CURO

Center for Undergraduate Research Opportunities

Symposium 2006

April 10, 2006

Tate Student Center & Student Learning Center

Program and Book of Abstracts

Creating a Culture of Undergraduate Inquiry

The Honors Program's
Center for Undergraduate Research Opportunities

2006 Symposium Program and Abstracts

CURO Office
203 Moore College
The University of Georgia
Athens, GA 30602
(706) 542-5871
http://www.uga.edu/honors/curo

Technology support compliments of:	College of Agricultural and Environmental Sciences (Chris Adcock and Polly Cleveland)
	College of Education (Ron Braxley)
	College of Family and Consumer Sciences (Chasity McWilliams)
	College of Veterinary Medicine (Scott Brown and John Hess)
	Franklin College of Arts and Sciences (Aaron Lines and Christine Miller)
	Grady College of Journalism and Mass Communication (Cletus Stripling)
	Terry College of Business (Sarah Fraker)
Symposium Chair:	Dr. Pamela Kleiber
Editors:	Rebecca Cheney, Dr. Pamela Kleiber, and Ben Simpson
Cover and poster design:	Rebecca Cheney
Cover and poster art:	Samuel Stabler, Drawing and Art Education Majors, Lamar Dodd School of Art, University of Georgia
Proofread by:	Rebecca Cheney, Dr. Pamela Kleiber, Ben Simpson, and Colleen White
Published by:	Honors Program, University of Georgia
Printed by:	Central Duplicating, University of Georgia

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University of Georgia
Tate Student Center & Student Learning Center Fourth Floor Rotunda
April 9, 2007

CALL FOR ABSTRACTS

The Center for Undergraduate Research Opportunities at the University of Georgia provides a forum for all undergraduates 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.

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. Those who wish to present their work should submit an application and an abstract of a maximum of 250 words (via the CURO web site) and a brief supporting letter from the sponsoring faculty member no later than January 12, 2007. Group research projects should be submitted with one application and one letter of faculty support. All abstracts will receive graduate student peer review with faculty guidance. All participants accepted into the Symposium will be notified by February 16, 2007, and their abstracts will be published in a book of abstracts. Sponsoring faculty will be invited to preside at their students' sessions.

Best Paper Awards
Papers on work being presented at the CURO Symposium submitted by March 19, 2007 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. Maximum length is 20 pages, double spaced.

Purpose 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
- A 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 2007 Symposium. For more information, contact curo@uga.edu, (706) 542-5871.

Monday, April 10th, 2006

Begin registration of oral and poster presenters; Students hang up posters — **9:00 a.m.**
Tate Student Center, Lower Lobby

Concurrent Oral Sessions — **10:10 a.m.**
Tate Student Center, Rooms 137, 138, 139, 140, 141

Performing Arts: Music — **11:15 a.m.**
Tate Student Center, Georgia Hall A

Concurrent Oral Sessions — **11:15 a.m.**
Tate Student Center, Rooms 137, 138, 139, 140, 141

Performing Arts: Creative Writing — **12:20 p.m.**
Tate Student Center, Georgia Hall A

Concurrent Oral Sessions — **12:20 p.m.**
Tate Student Center, Rooms 137, 138, 139, 140, 141

Performing Arts: Dance — **1:25 p.m.**
Tate Student Center, Georgia Hall A

Concurrent Oral Sessions — **1:25 p.m.**
Tate Student Center, Rooms 137, 138, 139, 140, 141

Performing Arts: Drama — **2:30 p.m.**
Tate Student Center, Georgia Hall A

Concurrent Oral Sessions — **2:30 p.m.**
Tate Student Center, Rooms 137, 138, 139, 140, 141

Welcome and Opening Session — **4:00 p.m.**
Tate Student Center, Georgia Hall A
Dr. David S. Williams
Director, Honors Program
Dr. David C. Lee
Vice President for Research

Introduction of Keynote Speaker
Ms. Melissa Cabinian
CURO Scholar and CURO Apprentice Program Alumna

Keynote Address: *"Polycentrism: Interdisciplinary Work in the Academy"*
Dr. Jace Weaver
Professor, Religion and Native American Studies
Director, Institute of Native American Studies

CURO National Science Foundation Promising Scholars and Outstanding STEM High School Teachers
Dr. David S. Williams
Director, Honors Program

Announcement of Excellence in Undergraduate Research Mentoring Awards
Dr. Arnett C. Mace
Sr. Vice President for Academic Affairs and Provost

Poster Session **5:00 p.m.**
Tate Student Center, Georgia Hall A & B

CURO Apprentice Dinner **6:45 p.m.**
Tate Student Center, Reception Hall

Art Gallery Talks **7:00 p.m.**
Student Learning Center, Fourth Floor Rotunda
Prof. Carmon Colangelo
Director, Lamar Dodd School of Art
Ms. Robin Dana
Gallery Director, Lamar Dodd School of Art

Dessert Reception & Announcement of CURO Scholars, CURO Summer Research Fellows, Best Poster, and Best Paper Awards **8:00 p.m.**
Dr. David S. Williams
Director, Honors Program
Student Learning Center, Fourth Floor Rotunda
Deborah Dietzler
Executive Director, UGA Alumni Association

Monday, April 10, 2006

Concurrent Oral Sessions
Tate Student Center Conference Rooms 137, 138, 139, 140, 141

10:10 - 11:00 a.m. First Concurrent Session

Room 137	**Jake Turrentine**	Trans-sialidase Specific $CD8^+$ T Cell Responses in T. cruzi Infection of Balb/C Mice
	Faculty Mentor	Dr. Rick Tarleton, Department of Cellular Biology
	Fei Yang	Regulation of Branched-chain Amino Acid Catabolism in Streptomyces coelicolor: Applications for Metabolic Engineering of Polyketide Antibiotic Biosynthesis
	Faculty Mentor	Dr. Janet Westpheling, Department of Genetics
Room 138	**Leigh E. Creighton**	Strategy and Intent Versus Function: A Comparative Study of the Moro Islamic Liberation Front and the Shining Path, Two Terrorist Groups
	Faculty Mentor	Dr. Stephen Shellman, Department of International Affairs
	Christine E. Tarleton	The Case for Increased Federal Funding of Embryonic Stem Cell Research
	Faculty Mentor	Dr. Steven Stice, Department of Animal and Dairy Science
	Lindsay Looft, Kevin Chang	Risk Management among Non-Clinical Healthcare Employees: The Key to Preserving Infrastructure in a Medical Emergency
	Faculty Mentor	Dr. Corrie Brown, Department of Pathology
Room 139	**Jana Dopson**	The Enigmatic Origins of the Bell Beaker Phenomenon
	Faculty Mentor	Dr. Ervan Garrison, Department of Anthropology and Department of Geology
	Elaine A. Augustine	New Light on an 18^{th}-Century Terracotta Sculpture: The Study for Sleeping Shepherd in the High Museum
	Faculty Mentor	Dr. Alisa Luxenberg, Department of Art History
	Laura C. Mackert	Migration of the Avant-garde in Early Modernist Visual Art: The Question of Sequence in Innovative Form and Ideology
	Faculty Mentor	Dr. David Roberts, Department of History
Room 140	**Grace A. Anglin**	The Influence of Gender on the Relationship Between Transplant Consequences and Health Outcome,
	Faculty Mentor	Dr. Ronald Blount, Department of Psychology

	Edmond Fomunung	The Effects of Cocaine on the Isolated Rabbit Heart and the Increased Cardiovascular Risk It Presents in the Presence of the Non-Selective Beta Blocker Propranolol
	Faculty Mentor	Dr. Benedict Lucchesi, Department of Pharmacology and Toxicology, University of Michigan Medical School
Room 141	**Russ Richardson**	The Effect of Land Use Strategies on the Functional Diversity of Neotropical Nematode Communities
	Faculty Mentor	Dr. Ronald Carroll, Institute of Ecology
	Brett M. Maley	Effect of Introduced Predator, the American Mink (*Mustela vison*) on Ground Nesting Songbirds in the Cape Horn Archipelago, Chile"
	Faculty Mentor	Dr. Amy Rosemond, Institute of Ecology
	Kelly Proctor	Differences in Environmental Reporting: China and the United States
	Faculty Mentor	Dr. Lee B. Becker, Director of Cox Center for International Mass Communication Training and Research

11:15 a.m. – 3:20 p.m. Performing Arts

Tate Student Center, Georgia Hall A

Danny Gough	Music
Faculty Mentor	Dr. Pamela B. Kleiber, Center for Undergraduate Research, University of Georgia
Shehzeen Choudhury	American Stranger
Faculty Mentor	Dr. Judith Ortiz Cofer, Department of English, University of Georgia
Betsy Jones	Creative Writing
Faculty Mentor	Dr. Phil Williams, Franklin College of Arts & Sciences, University of Georgia
Angela Still	Grandma Wobbly's Olde Fashioned Fudge Shoppe
Faculty Mentor	Dr. Judith Ortiz Cofer, Department of English, University of Georgia
Charlotte Foster	Being (Interpretations of Interpretations)
Faculty Mentor	Prof. Rebecca Enghauser, Department of Dance, University of Georgia
Joseph Hutto	Attention!Deficit-Hyperactivity:Disorder?
Faculty Mentor	Prof. Rebecca Enghauser, Department of Dance, University of Georgia

	Ezinne Okwandu	Carolina
	Faculty Mentor	Dr. Pamela B. Kleiber, Center for Undergraduate Research Opportunities, University of Georgia
	Lauri Short	Drama
	Faculty Mentor	Dr. David Saltz, Department of Theatre and Film Studies University of Georgia
	Megan Doyle	Drama
	Faculty Mentor	Dr. David Saltz, Department of Theatre and Film Studies University of Georgia
	Jamie Hyder	Drama
	Faculty Mentor	Dr. David Saltz, Department of Theatre and Film Studies University of Georgia
	Lauren Dykes	Rock, Paper, Scissors
	Faculty Mentor	Dr. David Saltz, Department of Theatre and Film Studies University of Georgia

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

Room 137	**Amy V. Chudgar**	Effects of Glycosaminoglycans and Pectins in Early Stages of Angiogenesis
	Faculty Mentor	Dr. Carl Bergmann, Complex Carbohydrate Research Center
	Anjali Shroff	Cloning, Expression, and Verification of Pyrococcus furiosus Protein, PF1476
	Faculty Mentor	Dr. Robert Scott, Department of Chemistry
	Matthew Haney	Antibody Depletion of Highly Abundant Proteins in Trypanosoma cruzi for Fine-tuning of Proteomic Analysis
	Faculty Mentor	Dr. Rick Tarleton, Department of Cellular Biology
Room 138	**Tyler B. Pratt**	Reforming the Kingdom: Educational, Economic, and Political Change in Saudi Arabia
	Faculty Mentor	Dr. Sherry Lowrance, Department of International Affairs
	Daniel J. Weitz	An Emerging International World Order: The Case for Mandatory Foreign Language Proficiency within the United States Public School System
	Faculty Mentor	Dr. Linda Harklau, Department of Language and Literacy Education
Room 139	**Courtney M. Thomas**	The Albany Movement: Black and White Perspectives in Albany, Georgia, 1961-62
	Faculty Mentor	Dr. Barbara McCaskill, Department of English

	Kathryn Otrosina	Forwarding the Agenda of the Right: The Intercollegiate Studies Institute's (ISI) Influence on Campus Student Newspapers
	Faculty Mentor	Dr. Kathleen deMarrais, Department of Elementary and Social Studies
	Sara E. Swart	Three Republican Archetypes Square Off in North Georgia
	Faculty Mentor	Dr. Charles Bullock, Department of Political Science
Room 140	**Jamarri J. Ivy**	Assessing Opinions of Georgia Residents on Poverty and Labor Markets in 2005
	Faculty Mentor	Dr. James Bason, Survey Research Center
	Victoria S. LeBeaux	Student Willingness to Pay to Avoid Unpleasant Odors on Campus
	Faculty Mentors	Dr. Jeff Mullen, Department of Agricultural and Applied Economics
	Michael J. Hotard	¿Para Risas?: The Relationship Between Sports and Gender in an Ecuadorian Fishing Village
	Faculty Mentor	Dr. Michael Harris, Department of Anthropology and Archaeology
Room 141	**Andrew Leidner**	The Evolution of Virulence in a Two Disease System
	Faculty Mentor	Dr. Pejman Rohani, Department of Ecology
	Melissa Cabinian	Antagonistic Effects of Naturally Occurring Altered Peptide Ligands on Trypanosoma cruzi-specific CD8 T Cell Response
	Faculty Mentor	Dr. Rick Tarleton, Department of Cellular Biology
	Alina Kuo	Identification of a New IS Element from Streptomyces Coelicolor
	Faculty Mentor	Dr. Janet Westpheling, Department of Genetics

