information available to the analyst dealing with foreign events is open source, further development of an effective method of analysis can dramatically

improve the framework of fragmented intelligence by filling in gaps and creating links. Effective analysis of OSINT can move the IC toward a greater understanding of other parties, especially in individual motivations and in cultural knowledge. This framework provides a more complete database to be supplemented by other forms of intelligence, such as those collected by clandestine or satellite methods. Since the internet is the main source of the expanding supply of information, it should also be used to organize and funnel ideas between outside parties and the intelligence community through a database of personnel and relevant research. The willingness to process and share information is rewarded with a system of incentives designed to benefit the analyst through recognition, monetary, professional, intellectual, and psychological rewards. By establishing a database of expert personnel and enabling them to share ideas, the intelligence community and research institutions can gain mutual benefit in processing open source information.

**Effects of Weighing Protocol on Corticosterone Concentrations in Leghorn Chickens**

Claire Stice  
Dr. Kristen Navara, Department of Poultry Science, University of Georgia

In the poultry industry, weighing protocols often involve carrying and weighing the birds by the feet or the wings. There has been very little research studying how such handling techniques can affect their stress levels. The purpose of our study was to determine which weighing methods caused the most significant stress response. We hypothesized that coddling would provoke a smaller physiological stress response compared to birds that are handled in a less gentle manner such as by the wings or feet. We tested this hypothesis in two stages. For the first, we tested whether handling by the feet for 5min provoked a larger physiological stress response than coddling for the same period of time. For stage two, we weighed birds using one of three weighing protocols using similar durations to those in industry: handling by feet, handling by

wings, and weighing upright using a new weighing apparatus. Corticosterone levels, the primary stress hormone in birds, were measured 1h after handling using a radioimmunoassay. During stage one, birds inverted during handling produced significantly more corticosterone compared to coddled birds. During stage two, although we expected birds coddled and weighed without any physical restraint to have the lowest level of corticosterone, we saw no significant difference between any of the handling groups, perhaps due to the short handling duration used during the second stage. The findings from this experiment can be applied directly to industry as well as offer new questions for research and understanding the domestic chicken's response to stress.

### **Best Practices in Graduated Driver's Licensing**

Theodore Story – CURO Apprentice  
Dr. Don Bower, Department of Child & Family Development, University of Georgia

Automobile crashes are the leading cause of teen morbidity and mortality in the U.S. In recent years, increasing numbers of states have implemented legislation referred to as Graduated Driver's Licensing (GDL) as one approach to address this problem. Although GDL policies have been refined over time, remaining differences in the regulations among states (and even among countries) provide a rich research opportunity for recommending promising practice in this policy arena. This study attempts to answer this question of which current and proposed GDL practices seem to be most effective, with effectiveness being measured as effecting lower teen crash rates. The researchers will conduct a qualitative assessment of recent empirical research, trend analyses, government agency reports, and literature reviews for consistent and predominant themes. These themes will then be compared to current driver's licensing policies in Georgia to identify areas of potential improvement. Variables such as age at licensure, length of learning periods, cost of licensing, passenger and night-driving restrictions, testing procedures, and sanctions for violations are predicted to correlate with the

effectiveness of practices. Existing literature that assesses the effectiveness of these practices is being reviewed and analyzed to create a compendium of research-based policy recommendations. Interstate as well as international GDL comparisons will be conducted and summarized. The product of this review will be a summary of best practice recommendations for consideration by Georgia legislators and agency administrators.

### **Novel Synergistic Inhibitors of Methicillin-Resistant *Staphylococcus aureus* (MRSA)**

John Taliaferro  
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Haloenol Lactones (HEL) are a known family of 5- or 6-membered compounds that have proven to act as suicide inhibitors of serine proteases, much like human neutrophil elastase (HNE), chymotrypsin, and trypsin. Knowing HEL's targets for inhibition, it is thought that it could also cause inhibition of the serine protease  $\beta$ -lactamase.  $\beta$ -lactamases are enzymes produced by bacteria that cleave the  $\beta$ -lactam rings of  $\beta$ -lactam antibiotics. MRSA, a known strain of *Staphylococcus aureus* resistant to broad-spectrum antibiotics, produces high levels of  $\beta$ -lactamase, allowing it to resist antibiotics like  $\beta$ -lactams. For HEL to achieve inhibition of the  $\beta$ -lactamase, it allows the lactone to be hydrolyzed by the target protease enzyme. This hydrolysis reveals the reactivity of the molecule by exposing the electrophilic species of the HEL for the alkylation of the enzyme. The hydrolysis causes an acyl transfer to the active site hydroxyl group which releases an  $\alpha$ -haloketone electrophilic moiety that alkylates the accessible nucleophilic residues at the active site. To test for inhibition of  $\beta$ -lactamase, multiple analogs of HEL were created using essential amino acids and alkylation of the free amine on each amino acid with propargyl bromide. From there, the lactone was formed by halolactonization. These analogs were placed at several different concentrations with a specific concentration of penicillin G and MRSA. One of the analogs showed zones of growth inhibition of the