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

Room 137	**Priya Chandan**	LHR Expression in Transfected Ovarian Cells
	Faculty Mentor	Dr. David Puett, Department of Biochemistry and Molecular Biology
	Kimberly Coveney	Role of Calcium Independent Phospholipase A2 (iPLA2) in Phospholipid Metabolism in Chemotherapeutic-induced Cancer Cell Death
	Faculty Mentor	Dr. Brian Cummings, Department of Pharmaceutical and Biomedical Sciences

	Chen Lin	Identifying GPI-anchored Proteins in Breast Cancer Cells
	Faculty Mentor	Dr. James Pierce, Complex Carbohydrate Research Center
Room 138	**William M. Draxler, Joshua R. Heard**	Containerized Shipping: A Gap in National Security
	Faculty Mentor	Dr. Michael Speckhard, Department of International Affairs
	Adam P. Williams	Reconstructing Maginot: Missile by Missile
	Faculty Mentor	Dr. James Holmes, Center for International Trade and Security
	Balaji L. Narain, Kate Bryant	Evolution of US Trade Policy: A Reconsideration of US Anti-Dumping Laws
	Faculty Mentor	Dr. James Holmes, Department of Economics
Room 139	**Alexander Watts**	Emotion, Identity, and Cardiovascular Response
	Faculty Mentor	Dr. Dawn Robinson, Department of Sociology
	Jessica Zabell, Sara Douglass, Crystal Barber	The Relationship between Children's Emotional Responses to Puppet Vignettes and their Social Competence
	Faculty Mentor	Dr. Tsu-Ming Chiang, Department of Psychology, Georgia College & State University
	Rebecca D. Trupe, Grace A. Anglin	Development of the AFFECT Module: A Family-Focused Emotion Communication Training (AFFECT) Module
	Faculty Mentor	Dr. Kimberly Shipman, University of Colorado Medical School
Room 140	**Natalie M. Jennings**	Hepatic Expression of Deiodinase-1 in the Rat
	Faculty Mentor	Dr. Duncan Ferguson, Department of Physiology and Pharmacology
	Anna Lee	Pulmonary Responses to Ozone in Obese Mice
	Faculty Mentor	Dr. Stephanie Shore, Department of Public Health, Harvard School of Public Health
	Rachel E. Whitaker	A Tangled Topic: The Connect Sum of Mathematical Knots
	Faculty Mentor	Dr. Jason Cantarella, Department of Mathematics
Room 141	**Barrett Jones**	Design of an Inducible System for Expression of the Human Luteinizing Hormone Receptor
	Faculty Mentor	Dr. Susanne Warrenfeltz, Department of Biochemistry and Molecular Biology

	Annie Tran	Analyzing the Effects of Pectin Degrading Enzymes and Their Inhibitors on the Neurological Development of Drosophila
	Faculty Mentor	Dr. Michael Tiemeyer, Department of Biochemistry and Molecular Biology Dr. Carl Bergmann, Complex Carbohydrate Research Center
	Katrin Usifo	Identification of Transcription Factors that Bind to WhiB3 Promoter in Mycobacterium Tuberculosis
	Faculty Mentor	Dr. Joel Ernst, Department of Microbiology, New York University Medical School

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

Room 137	**Kristen E. Habel**	The Creation of 16S rDNA Clone Libraries for the Identification of Bacteria in the Gut Microbial Flora of Drosophilia melanogaster
	Faculty Mentor	Dr. Larry Shimkets, Department of Microbiology
	Jodi L. Dyer	Phenotypical and Genotypical Antibiotic Resistance Analyses of Fecal Bacteria Isolates in Dairy Cattle
	Faculty Mentor	Dr. Susan Sanchez, Athens Diagnostic Lab, College of Veterinary Medicine
	Dan W. Thon	Development of a Trypsin Assay in a Permeabilized Cell System to Characterize the Luteinizing Hormone Receptor Induced Activation of G-Proteins
	Faculty Mentor	Dr. David Puett, Department of Biochemistry and Molecular Biology
Room 138	**Carey J. Kirk**	Healing Arts: The Use of Drama Therapy in Treating People Suffering from Trauma
	Faculty Mentor	Dr. David Saltz, Department of Drama and Theater
	John Crowe	AUX Launch: Art, Representation and Commerce on the Web
	Faculty Mentor	Prof. Mark Callahan, Institute for Creative Exploration
	Tom R. Ribitzky	ATB & The Angel of History: A Case Study of the Dialectic in Trance Music
	Faculty Mentor	Dr. Beatrice Hanssen, Department of Germanic and Slavic Languages
Room 139	**Ashley N. Beebe**	The Effects of Media on Economic Policy and Business Decisions in Brazil and Argentina
	Faculty Mentor	Dr. James Holmes, Center for International Trade and Security

	Allyson L. Barnes	Efficiency Evaluation of Cotton Production Practices using Stochastic Frontier Analysis
	Faculty Mentor	Dr. Timothy Park, Department of Agricultural and Applied Economics
	William M. Collier	Modeling the Effects of the North American Beaver (*Castor Canadensis*) on Sub-Antarctic Stream Food Webs in the Cape Horn Archipelago, Chile
	Faculty Mentor	Dr. Amy Rosemond, Institute of Ecology
Room 140	**Ian Lewis Campbell**	The Mythological Present
	Faculty Mentor	Dr. Glenn Wallis, Department of Religion
	Matthew R. Smith	Johnny Cash, Mythology, and the Possibilities of Experimental Historiography
	Faculty Mentor	Dr. Steven Soper, Department of History
	Radhika Prabhakar	The Interaction of Geography and Identity in Ruth Klüger's *Still Alive*
	Faculty Mentor	Dr. Martin Kagel, Department of Germanic and Slavic Languages
Room 141	**Deep Shah**	Changes in the Synaptology of Corticostriatal and Thalamostriatal Innervation in the MPTP-treated Monkey Model of Parkinson's Disease
	Faculty Mentor	Dr. Yoland Smith, Division of Neuroscience, Yerkes National Primate Research Center
	Rouhin Sen	Determining What Causes Certain Carbohydrates to be Expressed in Certain Cells
	Faculty Mentor	Dr. Michael Tiemeyer, Department of Biochemistry and Molecular Biology
	Patrick R. Lingo	A Conserved Neural Signaling Pathway Regulates Hunger -induced Stress Tolerance in Drosophila
	Faculty Mentor	Dr. Ping Shen, Department of Cellular Biology

2:30 – 3:20 p.m. Fifth Concurrent Session

Room 137	**Liron Bar-Peled**	A Novel Pathway for Polysaccharide Precursor Synthesis
	Faculty Mentor	Dr. Maor Bar-Peled, Department of Plant Biology
	Deep Shah, Paul Ruddle	Integrating Computational and Experimental Analysis to Study Transposable Elements (TEs) in Medicago truncatula
	Faculty Mentor	Dr. Susan Wessler, Department of Plant Biology

	Mason Y. Savage	Sequence Polymorphisms in the Mismatch-repair (TcMSH2) and Glutathione-S-transferase (Tc52) Genes of Trypanosoma cruzi Isolates from the United States
	Faculty Mentor	Dr. Michael Yabsley, Wildlife Disease Study
Room 138	**Mary Gassama**	Puppet Regimes
	Faculty Mentor	Dr. Stephen Shellman, Department of International Affairs
	Betsy A. Beasley	Striking the War Machine: The Anti-War Folklore of American Civilians and GIs during the Vietnam War
	Faculty Mentor	Dr. Elissa Henken, Department of English
	Michael W. Davis	Theory and National Identity: Yugoslavia in the Late 1940s and 1950s
	Faculty Mentor	Dr. Keith Langston, Department of Germanic and Slavic Languages
Room 139	**Arthur H. Shockley**	An Exemplary Being: The Prostitute in the Early Plays of Bertolt Brecht
	Faculty Mentor	Dr. Martin Kagel, Department of Germanic and Slavic Languages
	Alicia Higginbotham	Homer's Voice Recalled: Christopher Logue's *Iliad* Accounts
	Faculty Mentor	Dr. Thomas Cerbu, Department of Comparative Literature
	Laura B. Kearns	**"**Fracturing Fairy Tales": Lu Xun's Old Tales Retold Reveal Power in Ancient Chinese Mythology
	Faculty Mentor	Dr. Kam-Ming Wong, Department of Comparative Literature
Room 140	**Sarah M. Yagoda**	Effects of Market System Entry on Rural Indigenous Women in Ecuador
	Faculty Mentor	Dr. Jose Alvarez, Department of Romance Languages
	Balaji L. Narain	The Employment of Fiscal Policy as the Primary Means of Controlling Inflation and Promoting Short-Term Stabilization, with Focus on the 1980s and 1990s in the United States
	Faculty Mentor	Dr. Harrison Hartman, Department of Economics
	Brian L. Levy	Family Involvement in Education: Is There a Magic Bullet?
	Faculty Mentor	Dr. Larry Nackerud, School of Social Work
Room 141	**Amy E. Trice**	Testing the River Continuum Concept in Sub-Antarctic Streams
	Faculty Mentor	Dr. Amy Rosemond, Institute of Ecology

Richard W. Dewey	Prediction of Maximum and Minimum Air Temperature of a 24-Hour Period with Artificial Neural Networks
Faculty Mentors	Dr. Ronald McClendon, Department of Biological and Agricultural Engineering
Erika Porter	NADH/Flavoprotein Imaging of the Zebrafish Lateral Line System
Faculty Mentor	Dr. Charles Keith, Department of Cellular Biology

4:00 p.m. Welcome and Opening Session

Tate Student Center, Georgia Hall A

Introductions and Welcome	Dr. David S. Williams, Director, Honors Program Dr. David C. Lee, Vice President for Research
Introduction of Dr. Weaver	Melissa Cabinian, CURO Apprentice Program Alumna and CURO Scholar
Keynote Address ***Polycentrism: Interdisciplinary Work in the Academy***	Dr. Jace Weaver Professor, Religion and Native American Studies Director, Institute of Native American Studies
CURO National Science Foundation Promising Scholars and Outstanding STEM High School Teachers	Dr. David S. Williams, Director, Honors Program
Excellence in Undergraduate Research Mentoring Awards	Dr. Arnett C. Mace, Senior Vice President for Academic Affairs and Provost

5:00 p.m. Poster Presentations

Tate Student Center, Georgia Hall

Laura Beth Agnew	An Immunohistochemical Study to Investigate the Potential Role of Intercellular Adhesion Molecule-1 (ICAM-1) and Fractalkine in Placental Malaria
Faculty Mentor	Dr. Julie Moore, Department of Infectious Diseases
Laura M. Aikens	Capital Punishment: A Closer Look
Faculty Mentor	Dr. Dean Rojek, Department of Sociology
Allyson L. Barnes	Efficiency Evaluation of Cotton Production Practices using Stochastic Frontier Analysis
Faculty Mentor	Dr. Timothy Park, Department of Agricultural and Applied Economics

Ingrid Bloom	Differentiation of Human Embryonic Stem Cells into Endothelial Progenitors
Faculty Mentor	Dr. Steven Stice, Department of Animal and Dairy Science
Sarah Breevoort	Construction of Three Rce1p Mutant Plasmids to Aid in the Characterization of Rce1p Enzymatic Activity
Faculty Mentor	Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
Peter Caruana	Characterization of IS492 insertion at the *eps* locus of Pseudoalteromonas *atlantica*
Faculty Mentor	Dr. Anna Karls, Department of Microbiology
Anureet J. Cheema	Glycomics and Glycoproteomics on Complex Glycoprotein Mixtures: Optimization of Separation Methods for Glycopeptide and Oligosaccharide Analysis
Faculty Mentor	Dr. Michael Pierce, Department of Biochemistry and Molecular Biology
Nathan Crain	Understanding Cellular Immortality: Telomere Functioning in Yeast
Faculty Mentor	Dr. Michael McEachern, Department of Genetics
Amy Chudgar	Effects of Glycosaminoglycans and Pectins in Early Stages of Angiogenesis
Faculty Mentor	Dr. Carl Bergmann, Complex Carbohydrate Research Center
Sita M. Damaraju	The Effect of Polymer Scaffolds with Nanopillar Structures Fabricated Using Solvent Leaching/Gas Forming Method on Long Term Osteoblast Response
Faculty Mentor	Dr. William Kisaalita, Department of Biological and Agricultural Engineering
Jodi L. Dyer	Phenotypical and Genotypical Antibiotic Resistance Analyses of Fecal Bacteria Isolates in Dairy Cattle
Faculty Mentor	Dr. Susan Sanchez, Athens Diagnostic Lab, College of Veterinary Medicine
Laura Frame	The Effect of Aedes aegypti Larval Nutrition on Metamorphosis
Faculty Mentors	Dr. Aparna Telang, Department of Entomology Dr. Mark Brown, Department of Entomology
Sana F. Hashmi	O-glycans and Congenital Muscular Dystrophy
Faculty Mentor	Dr. Lance Wells, Department of Biochemistry and Molecular Biology
Ned W. Hembree	Synthesis of Dipeptidyl Acyloxymethyl Ketones (AOMK) Inhibitors of Yeast Enzymes Rce1p and Ste24p
Faculty Mentor	Dr. Timothy Dore, Department of Chemistry

Maggie M. Hodges	Isolation and Characterization of a Novel Heterotrophic Anaerobic Thermophile from the Uzon Caldera (Kamchatka, Russia)
Faculty Mentor	Dr. Paul Schroeder, Department of Geology
Staci R. Hutsell	Matrigel Invasion Assay for Ovarian Cancer Cell Lines
Faculty Mentor	Dr. David Puett, Department of Biochemistry and Molecular Biology
Natalie M. Jennings	Hepatic Expression of Deiodinase-1 in the Rat
Faculty Mentor	Dr. Corrie Brown, Department of Pathology
Lisa Jordan	The Role of Sympathetic Nerves in Leptin-induced Loss of Body Fat
Faculty Mentor	Dr. Ruth Harris, Department of Food & Nutrition
Blake L. Joyce	Tangerine Blush: Engineering Soybean to Produce β-carotene in Seed Cotyledons
Faculty Mentor	Dr. Wayne Parrott, Department of Crop and Soil Sciences
Simon Kahsay	Development of a Diagnostic Test for Mycobacterium avium
Faculty Mentor	Dr. Russell Karls, Department of Infectious Diseases
Jayne M. Kelly	The Effects of Social Experience on Aggressive Behavior in Drosophila
Faculty Mentor	Dr. Yong-Kyu Kim, Department of Genetics
Allison Koch	Systems Biology of the Quinic Acid Cluster in Neurospora crassa
Faculty Mentor	Dr. Jonathan Arnold, Department of Genetics
Sonika Kushwaha, Sarah Reagin	Striking A Balance: How Young Children Hammer
Faculty Mentors	Dr. Dorothy Fragaszy, Department of Psychology Dr. Kathy Simpson, Department of Kinesiology
Lindsay Looft	Permethylation of 2-Aminopyridine Labeled Oligosaccharides: Facilitating the Analysis of Complex Glycan Mixtures
Faculty Mentor	Dr. Michael Pierce, Department of Biochemistry & Molecular Biology
Jon McGough	Female Choice in Sexual Selection in Drosophila pseudoobscura
Faculty Mentor	Dr. Wyatt Anderson, Department of Genetics
Tatyanna Nienow	Adapting Yeast for the Study of Pitrilysin and other M16A Enzymes
Faculty Mentor	Dr. Walter Schmidt, Department of Biochemistry and Molecular Biology
Carmel L. Norman	Effects of a Boring Lichen on Shell Strength of the Marsh Periwinkle Snail Littoraria irrorata
Faculty Mentor	Dr. David Porter, Department of Plant Biology

Ezinne A Okwandu	Development of Real-time PCR to Measure mRNA Expression of Stress Peptides in Specific Brain Nuclei of Rats
Faculty Mentor	Dr. Ruth Harris, Department of Food and Nutrition
Travis M. Palmer	Construction & Expression of Fusion Protein yHCG1 & LHR ECD & ECLs for Expression in Insect Cells
Faculty Mentor	Dr. David Puett, Department of Biochemistry and Molecular Biology
Kurinji Pandiyan	The Genomic Instability of Human Embryonic Stem Cells
Faculty Mentor	Dr. Steve Stice, Department of Animal and Dairy Science
Marlena L. Pinchon	Activation of Innate Immune Response by Wild-type and Attenuated Rabies Virus
Faculty Mentor	Dr. Zhen Fu, Department of Pathology
Patrick G. Pilie	Morphogenesis of the Rat Cerebellum
Faculty Mentor	Dr. Alexandra Joyner, Skirball Institute, New York University School of Medicine
Sarah B. Puryear	Detection of Babesia microti in Human Tissue through In Situ Hybridization
Faculty Mentor	Dr. Corrie Brown, Department of Pathology
Eva B. Reed	Effect of Trait Anxiety on Explicit Memory for Positive and Negative Words Presented Under Divided and Restricted Attention
Faculty Mentor	Dr. Richard Marsh, Department of Psychology
Russ Richardson	The Effect of Land Use Strategies on the Functional Diversity of Neotropical Nematode Communities
Faculty Mentor	Dr. Ronald Carroll, Institute of Ecology
Rebecca L. Satterfield	Analysis of Mycobacterium shottsii Pathogenesis Using Zebrafish as a Model System
Faculty Mentor	Dr. Russell Karls, Department of Infectious Diseases
Deep Shah	Integrating Computational and Experimental Analysis to Study Transposable Elements (TEs) in *Medicago truncatula*
Faculty Mentor	Dr. Susan Wessler, Department of Plant Biology
Deep Shah	Changes in the synaptology of corticostriatal and thalamostriatal innervation in the MPTP-treated monkey model of Parkinson's Disease
Faculty Mentor	Dr. Yoland Smith, Division of Neuroscience, Yerkes National Primate Research Center, Emory University

Christina M. Swaney	The Expression and Purification of Cysteine Dioxygenase and Cysteine Sulinicacid Decarbonoxylase, the Enzymes Constituting the Pathway for Taurine Biosynthesis in Humans
Faculty Mentor	Dr. William Lanzilotta, Department of Biochemistry and Molecular Biology
Elizabeth C. Theriault, Jordan Bray	Molecular Epidemiology of Salmonella enterica Typhimurium on Poultry and Dairy Farms in Georgia
Faculty Mentor	Dr. John Maurer, Department of Poultry Science
Courtney M. Thomas	The Albany Movement: Black and White Perspectives in Albany, Georgia, 1961-62
Faculty Mentor	Dr. Barbara McCaskill, Department of English
Jenna L. Thomason	NIRS Detection of Brain Activity During Low Intensity Exercise
Faculty Mentor	Dr. Kevin McCully, Department of Kinesiology
Annie Tran	Analyzing the Effects of Pectin Degrading Enzymes and Their Inhibitors on the Neurological Development of Drosophila
Faculty Mentors	Dr. Michael Tiemeyer, Department of Biochemistry and Molecular Biology Dr. Carl Bergmann, Complex Carbohydrate Research Center
Christy M. Turner	Effects of Nitrate Contamination on Leaf Breakdown in a Stream at the State Botanical Garden of Georgia
Faculty Mentor	Dr. Sue Eggert, Department of Entomology
Daniel J. Weitz	An Emerging International World Order: The Case for Mandatory Foreign Language Proficiency within the United States Public School System
Faculty Mentor	Dr. Linda Harklau, Department of Language and Literacy Education
Cary F. West, Danielle Morozewicz	Improving Ultrasound Arterial Assessment by Standardizing Probe Selection and Optimization Settings
Faculty Mentor	Dr. Kevin McCully, Department of Kinesiology
Dustin Williams	Development of Transgenic Zebrafish to Understand the Role of Hyal-2 in Tumor Formation
Faculty Mentor	Dr. Scott Dougan, Department of Cellular Biology
Jennifer S. Wilson	Beta-amyloid Immunoglobins as a Potential Early Marker for Alzheimer's Disease
Faculty Mentor	Dr. L. Stephen Miller, Department of Psychology

James M. Wheeler	Analysis of Interactions Between EPGs/PGIPs/Pectins Using Surface Plasmon Resonance
Faculty Mentor	Dr. Carl Bergmann, Complex Carbohydrate Research Center
Charles Wooten	Genetic Manipulation of *Actinosynnema pretiosum*
Faculty Mentor	Dr. Janet Westpheling, Department of Genetics
Lanelle Wright	Identifying IS492 Chromosomal Insertions in Escherichia coli
Faculty Mentor	Dr. Anna Karls, Department of Microbiology
Stephanie Yarnell	Unraveling the Molecular Basis of the Role of Pectins in Human Health
Faculty Mentor	Dr. Carl Bergmann, Complex Carbohydrate Research Center

7:00 p.m. Art Gallery Talks

Student Learning Center, Fourth Floor Rotunda

Introductions	Prof. Carmon Colangelo, Director, Lamar Dodd School of Art Ms. Robin Dana, Gallery Director, Lamar Dodd School of Art

Visual Arts Presenters

Allison Banks	Photography
Faculty Mentor	Professor Michael Marshall, Department of Photography, University of Georgia Professor Stephen Scheer, Department of Photography, University of Georgia
Cameron Dye	Printmaking
Faculty Mentor	Professor Joe Sanders, Department of Printmaking, University of Georgia
Alexis Gregg	Ceramics
Faculty Mentor	Professor Ted Saupe, Department of Ceramics, University of Georgia
Courtney Reece	Scientific Illustration
Faculty Mentor	Professor Gene Wright, Department of Scientific Illustration, University of Georgia
Samuel Stabler	Drawing and Painting
Faculty Mentor	Professor Joseph Norman, Department of Drawing and Painting, University of Georgia
Jennifer Xin	Graphic Design
Faculty Mentor	Professor Lanny Webb, Department of Graphic Design, University of Georgia

Art exhibit arranged by Ms. Robin Dana, Gallery Director, Lamar Dodd School of Art

8:00 p.m. Dessert Reception and Awards Ceremony

Student Learning Center, Fourth Floor Rotunda

Presentation of CURO Summer Research Fellowships, CURO Scholars, Best Poster, and Best Paper Awards	Dr. David S. Williams, Director, Honors Program Deborah Dietzler, Executive Director, UGA Alumni Association

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. This year the Graduate School and the Honors Program have established a new award that recognizes graduate students devoted to the research mentorship of undergraduate students. Awards will be presented at the CURO Symposium Awards Ceremony on Monday, April 10, 2006 at 4:00 p.m. in the Tate Student Center, Georgia Hall.

2006 Awards

Master Level Faculty Award
Dr. Patricia Hunt-Hurst, Associate Professor of Textiles, Merchandising, and Interiors

Early Career Faculty Award
Dr. Rodney Mauricio, Professor of Genetics

Graduate Student Award
Christopher Anderson, PhD candidate in Ecology

Graduate Student Recognition
Dawn Holligan, PhD student in Plant Biology

2005 Awards

Faculty Awards
Dr. Gary Barrett, Odum Professor of Ecology
Dr. Sidney Kushner, Professor of Genetics

Department Award
Department of Cellular Biology.