MRSA, which grew larger as the concentration of the HEL increased. These increasing zones of inhibition showed that HEL has possible  $\beta$ -lactamase inhibition capabilities, and further analogs need to be created in order to test possible theories to why synergistic activity is observed.

#### **DNA Methylation Related to Cancer**

Yu Taniguchi – CURO Scholar

Dr. Shaying Zhao, Department of Biochemistry & Molecular Biology, University of Georgia

Xiao (~30kb) and Da (~280kb), meaning small and big, respectively, in Chinese, are regions found in the human genome. Since there has been no recombination between Xiao/Da sequences, we believed these regions are condensed, thereby preventing genomic rearrangement. Condensation of chromatin is usually directed by DNA methylation. Therefore, we believe that DNA methylation plays a key role in regulating these elements and preserving genome in these regions. To elucidate the key mechanism of heterochromatin formation in Xiao/Da and its effect, we have studied differences between methylated and unmethylated sequences by using Methylation-specific polymerase chain reaction (MSP). MSP allows us to differentiate methylated from unmethylated cytosine by using sodium bisulfite treatment of DNA that keeps the marks of methylated cytosines together with the specific amplification of this modified DNA utilizing primer sets that are only complimentary to the formerly methylated or unmethylated alleles. In order to perform MSP, I modified a wild type sequence of Xiao/Da into methylated and unmethylated sequences; designed wild-type, methylated, and unmethylated primers with UCSC genome browser and Primer 3 website; tested these primers with Bisulfite modified DNA in PCR; and ran agarose gel for a detection. We have expected to obtain results that show a strong methylation band and a weak unmethylated band. This may indicate that DNA methylation occurs in Xiao/Da regions and prove our hypothesis that DNA methylation causes condensation. DNA methylation would eventually contribute to preserving the human

genome by avoiding any recombination between Xiao/Da sequences.

#### **Breaking the Rules: A Qualitative Study of Academic Dishonesty at the University of Georgia**

Michael Thomas – CURO Scholar

Dr. Mark Cooney, Department of Sociology, University of Georgia

Academic dishonesty is a frequently practiced behavior amongst students at the University of Georgia. Not to be confused with “cheating,” a more vague term, academic dishonesty refers to any violation of a university honesty policy. Most academic dishonesty research predominately consists of extensive quantitative data gathered from a large number of universities. However, the literature lacks detailed accounts of the conditions preceding, during, and resulting from acts of academic dishonesty. By conducting extensive qualitative interviews with 17 University of Georgia Honors Program students and constructing a detailed database of their responses, my purpose was to discover what circumstances result in incidents of academic dishonesty, what sanctions are imposed on students found in violation of the University of Georgia academic honesty policy, and what preventive measures can be introduced to limit the frequency of academic dishonesty. Data revealed that despite the University’s firm stance against violations of the academic honesty policy, students were exposed to numerous situations where acts of academic dishonesty could be easily commissioned. Interestingly, among the few students whom faculty detected for violations of the academic honesty policy, the vast majority were not reported to the University of Georgia administration but instead received informal sanctions. Though limited by a small sample size, these initial findings suggest that while still holding students accountable for academic honesty policy violations, faculty and administrators could introduce several simple strategies that would likely reduce the amount of academic dishonesty at the University of Georgia.