2004 Award

Faculty Award
Dr. William S. Kisaalita, Associate Professor, Dept. 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. Tim 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 Veterinary Medicine

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

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
Genetics Department
Dr. John MacDonald, Department Head and Professor

Program Award
Savannah River Ecology Laboratory
Dr. Paul Bertsch, Director

Graduate Student Reviewers for CURO 2006 Symposium

Cady Berkel	Child and Family Development
Sarah Cooley	Marine Sciences
Sarah Craven	Microbiology
Patrick Curtis	Microbiology
John M. Davis	Ecology
Emily DeCrescenzo Henriksen	Microbiology
Geneva DeMars	Biochemistry and Molecular Biology
Anita DeRouen	English
George Felis	Philosophy
Joy Harden	Counseling Psychology
Jeff Lake	Plant Biology
Rebecca Nordin	Educational Psychology
Greta Polites	Management Information Systems
Chip Small	Ecology
Sara Steger	English
Jeff Stoike	Ecology
James Tucker Swindell II	Biochemistry
Meghan VanDeventer	Educational Psychology
Sarah Vess	Educational Psychology

Reviewers for Best Paper Awards

Faculty

Dr. Ronald Carroll	Ecology
Dr. Jody Clay-Warner	Sociology
Dr. Roxanne Eberle	English
Dr. William P. Flatt	Foods and Nutrition (Emeritus)
Dr. Richard K. Hill	Chemistry (Emeritus)
Dr. Sylvia M. Hutchinson	Center for Teaching and Learning (Emerita)
Dr. Sidney Kushner	Genetics
Dr. William Lanzilotta	Biochemistry and Molecular Biology
Dr. Kevin McCully	Kinesiology
Dr. Carolyn Medine	Religion, Institute for Women's Studies, Institute for African American Studies
Dr. Leara Rhodes	Journalism
Dr. Paul Sutter	History
Dr. Kalpen D. Trivedi	English
Dr. Lance Wells	Biochemistry and Molecular Biology

Graduate Students

Cady Berkel	Child and Family Development
Jeff Lake	Plant Biology
Greta Polites	Management Information Systems
James Tucker Swindell II	Biochemistry

Reviewers for CURO Summer Research Fellowships

Dr. Wyatt Anderson	Professor, Genetics
Dr. William Barstow	Department Head and Professor, Biological Sciences
Dr. Karen Bauer	Director, Office of Institutional Research Adjunct Associate Professor, Institute of Higher Education
Dr. Roxanne Eberle	Associate Professor and Undergraduate Coordinator, English
Dr. Leara Rhodes	Associate Professor, Journalism
Dr. Scott Shaw	Professor, Physics and Astronomy
Dr. Regina Smith	Associate Vice President for Research
Dr. Katharina Wilson	Professor, Comparative Literature

CURO Advisory Board

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Melissa Cabinian	Undergraduate Student
Melvin Hines, Jr.	Undergraduate Student
Douglas Jackson	Undergraduate Student

Ex Officio

Dr. David S. Williams	Director of the Honors Program, Foundation Fellows, and CURO
Dr. Pamela B. Kleiber	Associate Director of the Honors Program and CURO

CURO Gateway Seminar Faculty

Professor Mark Callahan	Ideas for Creative Expression (ICE)
Dr. Ron Carroll	Ecology
Dr. Kathleen DeMarrais	Social Science Education
Dr. Joseph Dominick, Jr.	Journalism
Dr. William Eiland	Art History
Dr. Marcus Fechheimer	Cellular Biology
Dr. Katarzyna Jerzak	Comparative Literature
Dr. Pamela B. Kleiber	Honors Program and CURO
Dr. Elizabeth Kraft	English
Dr. Marc L. Lipson	International Business
Dr. Tricia Lootens	English
Dr. Larry Nackerud	Social Work
Dr. Jeffry Netter	Banking and Finance
Dr. Rosemary Phelps	Counseling Psychology and Human Services
Dr. David Porter	Botany
Dr. Dean Rojek	Sociology
Dr. Paul Schroeder	Geology
Dr. Scott Shamp	Telecommunications
Dr. Stephen Shellman	International Affairs
Dr. Michael Terns	Biochemistry and Molecular Biology
Dr. Kecia Thomas	Psychology
Dr. Katharina Wilson	Comparative Literature

Karen A. Holbrook Academic Support Award Recipients

2006 Award

Jody L. Dyer	
Faculty Mentor	Dr. Susan Sanchez, Athens Diagnostic Lab, College of Veterinary Medicine

2005 Award

Josef Broder	*Multivariate Harmonic Analysis*
Faculty Mentor	Dr. Andrew Sornborger, Department of Mathematics

2004 Award

Steven Jocoy	
Faculty Mentor	Dr. Michael Bender, Department of Genetics

An Immunohistochemical Study to Investigate the Potential Role of Intercellular Adhesion Molecule-1 (ICAM-1) and Fractalkine in Placental Malaria

Laura Beth Agnew
Dr. Julie Moore, Department of Infectious Diseases, University of Georgia

Placental malaria can cause premature deliveries, low birth weight babies, and maternal anemia, and it is an important public health concern in areas where malaria transmission is endemic. During human placental malaria, Plasmodium falciparum-infected red blood cells (iRBC) are harbored in the intervillous spaces of the placenta, and this sequestration leads to a higher concentration of malaria parasites than is found in the periphery of the body. Recent studies have investigated the interaction between iRBCs and the syncytiotrophoblast (ST) membrane, and it is believed that the consequences of their interaction may better explain the phenomenon of placental malaria. The purpose of this study is to compare the immunohistochemical staining of infected and normal placental tissue sections to determine if infection has an effect on the concentration or localization of two immunological molecules, intercellular adhesion molecule-1 (ICAM-1) and fractalkine. This experiment uses the Avidin Biotinylated enzyme Complex (ABC) staining method to visualize the location and intensity of both molecules following incubation with primary antibody, biotinylated secondary antibody, ABC, and enzyme substrate. Previous studies have suggested that both ICAM-1 and fractalkine might play important roles in the immunology of placental malaria by aiding in the sequestration of iRBCs in the intervillous spaces of the placenta, and both molecules are expressed by the ST. If more intense staining of these molecules is seen in placental tissues infected with malaria and if the staining is localized to areas such as the ST and intervillous spaces of the placenta, then this study would suggest that ICAM-1 and fractalkine are key immunological compounds in placental malaria and that one or both might be yet another reason for the higher concentration of iRBCs seen in placental tissues.

Capital Punishment: A Closer Look

Laura M. Aikens
Dr. Dean Rojek, Department of Sociology, University of Georgia

Capital punishment is an issue of great contention. The deterrence doctrine predicts that as the harshness of the punishment increases, the likelihood a person will commit a crime decreases. It also requires that the punishment swiftly follow the act to be effective. It would follow from this theory that capital punishment is the most effective way of deterring crime. However, even proponents of the deterrence doctrine do not believe that capital punishment can be applied to murderers. The perpetrators are usually under the influence of alcohol or drugs and therefore not in a rationally thinking state of mind. For deterrence to work, people must be rational. Other than the fact that capital punishment has no effect on crime rates, there are many other problems with the death penalty. There is an incredible amount of money and time that must be put forth in a death penalty case. The recent advent of DNA analysis has helped to prove several individuals' innocence, individuals who were sitting on death row. Some wonder if capital punishment constitutes "cruel and unusual" punishment because of the frequency of botched executions. Many countries disapprove of our use of the death penalty, and recent pressure from them has influenced some of our policies regarding it. A final issue many antagonists of capital punishment put forth is that it has become a form of vengeance, something which is not the responsibility of our justice system.

Development of the AFFECT Module: A Family-Focused Emotion Communication Training (AFFECT) Module

Grace A. Anglin – CURO SUMMER FELLOW, CURO APPRENTICE & Rebecca D. Trupe – CURO SUMMER FELLOW
Dr. Kimberly Shipman, University of Colorado Medical School

Our research focused on developing an intervention program called A Family Focused Emotion Communication Training Module

(AFFECT) aimed at teaching caregivers how to effectively communicate with their children about emotional experiences. Emotional management skills, normally learned from the primary caregiver, are important for the psychosocial adjustment of the child. Emotional management skills include the child's ability to recognize their emotions and the emotions of others, to understand the causes and consequences of emotion, and to modify and regulate their emotions. Children developing within "at risk" contexts, such as physical maltreatment, generally have less developed emotional management skills and display increased emotional and behavioral problems. Our research helped develop an intervention program aimed at teaching caregivers to effectively manage their own emotions and communicate with their children about emotions. In developing the intervention, we adapted techniques from dialectical behavior therapy for teaching emotion regulation skills, as well as designed supplemental handouts, worksheets, and homework activities for parents to reinforce the components of the program. In addition, we created a behavioral coding system that will be used to test the effectiveness of the intervention program at teaching emotion-focused communication skills (e.g., active listening skills, emotion coaching skills, emotion support skills). The AFFECT Module is still in development and has not yet been clinically tested using the coding system. However, we intend to use the coding system in future pilot studies to evaluate the AFFECT Module so it can be applied as an intervention for maltreating parents.

The Influence of Gender on the Relationship between Transplant Consequences and Health Outcome

Grace A. Anglin – CURO APPRENTICE
Dr. Ronald Blount, Department of Psychology, University of Georgia

Pediatric transplantation, formerly considered a last option for terminally ill children, has become the treatment of choice for a number of serious medical conditions. Life-saving organ transplantation is not a "cure," but rather, a transition from a chronic, life-threatening disease to a second chronic condition that requires living with and caring for a transplanted organ. To prevent organ rejection, a patient must take immunosuppressant medication daily for life. Patients follow, or adhere to, their prescribed medication regimen to varying degrees, with adolescent transplant patients often less medically adherent than other age groups. As a result, they are at increased risk for organ rejection. Unwanted side effects of necessary transplant medications which include excessive hair growth, weight gain, and limited athletic ability often create psychological barriers to proper adherence. What is unknown is how transplant consequences differentially affect adolescent male and female recipients. Interviews were completed with pediatric solid organ transplant recipients (ages 11-18) and their parents to determine how gender influences the relationship between transplant consequences and health outcome (e.g., quality of life, medication adherence). Interview questions assessed physical side effects, functional impairments, and quality of life. Medical adherence was based on patient and parent report, prescription drug refill records, and immunosuppressant drug levels. The results of this study will be used in the development of intervention programs to target the unique challenges of male and female adolescent transplant recipients.

New Light on an 18th-Century Terracotta Sculpture: The Study for Sleeping Shepherd in the High Museum

Elaine A. Augustine
Dr. Alisa Luxenberg, Department of Art History, University of Georgia

Works of art that are neither signed nor dated produce research opportunities for art historians to assign authorship as well as determine the year(s) in which they were completed. Study for Sleeping Shepherd is a small terracotta sculpture in the High Museum of Art in Atlanta. Art historians have attributed the work to Louis-Claude Vassé as the study for Sleeping Shepherd (marble, 1751), his reception piece into the French royal art academy and dated it circa

1740-1745. However, that dating can be challenged through visual comparisons, exhibition records, and biography. In addition, the material of this work—fired clay—affects any interpretation of its function and stylistic qualities. While terracotta was traditionally used to create preparatory works of art and not given a careful finish, it was also becoming, by the 1730s, desired by French art collectors who appreciated its surface qualities. My contribution to the study of this sculpture is to compare it with the finished marble reception piece Sleeping Shepherd as well as with ancient statues and contemporary sculptures by other French artists. These comparisons aid in determining a more precise date in which the High's terracotta may have been executed. I will also explore the motivation for and meaning of depicting a sleeping nude shepherd in relation to the classical revival in 18th-century French art. Research into contemporary criticism of Vassé's art and the provenance of this terracotta may help us to understand how some of his contemporaries perceived his art.

Photography
Allison Banks
Prof. Michael Marshall & Prof. Stephen Scheer, Department of Photography, University of Georgia

I have always believed in the importance of awareness of places, both large and small, and of our interpretations of them, our memories and imagined histories of them. When I began making photographs, it was very much an exercise in thinking about how I grew up, and where I came from. The photographs were my interpretation, my applied meaning, and my dream of a world. Since then, I have continued to broaden the terms of my history, becoming aware of the greater context in which I am situated.

My interest in the idea of The Neighborhood has grown, and I have begun exploring the ways in which we dress our yards, prune our shrubs, walk our dogs, park our cars, and feed our birds. I concentrate my vision on what is small, not entire yards, and thus each photographed object becomes a symbol of itself, encouraging us to consider new ideas about its meaning. In this way, I hope to more broadly define what it means to own a piece of land, to care for it, and decorate it. My photographs are quiet, personal, and about a certain way of seeing and arranging photographic space. I hope for them to be not only about how things look, but also about how we look at things and how it is possible that by slowing down and reflecting on what may initially seem small or inconsequential, we may come to recognize something more in our lives.

Efficiency Evaluation of Cotton Production Practices using Stochastic Frontier Analysis
Allyson L. Barnes
Dr. Timothy Park, Department of Agricultural and Applied Economics, University of Georgia

The overall objective of the study is to evaluate different technologies and cultural practices used in the production of upland cotton in South Georgia using stochastic frontier analysis. Stochastic frontier analysis recognizes that for a given level of inputs, producers can attain a maximum output, which is identified as the production frontier. Other producers may experience random shocks such as adverse weather, pest infestations, constraints on soil quality, along with limitations on managerial skill, resulting in output that lies below the frontier. Efficiency scores summarize how far below the frontier producers are operating. A stochastic frontier analysis is estimated in a statistical model to identify the key factors that influence the technical efficiency and cost

efficiency of cotton producers. Survey information from South Georgia cotton producers was gathered including combinations of tillage techniques and adoption of cotton transgenic technology along with the input, cost, and yield data on a field level. We include data on the tillage method used by the farmer (conventional tillage and strip tillage) along with five types of cotton, including conventional and transgenic varieties which have a built-in resistance to specific pests such as the cotton bollworm and the tobacco budworm. The efficiency model demonstrated that production methods using transgenic cotton varieties resulted in greater net returns and efficiency rankings than conventional cotton. Net returns and efficiency rankings were highest with conservation tillage. The research results will stress the advantages of the stochastic frontier approach for evaluating efficiency effects in crop production and outline additional applications of the technique for extension advisors assisting Georgia crop producers.

A Novel Pathway for Polysaccharide Precursor Synthesis

Liron Bar-Peled
Dr. Maor Bar-Peled, Department of Plant Biology, University of Georgia

Polysaccharides are the most abundant class of molecules in nature. They have numerous functions such as structural support (cellulose in plant cell walls), storage (starch), cell-to-cell communication (glycoproteins and glycolipids), protein trafficking and protein folding. Polysaccharides are synthesized from activated sugar-moieties known as nucleotide sugars. We are trying to address the different pathways by which these precursors are synthesized. One route by which nucleotide sugars are made involves a family of enzymes known as nucleotide sugar pyrophosphoyrlases (PPase) which convert a nucleotide (NTP) and sugar-1-phosphate to a nucleoside diphosphate (NDP)-Sugar and inorganic pyrophosphate. PPases are very specific enzymes and convert only one type of sugar-1-phosphate and nucleotide to respective nucleotide sugar. We have identified a gene in *Arabidopsis thaliana* that encodes a protein that shares 29% amino acid sequence identity to the well-characterized uridine diphosphate (UDP)-Glucose PPase. The recombinant gene was over-expressed in *Escherichia coli*, and the protein was purified via affinity chromatography. A series of assays were conducted varying the type of nucleotide and sugar-1-phosphates used, and it was discovered that this enzyme converts five different sugar-1-phosphate's and uridine triphosphate (UTP) to respective nucleotide sugars. This enzyme has been termed UDP-Sugar PPase due to its broad sugar-1-phosphate specificity. Initial biochemical characterization shows differences in kinetics between UDP-Sugar PPase and other substrate-specific PPases. Since there are other enzymatic pathways by which nucleotide sugars are made in vivo, it remains unclear what biological role UDP-Sugar PPase has in vivo and which is the major pathway toward nucleotide sugar production.

Striking the War Machine: The Anti-War Folklore of American Civilians and GI's during the Vietnam War

Betsy A. Beasley
Dr. Elissa Henken, Department of English, University of Georgia

Typical popular conceptions of the Vietnam War tend to construct two polarized camps of American reactions to the war. According to this view, "doves"—or those opposed to the war—consisted of college students, activists, hippies; "hawks"— those supporting the war—were the U.S. government, anyone involved in the U.S. military, and anyone over thirty. This dichotomy is problematic, as I discovered upon evaluating the folklore of the Vietnam War. I came to the project to look to the historical record to evaluate the chants, legends, personal experience narratives, jokes, folk songs, and folk images of both American civilians and enlisted Americans in Vietnam. A group's folklore concerning a specific topic like the war reflects as well as determines how the group feels about it; folklore both expresses a group's attitude toward the subject and influences how members of that group approach the subject, being affected as they are by folk culture. As such, historical

folklore, difficult as it is to collect, is imperative to a thorough examination of history. Through my research, I found that the dialogues of civilian protestors and of American GIs were more similar than different; in fact, most folk culture of American enlisted men was remarkably anti-war. While civilian protestors were more visible in their opposition, many American GIs fought against the war subtly, through their everyday speech rather than through marches and sit-ins. Although GI protest folklore did include some overtly anti-war speech, such as slogans on buttons distributed by Vietnam Veterans Against the War, most anti-war folklore took the form of jokes, songs, and rumors that only hinted at an anti-war message. The folklore of these GIs did not pronounce disapproval of the war, as did the folklore of civilian protestors. Rather, this form of GI folklore—as exemplified by one rumor that the toy company Mattel had manufactured the American military's M-16s—communicated a distrust of the war machine, and of the war itself, without resorting to slogans used by civilian protestors (such as "Hey, hey, LBJ, how many kids did you kill today?") that were much more explicit forms of protest. This study is significant in that it bridges the imagined irreconcilable opposition between GI and civilian protestor during the period. While each side implemented very different methods to demonstrate their contempt of the war, surprisingly a number of themes developed between the two sides, proving that, despite perceptions in the popular imagination, civilian protestors and American GIs were not such polar opposites after all.

The Effects of Media on Economic Policy and Business Decisions in Brazil and Argentina

Ashley N. Beebe – CURO SUMMER FELLOW
Dr. James Holmes, Center for International Trade and Security, University of Georgia

Despite strong, liberal medias in Brazil and Argentina, very little research analyzes the media in Latin American countries. My research analyzes how the media, business, and economic sectors interact in Brazil and Argentina. The research process included a thorough investigation of both through an interview with Dr. Anthony Pereira, Brazilian expert at Tulane University, the use of literature in the University library, and the use of various electronic news sources. The research reveals that Brazil's outlook in the business, media, and economic sectors is far more positive than Argentina's. This is true because Argentina, whose social and political infrastructure has been historically strong, is at the mercy of a weak economic situation. Everything from education to healthcare, the strength of the media to trust in the government, has been adversely affected by the recent economic collapse. While showing signs of growth, Argentina's nationalism, dwindling middle class, and the weakening social infrastructure all severely inhibit growth in the country. In contrast, Brazil is making great strides in erasing the effects of clientalism and personal favors that pervade the media, political, and business sectors. In addition, Brazil possesses a stabilizing economic and political situation, a market with huge potential for growth, and much of the infrastructure to support and maintain growth in the future.

Differentiation of Human Embryonic Stem Cells into Endothelial Progenitors

Ingrid Bloom – CURO SUMMER FELLOW
Dr. Steven Stice, Department of Animal and Dairy Science, University of Georgia

Endothelial cells line blood vessels and form the interface between circulating blood in the lumen and the rest of the vessel wall. Bone morphogenic protein-4 (BMP-4) is known to play a role in vascular development in other species, but its function in humans is unclear. An in vitro model of blood vessel development was designed to explore the role of BMP-4 in the formation of endothelial cells derived from human embryonic stem cells (hESC). The hypothesis was BMP-4 treatment of hESC preferentially directs differentiation toward endothelial cells.

Using a Pasteur pipette formed into a hook, hESC colonies were manually passaged onto collagen-laminin gel-coated plates. The colonies were grown with or without BMP-4 for

3 days, and BMP-4 supplementation was stopped. After 3-4 days in culture there was a dramatic reduction in the size of the BMP-4 treated colonies. In the untreated cultures, a "cell sheet" morphology grew along the gel surface in addition to "gel-invading" cells. In the BMP-4 treated cultures, the "invading" cells were seen, but the "cell sheet" was lacking. This led to the hypothesis BMP-4 inhibits hESC differentiation resulting in the "cell sheet" morphology. In addition, an extensive cell network resembling vascular capillaries was observed in the BMP-4 culture.

Fluorescence Activated Cell Sorting was used to detect an almost four-fold increase of cells expressing platelet-endothelial cell adhesion molecule-1, an endothelial protein marker, in the BMP-4 treated cultures. These data suggest that BMP-4 plays a role in the differentiation of hESC toward endothelial cells.

Construction of Three Rce1p Mutant Plasmids to Aid in the Characterization of Rce1p Enzymatic Activity

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

Rce1p is a relatively uncharacterized protease that is required for the post-translational processing of proteins containing a CaaX motif. The CaaX motif is composed of cysteine (C), two small aliphatic amino acids (a), and almost any amino acid (X) in the terminal position. CaaX proteins require post-translational modifications to exhibit biological activity. Rce1p cleaves the –aax potion of the CaaX motif of mammalian Ras proteins and the yeast **a**-factor pheromone in the CaaX modification pathway. Ras proteins play a significant role in signal transduction; however, the hyperactive form of Ras is associated with 30% of human cancer tumors, including more than 90% of pancreatic cancers and 50% of lung cancers. Inhibiting the post-translational modifications of Ras is proposed to disable, or at least moderate, its cancer-causing activity by rendering it biologically inactive. One possible means for Ras inhibition would be to block the activity of Rce1p. In this study, the ultimate goal is to characterize the enzymatic activity of Rce1p and Rce1p mutants through their interactions with inhibitors. Towards this end, three plasmids were constructed containing Rce1p mutants and expressed in yeast. The extracts were isolated, and the plasmids were analyzed for proper Rce1p expression in vivo by yeast patch mating. A second verification was obtained by western blot analysis. These plasmids will be used in conjunction with a larger pool of Rce1p plasmids encoding additional mutants for in vitro inhibitor profile studies. These studies may ultimately yield novel Rce1p inhibitors that may be useful as anti-cancer drugs.

Antagonistic Effects of Naturally Occurring Altered Peptide Ligands on *Trypanosoma cruzi*-specific CD8 T Cell Response

Melissa Cabinian – CURO SCHOLAR
Dr. Rick Tarleton, Department of Cellular Biology, University of Georgia

Persistent infection with the protozoan parasite *Trypanosoma cruzi* results in Chagas disease, the leading cause of heart failure in South America. Although infected hosts develop a vigorous anti-*T. cruzi* immune response, *T. cruzi* is able to resist complete immune clearance by evasion mechanisms not yet understood. CD8 T lymphocytes are responsible for immunity to intracellular pathogens and necessary for the control of *T. cruzi* infection. Peptide targets of the CD8 T cell response in *T. cruzi*-infected humans and mice are primarily encoded within the *trans*-sialidase (*ts)* gene superfamily. *T. cruzi* expresses numerous related *ts* proteins which may result in the presentation of altered peptide ligands (APLs) to responding T-cells. APLs can antagonize T cells specific for the homologous antigenic epitope through a low affinity interaction with the T cell receptor (TCR). In this study, the effects of APLs on the ability of naïve and effector TsKb20-specific T-cells to respond to TsKb20 (ANYKFTLV), a *ts*-derived cytotoxic T lymphocyte (CTL) epitope, are evaluated. Several APLs were shown to inhibit TsKb20-specific effector T cells from producing

interferon-γ in response to TsKb20. Future work will focus on evaluating the impact of APLs presented on cells targeted for cytotoxic killing by TsKb20-specific CD8 T-cells. Antagonism of the activation of naïve CD8 T-cells will also be assessed by vaccinating mice with dendritic cells presenting APLs and TsKb20, then measuring the subsequent T cell expansion using class I major histocompatibility tetramers specific for TsKb20. The identification of antagonistic APLs will allow us to investigate the role of TCR antagonism in the ability of *T. cruzi* to evade immune responses.

The Mythological Present

Ian Lewis Campbell – CURO SUMMER FELLOW
Dr. Glenn Wallis, Department of Religion, University of Georgia

Myth is believed to be a phenomenon of human culture that has been relegated to ancient man, a phenomena that our modern world has surpassed by scientific knowledge. Yet, myth exists in our modern society in a similar form. Myth is a tool of placement, identity, and understanding with which modern man uses to contemplate the world.

This paper presents a theory of how myth works in the present by answering several questions: What is Myth? How does myth arise and function? Who is the mythmaker? Kenneth Burke defines myth as "a narrative that effects identification within the community that takes it seriously, endorsing shared interests and confirming the given notion of order." It arises out the collective, social action of living in a politicized culture, and not only grants a semblance of order but is a foundation of authority. The myths we find in our contemporary political world are not static creations but are used by mythmakers (anyone in a position of authority that relies on myth for that authority) to create new myths that reinforce power.

Using past theories of myth formulated by Roland Barthes, Kenneth Burke and Ernst Cassirer, I will present a comprehensive theory that explains the function of myth in the present, western world, and the influence it has in our political lives.

Characterization of IS*492* insertion at the *eps* locus of *Pseudoalteromonas atlantica*

Peter R. Caruana
Dr. Anna Karls, Department of Microbiology, University of Georgia

Pseudoalteromonas atlantica is a pioneer biofilm-forming, Gram-negative bacterium that is found in water columns and on solid surfaces of the Atlantic and Pacific oceans. Expression of extracellular polysaccharides (EPS) is important in biofilm formation by bacteria. Interestingly, *P. atlantica* exhibits on-off phase variation of peripheral extracellular polysaccharide (^{P}EPS) production resulting in two colony morphologies, mucoid (M, $^{P}EPS^{+}$) and crenated (C, $^{P}EPS^{-}$). This phase variation is associated with the transposition of a mobile DNA element, IS*492*. The correlation between phase variation and insertion of IS*492* into *eps* genes that are required for ^{P}EPS production was investigated.

Independent crenated variants of mucoid *P. atlantica* were isolated and characterized by a polymerase chain reaction (PCR) assay in which the primers amplified a predicted target site in an *eps* gene on the chromosomal DNA. DNA sequencing of PCR products revealed the exact site of insertion for each isolate. My results suggest that a correlation exists between the insertion of IS*492* at the *eps* locus and the M→C phase variation. In addition, sequence data suggests that the insertion of IS*492* is site-specific, a feature not commonly associated with bacterial insertion sequences. To further characterize the target site preference of IS*492*, current experiments are designed to follow the insertion of a "genetically marked" IS*492* element following its introduction into *P. atlantica* via conjugation on a mobilizable suicide plasmid.