**Application of Protein Interface Footprinting via Hydroxyl Radical Oxidation to Endopolygalacturonase II**

Stephen Thompson

Dr. Robert Woods, Complex Carbohydrate Research Center, University of Georgia

*Aspergillus niger* is a fungus, commonly known as black mold, that secretes an enzyme, endopolygalacturonase II (PGII), that degrades the smooth regions of pectin in the cell walls of plants. PGII binds to the substrate polygalacturonic acid (PGA), a major substituent of pectin, and cleaves the internal bonds of homogalacturonan, which allows for the fragmentation and solubilization of pectin. To fully understand the function of PGII and the nature of its interaction with PGA, the location and function of the protein's active/binding site must be determined. Biomolecular surface mapping via hydroxyl radical footprinting offers an accurate method for the characterization of this interaction. Hydroxyl radicals, generated by nanosecond laser-induced photochemical dissociation of hydrogen peroxide, oxidize amino acid residues located on the protein surface to produce stable covalent modifications. When the ligand, PGA, is present on PGII, oxidation will occur on the amino acids not attached to the ligand. After proteolytic digestion of the oxidized PGII via V8 protease, FT-LTQ mass spectrometry and ByOnic analysis software will be used to identify the non-oxidized fragments, which represent the active site of the protein. Comparison with solvent accessible surface area data will allow for the accurate development of a 3D structure for PGII, particularly the structure of its active site.

**NCAMP-1: A Novel Host Danger Molecule in Catfish**

Emilia Tuck

Dr. Liliana Jaso-Friendmann, Department of Infectious Diseases, University of Georgia

Host danger molecules are intracellular molecules that initiate inflammation when released into extracellular milieu upon tissue damage following trauma or infection. The innate immune response that ensues from the

binding of these molecules to pattern recognition receptors (PRR) results in an increase in pro-inflammatory cytokine secretion and an increase in antigen presentation to adaptive immune cells. Danger molecules from microbial sources (e.g., LPS) and the mechanisms by which they induce inflammation are well understood, but less is known about their endogenous counterparts. Recent data from our laboratory have shown that a histone H1x-like protein, NCAMP-1, is released into serum of stressed animals and may induce activation of innate immunity in fish. Based on these findings, we hypothesize that NCAMP-1 may act as a host danger molecule. The objectives of this study are to assess changes in pro-inflammatory cytokine TNF alpha, IL-1 beta, and gamma interferon gene expression in catfish immune cells by quantitative polymerase chain reaction (qPCR). A time-dependent response in transcriptional activation of the genes of interest is measured following treatment of purified cells with recombinant NCAMP-1. The results demonstrate an increase in IL-1 beta message expression at 3 and 6 hours post-treatment. This information will provide knowledge about mechanisms by which the immune system may use self molecules to sense danger and produce inflammatory responses. Beyond the practical applications in the design of aquaculture vaccines, this work could also answer fundamental questions about chronic inflammation and autoimmune diseases in other species.

**Glutamate Dehydrogenase and Its Role in *Helicobacter pylori***

Soumya Vaish

Dr. Robert Maier, Department of Microbiology, University of Georgia

The function of the enzyme glutamate dehydrogenase (GDH-ase), encoded by the gene *gdhA*, has not been studied in *Helicobacter pylori* bacteria. In *E. coli*, this enzyme catalyzes the formation of glutamate from  $\alpha$ -ketoglutarate and thus assimilates nitrogen in the form of ammonia. Urease, another enzyme in *H. pylori*, forms ammonia from urea. We hypothesize that without the presence of GDH-ase, urease

activity may be decreased. As glutamate would not be produced, mutants may require a glutamate supplement to survive. Also, additional stress may cause lower growth rates and greater sensitivity to acidic pH. The wild-type strain, *H. pylori* 43504, and a constructed mutant strain lacking *gdhA* were both subjected to different growth conditions, including glutamate-supplemented blood agar media, Brain-Heart Infusion (BHI) media, and different levels of pH. Urease enzyme activity was also measured in both strains of bacteria. Our results did not support our hypothesis, as the growth rate, acid sensitivity, and urease activity of the mutant strain did not show any significant deviation from the wild-type strain. The construct was also able to grow on blood agar plates without supplemental glutamate. The survival of the mutant strain on blood agar suggests that there may be another pathway responsible for the synthesis of glutamate. This research broadens our knowledge of this common pathogen by drawing conclusions about the basic metabolic processes in *H. pylori*. Future experiments may involve comparing the two pathways of glutamate synthesis or conducting an assay measuring glutamate dehydrogenase specific activity.