LHR Expression in Transfected Ovarian Cells

Priya Chandan

Dr. David Puett, Department of Biochemistry and Molecular Biology, University of Georgia

Ovarian cancer is the fifth most common cancer in women. Epidemiologic evidence implicates the gonadotropic hormones in the etiology of ovarian cancer, due to the correlation between high serum levels of the gonadotropic hormones and an increased risk of ovarian cancer. The gonadotropic hormone signaling pathway ultimately leads to the expression of matrix metalloproteinases (MMPs). MMPs degrade the proteins of the extracellular matrix, specifically collagen, which is a necessary function in both normal ovulation and tumor migration and invasion. This biochemical evidence substantiates the epidemiologic risk correlation. These studies test the hypothesis that stimulation of the luteinizing hormone receptor (LHR) in ovarian cells will lead to increased expression of MMPs and therefore contribute to ovarian tumorigenesis. LHR was introduced into a human ovarian cancer cell line (SKOV3), which does not express the receptor under normal culture conditions. The goal of the project is to determine the time point of peak LHR expression, stimulate the receptor with hCG (human choriogonadotropin) at this time point, and then analyze MMP expression due to LHR stimulation. Samples were taken at different time points and analyzed to determine LHR expression at the RNA level. Expression was found as early as 6 hours, with peak expression occurring at 25 hours. Further analysis of this peak in expression is needed. In addition, further research is needed to define the dose response of MMP protein expression following LHR activation.

Glycomics and Glycoproteomics on Complex Glycoprotein Mixtures: Optimization of Separation Methods for Glycopeptide and Oligosaccharide Analysis

Anureet J. Cheema
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Cell surface glycoprotein glycans are critical for cell-cell and cell-matrix interactions as well as regulation of cell growth and enzyme activity. Therefore, some of them are of particular importance as cancer biomarkers, which have altered glycosylation sites. The research reported here involved developing a standard procedure for the analysis of N-linked glycans as well as the sites of N-linked glycosylation in complex mixtures of glycoproteins, such as blood serum. As a reservoir of diverse proteins, serum can be of great importance in research and diagnosis of different disease stages. To reduce the interference of highly abundant proteins during analysis, albumin and immunoglobulin removal procedures were developed and optimized with blue sepharose and Protein A columns. Glycopeptides were isolated through a series of steps in which the serum glycoprotein mixture, devoid of albumin and immunoglobulins, was denatured, reduced, carboxyamidomethylated and trypsinized to fragment the peptides. From the peptide mixture, specific glycopeptides were isolated by size exclusion chromatography and lectin chromatography. Peptide N-glycoamidase F (PNGase F) was then used for the detachment of oligosaccharides, which were then subjected to permethylation and analyzed by Matrix Assisted Laser Desorption/Ionization-Time of Flight (MALDI-TOF) mass spectrometry. The deglycosylated oligosaccharides were also analyzed by Liquid Chromatography-Mass Spectrometry (LCMS/MS). The optimized procedure proved to be an efficient means of separating and identifying oligosaccharides in the complex glycoprotein mixture. In the future, such a procedure could be used to analyze serum and other complex glycoprotein mixtures in order to identify biomarkers for development and diseases, including cancer.

American Stranger

Shehzeen Choudhury
Dr. Judith Ortiz Cofer, Department of English, University of Georgia

My current project is a collection of short stories that explore cultural boundaries, political, and moral issues from national and international perspectives. I write about boundaries because they seem concrete at first glance but are in reality quite permeable. In the short story "American Stranger," I have tried to merge the

American world with the Bangladeshi world through the custom of the arranged marriage and the conflicts that ensue. All my stories are based on or inspired by true stories. Following the traditions of Bangladesh for fourteen years and seeing a cousin get married to a man who only saw her for a few seconds in candlelight made me want to explore the emotions that come with this experience shared by many in various corners of the world. Although the setting is unique, I believe the feelings of love, loss, sacrifice, and compromise that the story conveys are not restricted to one region in the world but are truly universal. Through this story I have tried to portray a world of traditions by describing the reactions from two different points of view. Here the distinct stories of two individuals from two different paths of life meet and are soon to become one.

Effects of Glycosaminoglycans and Pectins in Early Stages of Angiogenesis

Amy V. Chudgar
Dr. Carl Bergmann, Complex Carbohydrate Research Center, University of Georgia

Angiogenesis, or the sprouting of new blood vessels from pre-existing vessels, is a complex procedure that involves dozens of regulators and components and requires the precise orchestration of recruitment, migration, and interaction of endothelial cells, extracellular matrix (ECM) components, and growth factors. Although vessel formation is necessary for normal development, excessive or insufficient angiogenesis is harmful and leads to numerous pathologies, including tumor growth, inflammation, and ischemia. Glycosaminoglycans (GAGs) are a major component of the ECM and serve an important role in vessel formation by regulating smooth muscle cell proliferation, functioning as receptors for proangiogenic growth factors, and serving a critical role in cell adhesion, locomotion, and the insolubility of the ECM. Pectins are the major acidic polysaccharide component of plant cell matrices and serve similar functions in plants to those served by GAGs in animals. Pectins may offer a potent method of regulating angiogenesis. We have previously demonstrated that pectins are able to affect GAG degrading enzyme activity, and GAGs are able to affect pectin degrading enzymes (PDEs). To apply this information to angiogenic processes, we examined whether pectins could compete with GAGs, possibly inhibiting angiogenic events and offering therapeutic applications. An in vitro system mimicking early tube formation in angiogenesis was developed to study the process using human umbilical vein endothelial cells (HUVECs). The tube-forming assay was performed using different concentrations of GAGs and pectins, and experiments were analyzed through light and fluorescent microscopy. The results of these experiments will be presented.

Modeling the Effects of the North American Beaver (*Castor canadensis*) on Sub-Antarctic Stream Food Webs in the Cape Horn Archipelago, Chile

William M. Collier – CURO SUMMER FELLOW
Dr. Amy Rosemond, Institute of Ecology, University of Georgia

The North American beaver (*Castor canadensis*) was introduced into southern South America in 1946 and throughout the last half-century has established significant populations and expanded its range into Chile. Beavers alter both habitat and resources available to organisms in terrestrial and aquatic ecosystems, potentially affecting community composition and diversity, food web dynamics, and overall ecosystem processes. In this context, the goal of our research was to specifically address the influence of the beaver on species-level and trophic-level food web dynamics of streams. Effects of beaver were assessed using data from four catchments and three habitat types: natural stream reaches uninfluenced by beaver, beaver ponds created by damming, and reaches immediately downstream of beaver dams. Species-level richness and Shannon-Weiner diversity of aquatic macroinvertebrates were significantly reduced in beaver ponds compared to natural and downstream sites; however, these changes were accompanied by increased biomass and density of macroinvertebrates in

beaver pond sites. Using empirical data, we constructed descriptive models with STELLA™ modeling software to explicitly determine the effects of beaver on the aquatic communities impacted by their activities. A unique model was created for each habitat and then analyzed between habitat types to assess the impacts of beaver on the relative importance of both individual taxa and functional groups (groupings of taxa based on their feeding mode). Our results illustrate the large impact that beaver can have on sub-Antarctic stream food webs by significantly changing macroinvertebrate community composition, trophic structure, and energy flow from food resources to stream consumers.

Role of Calcium Independent Phopholipase A_2 ($iPLA_2$) in Phospholipid Metabolism in Chemotherapeutic–Induced Cancer Cell Death

Kimberly Coveney – CURO SUMMER FELLOW
Dr. Brian Cummings, Department of Pharmaceutical and Biomedical Sciences, University of Georgia

Phospholipase A_2s are historically classified into three categories, cytosolic Ca^{2+}- dependent PLA_2 ($cPLA_2$), secretory Ca^{2+}-dependent PLA_2 ($sPLA_2$) and Ca^{2+}-independent PLA_2 ($iPLA_2$). Like all phospholipases, $iPLA_2$s are activated by extracellular signals to cleave phospholipids, thereby releasing lipid fragments into the intracellular environment which then act as signaling molecules within the cell. Upon cleavage with $iPLA_2$, phospholipids release arachadonic acid and glycerol into the cell. Arachadonic acid then serves as an intracellular signaling molecule for the inflammation response.

Under normal conditions, phospholipases aid in the maintenance and upkeep of cellular bilayers, thereby playing an integral role in the viability of the cell. However, any artificial manipulation of the resident phospholipases could disrupt this type of cellular maintenance system fueled by the activity of phospholipases such as $iPLA_2$. This research focuses on the effect that bromoenol lactone (BEL), a calcium independent phospholipase A_2 ($iPLA_2$) inhibitor, has on cellular viability and the phospholipid profile of the cell. This pharmacological agent was administered alone and in conjunction with the chemotherapeutics vincristine and cisplatin to test the hypothesis that $iPLA_2$ inhibition mediates cell death in these cells by altering the release of death inducing lipid signals.

Prostate carcinomas (PC-3) and lung carcinomas (A549) were both examined to explore the effect that cell origin has on the reaction to the aforementioned treatments. Preliminary data show that the combinatorial therapy, which employs the simultaneous administration of BEL with a prescribed chemotherapeutic, is able to effectively decrease the amount of certain phospholipids within the cellular membrane while not altering others. The summation of death caused by the aforementioned chemotherapeutics and that caused by the inhibition of an integral enzyme involved in cellular membrane integrity ($iPLA_2$) is greater than that caused by chemotherapeutic use alone. Certain phospholipids, most notably 14:0-16:0 Phosphatidyl Choline, have shown such consistent decreases in numbers during combinatorial treatments that their role in membrane integrity and viability is being furthered examined.

Understanding Cellular Immortality: Telomere Functioning in Yeast

Nathan L. Crain
Dr. Michael McEachern, Department of Genetics, University of Georgia

Cellular immortality, a characteristic of carcinogenesis, is achieved through the maintenance of telomeres, the DNA-protein complexes found at the termini of eukaryotic chromosomes. Telomere maintenance occurs by two distinct mechanisms: repair by telomerase, a reverse transcriptase, or repair by recombination (RTE – *r*ecombinational *t*elomere *e*longation). Although the majority of human cancer cells utilize a telomerase-dependent maintenance pathway, about 5% of human cancers undergo a recombination method of telomere lengthening,

termed ALT (*a*lternative *l*engthening of *t*elomeres). RTE pathways are best understood in yeasts. Previously, the McEachern lab identified a mutation in the yeast *Kluyveromyces lactis*, stn1-M1, which maintains very long telomeres by recombination and closely resembles human ALT cells. Studies have shown the genes RAD50 and RAD59 are necessary for RTE in *Saccharomyces cerevisiae*. The objective of this study is to characterize the role of RAD50, RAD51 and RAD59 genes in determining telomere length by recombination in stn-M1 mutants. Crosses of the genes regulating telomere length were generated by tetrad analysis. The mutants were then plated on growth media and screened for colony morphology and telomere length. Our results have shown that the RAD59 gene is not required in *K. lactis* RTE. This might be explained by the fact that *S. cerevisiae* has telomeres heterogeneous in sequence, while *K. lactis*, like humans, has homogeneous telomeres. Further analysis of stn-M1 mutants will be presented.

Strategy and Intent Versus Function: A Comparative Study of Moro Islamic Liberation Front and the Shining Path, Two Terrorist Groups

Leigh E. Creighton – CURO APPRENTICE
Dr. Stephen Shellman, Department of International Affairs, University of Georgia

Terrorist groups are usually defined by the violent methods they use to achieve their stated goals as well as common goals, which generally entail the control of land, the desire to replace one government or regime with another, or a combination of the two. Throughout its history as well as the present, the Philippines has been a country known for its continuous onset of one terrorist group after the other. The Moro National Liberation Front (MNLF) of the Philippines aimed for the establishment of an independent Islamic State in the southern Philippines. The Shining Path (Sendero Luminoso), a Peruvian terrorist group founded in the late 1960s aimed to replace the Peruvian government with a peasant revolutionary regime and dispel all foreign influences. The focus of my paper is a comparison between the Shining Path's and MNLF's goals or intentions versus the actual results of their actions. I hypothesize that there will be a general congruence between many factors of the two groups, such as their targets, weapons, members and leaders. I am interested in the cause and effect relationship between the terrorist groups and their corresponding country's populace. I predict that the methods or tactics the terrorists use depends on the approval or disapproval from the populace.