### **Brain Activity Analysis of Good and Poor Performers During Inhibitory Eye Movements**

Manouela Valtcheva – CURO Scholar  
Dr. Jennifer McDowell, Department of Psychology, University of Georgia

Previous studies of eye movement performance in people with schizophrenia show that they make more errors than control subjects during tasks that require inhibition. One such task is the antisaccade task, which requires the subject to inhibit looking at a peripheral target and, instead, to generate a saccade (quick eye movement) to the mirror image location of the stimulus. Imaging studies in our lab and others have indicated that during the antisaccade task, people with schizophrenia exhibit decreased activity in prefrontal cortex and related circuitry. Such dysfunction in prefrontal cortex seems to be associated with poor performance on tasks

requiring inhibition and working memory generally, not just among those with schizophrenia. The current study looks at differences in brain activity between undergraduate students selected for good and poor performance on the antisaccade task. It is hypothesized that there will be decreased prefrontal cortex signaling associated with poor antisaccade performance. The subjects were placed in a 1.5 T MR scanner while performing antisaccade tasks. Functional MRI data were obtained for 30 subjects (69% female, M = 19.6 (SD = 2.1) years, 100% right handed), representing the top and bottom third of an antisaccade proportion correct distribution (N = 114). The functional MRI data will be analyzed to evaluate activity differences in prefrontal cortex and other regions between groups of good and poor performing subjects.

### **Synthesis of a Robust Photoremovable Protecting Group for Photoactivation of Gene Expression**

Alexandra Walker – CURO Summer Research Fellow  
Dr. Timothy Dore, Department of Chemistry, University of Georgia

Photoactivation of gene expression is an invaluable technology that enables the study of intracellular physiology. Genes important to tissue development often have different functions at different stages of life. Utilizing two-photon excitation (2PE) allows for excellent spatiotemporal control of gene expression and is useful for the investigation of tissue-specific roles of developmental genes. A photoactivatable activator of gene expression based on the 8-bromo-7-hydroxyquinolinyl (BHQ) and the 6-bromo-7-hydroxycoumarin (Bhc) groups will be synthesized and tested for its photochemical properties. BHQ and Bhc are photoremovable protecting groups that are hydrolytically robust and sensitive to 2PE. They will be conjugated to a small molecule that induces expression of a developmental gene of interest. Release of this regulator through exposure to 2PE light will trigger the expression of a gene in a single cell at developmentally critical times. Significant progress toward

synthesis of the targets has been made, but the reactions have not been optimized to adequately produce the desired products. Bromide groups were effectively appended to BHQ and Bhc, but their subsequent replacement by dimethyldithiocarbamate groups was achieved for Bhc and not BHQ. Reduction of the dimethyldithiocarbamate groups to sulfides on Bhc was not accomplished without destruction of the coumarin ring, which is less robust than quinoline. Low-yielding steps early in the synthesis reduce the availability of materials for experimental reactions on the forefront.

Theoretically, each step of the syntheses is possible to enact, but alterations should be made to the procedures and workups of each reaction to obtain the desired product.

### **Involvement of DNA Damage Response Factors in the Proliferation of Cancer Cells**

Alice Weaver

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

Telomeres, protective segments of non-coding DNA at the ends of eukaryotic chromosomes, play important roles in aging and cancer. Telomerase is the enzyme that synthesizes telomeres, a process occurring early in human development. The absence of telomerase activity in adults results in gradual telomere shortening, which triggers cell senescence or apoptosis. In most cancers, telomerase reactivation renders cells immortal, allowing for continued proliferation. Thus, telomerase is a molecular target for halting cancer growth. To better understand how telomerase works, our lab has developed a fluorescence *in situ* hybridization (FISH) procedure to view the subcellular localization of telomerase in human cancer cells. Results indicate that telomerase is only recruited to a fraction of chromosomes during each round of telomere synthesis. Based on previous evidence, we hypothesize that the subset of chromosomes acted upon by telomerase may be the same subset where DNA damage response (DDR) factors are observed. We are performing two experiments in HeLa cancer cells to evaluate our hypothesis: a) FISH and immunofluorescence to test for the co-

localization of DDR proteins and telomerase and b) protein knockdown and FISH to examine telomerase recruitment in cells where DDR is blocked. Our hypothesis predicts a positive correlation between telomerase recruitment and DDR proteins, which would suggest that DDR factors may be involved in telomere elongation and suggest directions for further cancer research.