AUX Launch: Art, Representation and Commerce on the Web

John Crowe – CURO SUMMER FELLOW
Professor Mark Callahan, Institute for Creative Exploration, University of Georgia

AUX Launch utilizes the web as a platform where the lines of separation between art, design, and commerce are blurred. Competition between traditional music industry distribution strategies and alternative models such as file-sharing and inexpensive downloads is contributing to the emergence of new web-based models of artistic representation and content distribution. This project combines creative and technological research in the creation of a web site that accompanies the publication of AUX, a collection of experimental sound from Athens, Georgia. The development of the AUX web site is one component of collaborative project supported by Ideas for Creative Exploration (ICE), an interdisciplinary initiative for advanced research in the arts at UGA. The initial stage of the project brought together recording artists who share a connection with Athens' thriving independent music scene and graduate students in the Lamar Dodd School of Art's acclaimed Printmaking and Book Arts program. The result was a limited-edition audio CD in unique packaging printed and assembled by hand. AUX Launch supports the distribution of the CD and will remain online as documentation of the project when the edition is no longer available. The site, AUXcd.com, provides information about the artists on the compilation and sense of context for the project within the global community. The development of the site is the result of individual effort using

Macromedia Flash software and original ActionScript programming. The project evolved through numerous prototypes and code refinements to launch-ready status. The innovative design reflects the unconventional nature of the compilation through the use of layered graphics, sound, animation, and minimal text. A dynamic interface activates subtle contrasts in color, negative space, and popup animations, creating moments of intuitive navigation and discovery.

The Effect of Polymer Scaffolds with Nanopillar Structures Fabricated Using Solvent Leaching/Gas Forming Method on Long Term Osteoblast Response

Sita M. Damaraju
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(Sita Damaraju, Ke Cheng, Guigen Zhang, and William S. Kisaalita)

The main objective of bone tissue engineering is to design robust skeletal implants which mimic the mineral component and the microstructure of natural bone. As a result, the functions of osteoblasts (bone forming cells) are better controlled in the new bone formation. In this study, nanotechnology is being used to develop Poly (L-Lactic acid) (PLA) scaffold structures consisting of nanopillars which are made out of nano-hydroxyapatite (NHA). These structures are hypothesized to improve the control of osteoblast behavior and response. NHA/PLA scaffolds were fabricated by the solvent leaching/gas forming method with ammonium bicarbonate as the porogen additive. An advantage of these 3-D nano-structures is that they are fabricated without using any special equipment, and porosity of the scaffold can be easily controlled or modified by this method. The fabricated scaffold is highly porous, and the pores are interconnected. The average pore size is about 200 micrometers, which provides a greater surface area for cells growth. The TE-85 bone tumorigenic cells, obtained from a tumor infected bone, were cultured in the scaffolds. Because TE-85 cells can proliferate in vitro, they are an excellent model to investigate bone formation in vitro. Results indicate that TE-85 cells are biocompatible with the fabricated scaffolds to facilitate cell adhesion. Later, the osteoblasts will be seeded on fabricated scaffolds to investigate the adhesion, proliferation and long-term functionality and matrix production. The results observed will be compared to standard PLA scaffolds without nanopillars.

Theory and National Identity: Yugoslavia in the Late 1940s and 1950s

Michael W. Davis
Dr. Keith Langston, Department of Germanic and Slavic Languages, University of Georgia

During the late 1940s and 1950s, Tito's communist regime in Yugoslavia was forced to face the recurring conundrum facing Belgrade: how to assimilate the various ethnic and religious factions into a greater Yugoslav identity. Ethno-religious tensions had provided opposition to Yugoslav identity since the nation's inception in 1918, and prior governments had compensated by establishing Orthodox Serbian preeminence at the expense of the national minorities. Tito's regime established the most viable sense of a greater Yugoslav identity following its split with the Cominform in 1948, an event that forced the regime to contemplate how to draw upon the support of all its citizens in the face of Soviet and Western pressure. As historians such as George Hoffman, Charles McVicker, Fred Neal, and Paul Shoup note, Tito's regime devoted considerable effort toward generating a body of theory to underlie the new Yugoslav identity. Primarily this was accomplished through theoretical positions regarding domestic policies and foreign diplomacy. This paper will focus upon the theoretical positions (though not actual implementation) regarding the withering away of the state and party, rejection of collectivization of agriculture and recognition of the peasantry, socialist democracy, and nonalignment during the Cold War. The importance of these positions in reducing tensions between the ethno-religious factions will be discussed in context of the larger

struggle to establish a coherent Yugoslav identity.

Prediction of Maximum and Minimum Air Temperature of a 24-Hour Period with Artificial Neural Networks

Richard W. Dewey
Dr. Ronald McClendon, Department of Biological and Agricultural Engineering, University of Georgia

Foreknowledge of maximum and minimum temperatures is useful for the development of weather simulations and for the protection of crops from freezes. The goal of this study was to develop artificial neural network (ANN) models to predict maximum and minimum temperatures of a 24-hour period six hours before the beginning of that period. An ANN is a network of processing units connected in a manner similar to neurons. ANNs can automatically adjust themselves to predict trends in a data set. Using data from the Georgia Automated Environmental Network to train the ANNs and the mean absolute error (MAE) of ANN predictions as a performance measure, many ANN design factors were tested for their effects on performance. Air temperature, humidity, wind speed, solar radiation, and seasonality produced the lowest MAE when all were used together in an ANN. The optimum duration of recorded data for these inputs was in the range of 2 to 8 hours. "Ward Network" architectures tended to have lower MAEs for minimum temperature prediction than standard backpropagation networks, but both types of architecture had similar MAEs for maximum temperature prediction. Two ANNs with one output node each had lower MAE than one ANN with two output nodes. The best models developed had MAEs of 2.124 °C on maximum temperature prediction and 1.675 °C on minimum temperature prediction. Future research could experiment with other design decisions to improve the ANNs' performance on winter and spring days with high humidity and wind speed, which were the most error-inducing days.

The Enigmatic Origins of the Bell Beaker Phenomenon

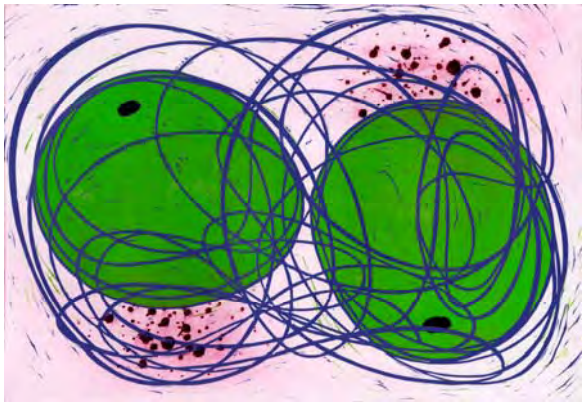
Jana Dopson
Dr. Ervan Garrison, Department of Anthropology and Department of Geology, University of Georgia

Bell Beaker pottery is an important, enigmatic, and well-documented phenomenon which appears suddenly and briefly in the archaeological record through most of Europe. These bell-shaped goblets are extremely uniform considering their geographic distribution and are surprisingly widespread considering their short persistence. Previous research has suggested a variety of diverse origins for the Bell Beakers including as status symbols associated with knowledge of copper metallurgy, and recent carbon dating indicates possible Iberian genesis. Thorough review of current literature in French and English provided the basis for investigation and was supplemented by interviews of leading Swiss Beaker archaeologists and on-site investigation of Swiss museum holdings. Two major points of contention in Beaker research include where the Beakers originated geographically and whether the Beakers indicate the spread of a people or simply the expansion of ideas. Stylistic analysis of goblet decoration led to many competing theories about Beaker origins, but modern radiocarbon data show that the Beakers are oldest in Iberia and get progressively younger to the north and east. Careful study of Beaker accompaniments has shown that regional ceramics are important to understanding the cultural and social settings of the Beaker period, and three distinct Beaker sub-cultures have been identified. The contemporary existence of these groups and the lack of evidence revealing large-scale migration imply that the archaeological Beaker culture is more representative of ideological, technological, and stylistic spread than en masse population movement. Beaker data are most consistent with a hypothesis supporting Iberian origins, metallurgy, and social status as important facets of Beaker success in Europe.

Containerized Shipping: A Gap in National Security

William M. Draxler & Joshua R. Heard,
Roosevelt @ UGA
Dr. Michael Speckhard, Department of International Affairs, University of Georgia

Although it is the lifeblood of the global economy, the containerized shipping system is also a major vulnerability in American national security. This key instrument of globalization has many economic advantages, but it also provides an avenue for criminal syndicates to engage in human trafficking and drug trafficking. Worse, a terrorist organization could very well use a shipping container as a delivery system for a weapon of mass destruction or to smuggle terrorists into the country. These containers could be used to transport illicit material to a destination where it would be used to construct a weapon of mass destruction. To address this threat, the Bureau of Customs and Border Protection has erected numerous programs to secure the supply chain, but these are riddled with problems. We propose a series of measures to correct the problems in two of these programs, the Container Security Initiative and the Customs-Trade Partnership Against Terrorism. These measures include increasing staff, distributing better detection equipment, and establishing the authority of customs officials to improve implementation of these programs. We also propose an independent measure for establishing a new standard in the security of ship manifests and also the development of a culture of security, both small steps in insuring security in every stage of the global supply chain.



Printmaking

Cameron Dye
Prof. Joe Sanders, Department of Printmaking, University of Georgia

My work is an exploration in aesthetics as I combine kitsch imagery along with a formalist sensibility. I am influenced by a wide variety of sources from the works of surrealists like André Masson and Stanley William Hayter to images from popular culture, such as cartoons, cereal boxes, and psychedelic posters. My prints usually begin as abstract, automatic drawings and slowly develop into images with intentionally cute and grotesque, representational imagery. I am interested in creating images with tension between opposing elements, such as cute and grotesque, or tasteful and tasteless, as a way of creating excitement.

Phenotypical and Genotypical Antibiotic Resistance Analyses of Fecal Bacteria Isolates in Dairy Cattle

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The emergence of antibiotic resistance in both commensal and pathogenic bacteria throughout the world is being heightened by the overuse of antimicrobial therapies both in humans and in agricultural applications. Common therapeutic treatments in food animals are thought to play a major role in the selection of resistant bacterial strains within animals, and conjugation within the gastrointestinal tract has been suggested as a means of transfer for genes that confer this resistance between both individual bacteria and bacterial species. Phenotypic resistance characterization and gene specific screening were conducted for Gram negative, lactose fermenting, normal flora isolates, including Escherichia coli, for the antibiotic resistance genes flo, tetA, strA, strB, and ampC, which encode resistance for chloramphenicol and florfenicol, tetracycline, streptomycin, and ampicillin, respectively. Two genes typically found in a single locus in some conjugational plasmids isolated from Salmonella, tetA and strA, were concurrently present in 36% of the

tested Enterobacteriaceae isolates, while 68% of these additionally carried flo, also a common component of this location. Approximately 11% of the isolates contained all five of the genes. This study was carried out on bovine fecal samples from which multi-drug resistant (MDR) Salmonella had been isolated. The farms in this study were chosen because they were known to carry MDR Salmonella, and the therapeutic use of antibiotics was known and made available. The results of the Gram negative resistance screenings were compared to the profiles of these MDR Salmonella isolates. The presence of similar to greater proportions of these resistance genes in different bacterial species within the commensal bacteria of animals, as indicated by comparison to the Salmonella profiles, suggests the presence of a resistance reservoir within their common environment. The importance of this experiment is the potential implications that a growing antibiotic resistance gene pool within food livestock could have upon their conference to human populations and the rising difficulties of medicinal treatment.

Rock, Paper, Scissors
Lauren Dykes
Dr. David Saltz, Department of Theatre and Film Studies, University of Georgia

Three haunting stories of young women struggling with their bodies and the world surrounding them. The line between victim and violator is constantly blurred, with each girl left alone to discover if she is to blame for her pain.