### **Development of Consensus-Degenerate Hybrid Oligonucleotide Primers for Retroviral Discovery**

Shuyan Wei – CURO Summer Research Fellow  
Dr. Scott Schatzberg, Department of Small Animal Medicine, University of Georgia

Identification of infectious etiologies for diseases is necessary to allow appropriate diagnosis, treatment, and prevention of disease. Retroviruses are a common cause of disease, but currently available methodologies for identification of unknown retroviruses are time-consuming. The objective of this study was to develop a polymerase chain reaction (PCR) assay using consensus-degenerate hybrid oligonucleotide primers (CODEHOPs) for efficient identification of known and novel retroviruses. Using the CODEHOP strategy, two sets of PCR primers were manually developed based on published amino acid and nucleotide sequences of the polymerase gene from 57 retroviruses. The primers were designed to contain a 3' degenerate core, based on 3-4 highly conserved amino acids, and a 5' consensus clamp, based on the most common codon used for 6-8 amino acids upstream of the degenerate core. To evaluate one set of primers, reverse-transcriptase PCR was performed on nucleic acids extracted from reticuloendotheliosis virus, lymphoproliferative disease virus of turkeys, and feline leukemia virus. Amplicons of the expected size for all three viruses were visualized following electrophoresis and exposure to ultraviolet light. The results suggest the developed primers are able to recognize multiple retroviruses with one PCR assay as expected. In the future, both sets of primers will be tested on representative retroviruses from each retroviral family.

Specificity will be evaluated by sequencing of the PCR amplicons, and serial dilutions will be used to evaluate sensitivity. Ultimately, the primers will be applied to clinical cases of canine neurological disease where retroviruses are expected to play a role in pathogenesis.

**Great Powers and Grand Strategy on the Korean Peninsula: The Gap Between Rhetoric and Action**

Edward Wells – CURO Apprentice  
Dr. Brock Tessman, Department of International Affairs, University of Georgia

The current diplomatic gridlock and nuclear standoff on the Korean peninsula is a product of the manner in which the six key actors in the region—China, Japan, Russia, the United States, South Korea, and North Korea—define their national interest. All of the states involved, except for North Korea, have publicly claimed to support non-proliferation and the reunification of the North and the South. Yet, their actions sometimes suggest other motivations. Though the public intent of key actors is to promote peace and principles, negotiating tactics and foreign policy behavior indicate an emphasis on power and prosperity. This difference between rhetoric and action has led to a lack of progress in achieving the set goals of non-proliferation and reunification. This paper acknowledges that states conceive their national interests based on the framework of the “4Ps”—power, peace, prosperity, and principles. Each actor claims peace and principles to be the top priority in promoting a unified and nuclear-free Korea, but power and prosperity tend to dominate the actual foreign policy agendas of these states. This argument is supported by the empirical record: after over a half-century of negotiations, conflicts, and compromises, the six parties have yet to resolve either the North Korean nuclear issue or the related challenge of reunification.

**Heart Rate Plateau in Response to Exercise Follows Exponential Kinetics**

Benjamin Wheeler & Destinee Ingra  
Dr. James Hargrove, Department of Foods & Nutrition, University of Georgia

The plateau principle postulates that health related transitions follow simple exponential kinetics. We tested the idea that change in heart rate during a timed step test could be modeled as an exponential function. The mathematical model is equation 1, where  $M_t$  is the value of a dependent variable such as pulse rate at time  $t$ ,  $M_0$  is the initial value,  $M_{ss}$  is the asymptote at the new steady state, and  $k$  is the first order rate parameter:

$$M_t = M_0 + (M_{ss} - M_0) * (1 - e^{-kt})$$

Subjects were 4 male and 27 female UGA students who were in good health. Data were collected with an Omron model HR-100C heart rate monitor. Each subject recorded heart rate at one-minute intervals while sitting, standing, and stepping up and down from an 18 cm step at a rate of 30 steps per minute. They sat down immediately after 3 min of stepping and recorded their pulse rates for another 3 min. Equation 1 was fit to individual and group average data using Solver in Microsoft Excel®. The rate parameter for approach to plateau in heart rate during the step test was 1.8 per min, and the plateau was 118 bpm. During recovery, the value of  $k$  was 1.5 per min, and the resting plateau was 75 bpm. We will present data showing that the equation can forecast changes in heart rate, namely, a reduction in mean heart rate and blood pressure, in response to short- and long-term training.

**Habitats of West Nile Virus Competent Mosquitoes: The Effects of Urbanization in New York City**

Abby Wong – CURO Scholar  
Dr. John Drake, Odum School of Ecology, University of Georgia

West Nile virus (WNV), a flavivirus spread by mosquitoes, first appeared in the United States in 1999. Since then, more than 25,000 people have been infected, resulting in over 1,000 fatalities. Mosquito habitat modeling has become one of the primary methods for predicting WNV incidence in human populations. As part of an ongoing partnership between the University of Georgia’s Odum School of Ecology and the New York State Department of Health and Mental Hygiene

(DOHMH) to examine the dynamics of vector-borne diseases in urban environments, a study was undertaken to understand distribution of WNV competent mosquito species. Results of a systematic review of the relevant literature showed that at the spatial scale of a city, competent mosquito species are rarely found in areas that have the highest percentage of impervious surfaces, but they are associated with moderate levels of development (e.g., areas with mild vegetation, medium population density, and artificial water sources, such as sewer treatment facilities or detention ponds). Therefore, machine learning algorithms were used to identify patterns in the relationship between mosquito species distribution and environmental variables associated with moderate levels of urbanization and postulated to influence local mosquito abundance. The results of these models will be mapped in New York City to identify hotspots of mosquito aggregation that may be targeted by DOHMH for mosquito control and thereby limit the transmission of WNV to human populations.

### **The Effect of Online Communication and Social Support on Positive Emotion and Health Outcomes in Individuals Treated with Ileoanal Reservoir Surgery**

Sook Kyung Yoon – CURO Scholar  
Dr. Kimberly Clay, School of Social Work,  
University of Georgia

This study will examine the use of the internet blog *jpouch.net* as a mechanism for the communication of positive emotional expression in survivors of chronic ulcerative colitis, colon cancer, and familial polyposis. The purpose of the study will be to measure the efficacy of this particular intervention method to promote positive mental health outcomes. Positive emotional expression is operationally defined using Fredrickson's Broaden and Build Theory of Positive Emotion in a mixed methods study based on survey data and messages from active participants in this online support group. The aim of this project is to establish the benefits of positive emotions and how these emotions are mediated and translated through the internet blog medium. The messages posted to the blog

will be analyzed using content analysis. Statements will be coded via manifest and latent content, in which the explicit and implicit messages will be extracted and evaluated within the context of how they affect treatment outcomes. Data will be analyzed using qualitative analysis software NVivo and quantitative analysis software Linguistic Inquiry and Word Count. Survey data will also be assessed for statistical significance in SPSS. As results are compiled researchers will extract pertinent content and interpret its potential meaning and implications for the population being studied. The research will be conducted collaboratively with students and faculty from several different departments, including social work, communications, biochemistry, and textiles.

### **Creation of a Reporter Molecule That Will Identify the Pathway Used to Degrade Isoprenylated Molecules**

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

Over the past decades, the function and existence of protein modification has been vague, but in recent decades the standard pathway of protein synthesis has been revised to include a final step, the posttranslational modification of proteins. Posttranslational modification can be followed by a reporter molecule, such as a plasmid. It has been observed that reporter molecules have altered steady states when not properly modified. The Schmidt lab has observed that cells recognize isoprenylated intermediates, proteins with additive hydrophobic molecules, and target them for protein turnover. We are concerned in this study with the fate of the intermediates of isoprenylated molecules when the Caax motif (prenylation, AAX tripeptide proteolysis, and carboxymethylation) is improperly modified by proteolysis and/or carboxymethylation. It was my aim to create a plasmid that allows me to identify the pathway used to degrade isoprenylated molecules. The knowledge of degradation mechanisms could lead to potential

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discoveries of methods in which protein turnover can be regulated with therapeutic goals. The oncoprotein Ras is an isoprenylated and therapeutic target. Chemical agents that interfere with Ras Caax proteolysis and/or carboxymethylation are in development and could be coupled with strategies to enhance turnover in order to deplete cancer cells of the Ras oncoprotein. Using PCR amplification, restriction digest, and ligations, a plasmid containing similar features to a-factor, the yeast mating pheromone, was created. The eventual goal is to use the plasmid that I created to reason the impact of inappropriate Caax modification on protein steady state levels.

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