The Effects of Cocaine on the Isolated Rabbit Heart and the Increased Cardiovascular Risk It Presents in the Presence of the Non-selective Beta Blocker Propranolol
Edmond N. Fomunung – CURO APPRENTICE
Dr. Benedict Lucchesi, Department of Pharmacology and Toxicology, University of Michigan Medical School

Cocaine, a crystalline alkaloid obtained from the leaves of the coca plant is highly addictive and potentially fatal. This has made its possession and distribution illegal in most parts of the world. The current study was performed to evaluate the biochemical processes underlying the toxic effects of cocaine on the heart. Cocaine has been reported to inhibit the reuptake of the certain neurotransmitters: norepinephrine, serotonin, and dopamine, and is known to block sodium channels. In this study, we sought to examine this mechanism of action and to evaluate the cardiovascular risk associated with the use of the beta-blocker propranolol. New Zealand white rabbit hearts were isolated and perfused at 30ml/min. The hearts were subjected to a period of hypoxia-reoxygenation, after which one was treated with cocaine, and another with both cocaine and propranolol. The electrocardiogram, coronary perfusion pressure, and left ventricular diastolic pressure were monitored closely on a trace using a multichannel recorder. Cocaine caused an immediate and drastic drop in both LVDP and CPP with eventual return to normal in the isolated heart. When the cocaine-exposed heart was treated with propranolol, the LVDP never recovered from the initial drop, and the heart eventually lost function. Our data suggest that cocaine exerts its toxicity on the isolated heart by significantly depressing heart function, as confirmed by the drop in LVDP and CPP. The data also suggest that when beta-blockers are introduced to a cocaine-exposed heart, the effects are particularly toxic and potentially fatal.

Being (Interpretations of Interpretations)
Charlotte Foster
Prof. Rebecca Enghauser, Department of Dance, University of Georgia
(Emily Crate, Charlotte Foster, Joseph Hutto, Leah Chapman, and Mary Mattmann)

Being (Interpretations of Interpretations) was developed through abstract gesture studies in the modern dance idiom. My goal was to develop new movement phrases which would produce an emotionally affective work. The abstract gesture studies were based on emotional responses to war, specifically the emotions of denial, courage, and detachment. Movement vocabulary was abstracted from photographs of people that exhibited strong emotion. I examined select photographs and identified details to influence

the shape, texture, and emotional response of my movement. These movements were threaded together using various speeds and dynamics that were determined in part by the dancers. Throughout the process, it became unnecessary that the audience draw a connection between my movement and war and more important that the audience have their own interpretation of the work.

Though each dancer brought a unique experience to the stage and had various strengths and weaknesses, they worked together as a congealed group, attempting to change their movement tendencies and adapt to each other. They also contributed largely to the creation of the piece in rehearsal. The dancers formed a supportive environment were I felt free to create, allowing me to experiment and grow as a choreographer. Without these specific dancers, this project would not have been so successful.

The Effect of *Aedes aegypti* Larval Nutrition on Metamorphosis

Laura Frame
Dr. Aparna Telang & Dr. Mark Brown, Department of Entomology, University of Georgia

Females of the mosquito species *Aedes aegypti* transmit yellow and dengue fever viruses through blood feeding on human hosts. An effective way to control viral outbreaks is to control mosquito populations in high risk areas. This is best done when mosquitoes are in their larval stage. Food for larvae can be limited by factors such as intra- and interspecific competition and the ephemeral nature of their aquatic habitat. Feeding by the last larval stage provides energy and nutrients required for growth, metamorphosis and reproduction. I hypothesized that if food for 4^{th} (final) stage larvae were limited, their ability to metamorphose and their resulting adult size would be affected. Specifically, I allowed 4^{th} stage larvae to feed for particular lengths of time and then housed them in fresh water only. When these larvae were allowed to feed for only 12 hours, few became adults, whereas most were developmentally arrested. Remarkably, arrested larvae survived for two weeks; and the implications for this survival await further study. Allowing larvae to feed for 24 hours resulted in 70% becoming adults. Female *A. aegypti* needed to feed longer as larvae to pupate compared to males. Females that fed longer as larvae attained a larger adult size. Female size has been found to strongly correlate to reproductive capacity, but how this affects her ability to transmit diseases awaits further study. This experiment indicated that food availability strongly affects the metamorphic capacity of *A. aegypti* larvae and thus limits mosquito populations.

Puppet Regimes

Mary Gassama – CURO APPRENTICE
Dr. Stephen Shellman, Department of International Affairs, University of Georgia

My research examines the political life of Laos and Cambodia in relation to Vietnam beginning from 1980. Although recognized as independent states, Laos and Cambodia were puppet regimes controlled by Vietnam. During the early 1980s, Vietnam had thousands of troops positioned in both Laos and Cambodia. Additionally, contact between the government of Vietnam and the governments of Cambodia and Laos exceeded the number of contacts usually made between sovereign states. Did Vietnam really control Laos and Cambodia? What steps did Vietnam take to gain a hold on both Laos and Cambodia? What characteristics did Laos and Cambodia have to make them susceptible to domination? What reasons did Vietnam have for wanting Laos and Cambodia under its control? My research considers these questions to understand the Laotian and Cambodian governments. I reviewed and examined sources such as the Xinhua General Overseas News Service and the British Broadcasting Corporation, paying special attention to the relationship between Vietnam, Cambodia, and Laos. Newspaper articles reporting the daily activities of the governments of Vietnam, Laos, and Cambodia provide evidence that Laos and Cambodia were puppet regimes. Although there have been academic books that detail the history of Indochina (Thailand, Vietnam, Laos, and Cambodia), books that focus on the relationship between

Vietnam, Laos, and Cambodia are uncommon. This research advances our knowledge of puppet regimes and the governments that control them: it displays the behaviors of dominating countries and their subordinates.

Ceramics
Alexis Gregg
Prof. Ted Saupe, Department of Ceramics, University of Georgia

My recent work in clay has taught me the power of intuition. I no longer dwell on the significance of what I'm doing. Instead, I allow my hand to respond to the surface as if I could close my eyes. The forms I have been creating give me an excitement and drive that I have not experienced before. It is as if clay has taught me to play, and when art making is fun, the results are also good. After the initial form is made, I step back and find the hidden faces and shapes that appear. I have come to realize the energy that is put into making a piece defines the energy it possesses on its own. Ultimately, I want my work to stand strongly as individuals with personality and mystery.

The Creation of 16S rDNA Clone Libraries for the Identification of Bacteria in the Gut Microbial Flora of *Drosophila melanogaster*
Kristen E. Habel
Dr. Larry Shimkets, Department of Microbiology, University of Georgia

Drosophila melanogaster has the longest history of any model organism and has been used by thousands of researchers around the world for over a century. In recent years these tiny organisms have played an important role in immunological and evolutionary ecology, specifically in the examination of immune effector systems and the role that pathogens play in the microevolutionary processes of these systems. Despite this abundance of research on host-pathogen interactions in Drosophila and the evolutionary consequences of these interactions, little is known about the normal microbial flora of Drosophila and the effect these bacteria have on host immunity. In this study, 16S rDNA gene sequences were used to identify bacterial species that make up the gut microbial flora of *Drosophila melanogaster*. Fly populations were collected from ten different longitudes along the East Coast, and two flies from each population were homogenized. Bacterial DNA was extracted from the homogenized flies and amplified using polymerase chain reaction. Gel electrophoresis was then used to isolate the target 16S rDNA sequences which were inserted into vectors and transformed into electrocompetent cells. The 16S rDNA gene in each plasmid was sequenced and examined with a local alignment algorithm to identify the different species of bacteria in each population. This data may indicate a clinal trend in the species of bacteria living in different fly populations and possibly allow for future studies of the microbial flora of Drosophila, including the identification of sexually transmitted bacteria.

Antibody Depletion of Highly Abundant Proteins in *Trypanosoma cruzi* for Fine-tuning of Proteomic Analysis
Matthew Haney – CURO SUMMER FELLOW
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Trypanosoma cruzi is a protozoan parasite that causes Chagas disease, the world's leading cause of congestive heart failure and a common cause of death in South America. Current treatments for Chagas are inadequate, though better understanding of parasite morphology could potentiate future treatments. Specifically, improved knowledge of *T. cruzi*-specific proteins may reveal novel candidate vaccines and potentially lead to improved treatment of the

disease. With this in mind, shotgun proteome analysis using liquid chromatography and tandem mass spectrometry identified roughly 3,000 *T. cruzi* proteins from the four major life-cycle stages (Atwood et al, 2005). Unfortunately, nearly 50% of all mass spectra collected mapped to only 8% of identified proteins, meaning a limited number of high-abundance proteins mask the detection of low-abundance proteins. To expose these low-abundance proteins to mass-spectrometric identification, protein-specific antibodies could be generated to bind to and remove the 67 high-abundance proteins from *T. cruzi.* To facilitate the subsequent cloning process, this protein group was first narrowed to 48 proteins based on homology. Previous lab efforts successfully cloned genes for 35 of the 48 proteins, so cloning of the 13 remaining genes was undertaken utilizing PCR amplification and the Invitrogen Gateway® technology. From a vector for protein expression, 32 of the total proteins were generated via autoinduction and purified under denaturing conditions. The antibodies subsequently produced to these 32 proteins in rabbits and mice will next be used to deplete high-abundance proteins from crude *T. cruzi* cell extracts before final mass-spectrometric analysis. The proteins identified by this new high-throughput proteomic analysis will verify *T. cruzi* genome annotations, identify new potential vaccine candidates, and further basic understanding of *T. cruzi* biology, hopefully leading to new and more effective treatments.

O-glycans and Congenital Muscular Dystrophy

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Alpha-Dystroglycan (aDG) is a key glycoprotein necessary for proper neural and muscle function. In several forms of congenital muscular dystrophy, mutations exist not in the protein itself but in the glycosyltransferases necessary for the O-mannose addition and extension of the glycan structure necessary for proper aDG function. In order to map and characterize the glycans of aDG, the following objectives are being addressed. First, aDG is being purified from various sources. The initial protein sample, from rabbit skeletal muscle, has been purified based on its ability to interact with the lectin WGA (wheat germ agglutinin) and the extracellular protein laminin-1. Purity of the preparation was confirmed by SDS-PAGE followed by silver staining and tryptic digestion followed by LC-MS/MS analysis. aDG from brain has also been demonstrated to bind to the lectin WGA, confirming that it contains terminal sialic acid and/or N-acetylglucosamine glycans. Second, the glycans are being released by a combination of chemical and enzymatic steps for further characterization by chromatography and mass spectrometry. Third, the sites of glycosylation, with an emphasis on the disease-causing O-man sites, are being mapped using mass spectrometry techniques for O-glycosylation including neutral-loss MSn and beta-elimination/Michael addition approaches. This investigation sets the stage for future work in comparing aDG from various tissues, including mouse models of congenital muscular dystrophy. Defining the glycans and sites of modification is the first step toward assigning functional roles for the glycans and is an essential step toward the development of glycopeptide-based therapeutic approaches for treatment of several forms of congenital muscular dystrophy. This work is partially supported by grants from UGARF and MDA (LW).

Synthesis of Dipeptidyl Acyloxymethyl Ketones (AOMK) Inhibitors of Yeast Enzymes Rce1p and Ste24p

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Thirty percent of all human cancers contain a mutated, mature form of Ras, a protein containing a C-terminal tetrapeptide sequence referred to as a CaaX motif. Proteins containing this motif undergo a three step post-translational modification pathway: isoprenylation of the cysteine residue, cleavage of the aaX group and carboxyl methylation of the newly exposed C-

terminal end. By inhibiting steps in this pathway it might be possible to create novel treatments for cancers caused by Ras mutations. The focus of the research conducted for this paper is to synthesize various dipeptidyl (acyloxy) methyl ketone (AOMK) inhibitors and test their inhibition properties on Ras converting enzyme (Rce1p) and Steril 24 (Ste24), two enzymes responsible for the proteolytic cleavage of the aaX motif in CaaX proteins. Selective inhibition of Rce1p interests us because of its essential role in the maturation of Ras. The potential inhibitors consist of a varied benzoate group attached to any of three different benzyloxy-protected dipeptides, Z-FK, Z-FA, and Z-FR. Using a fluorescence quenching assay, the percent activity relative to the uninhibited enzyme can be determined. These activities, coupled with the inhibitory activity of other compounds are needed so that an inhibitor profile of Rce1p and Ste24p can be established. The goal is to investigate if selective inhibition of each enzyme is possible.

Homer's Voice Recalled: Christopher Logue's *Iliad* Accounts

Alicia Higginbotham – CURO SUMMER FELLOW
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British actor, pornography writer, and poet Christopher Logue has been translating pieces of the *Iliad* since 1959 and has never learned a word of Greek. His translations, each containing only one or two segments of the 24-segment whole, make reference to Shakespeare, World War II, and Revlon lipstick ads. He has left behind the formal constraints of what scholar D. S. Carne-Ross calls "translationese" to find the voice of Homer once again.

Obviously, such an undertaking confronts many problems. Like any translation, Logue's *Iliad* must honor the original while also creating a new poem in English that responds to contemporary modes of thought. Logue also must contend with the long tradition of *Iliad* translations that precede his. Using translation theory, critical studies of both Logue and Homer, and interviews with Logue and current translation scholars, I explore the success of Logue's translations within both the postmodern poetry and classics studies communities.

Christopher Logue feels responsible to these scholarly fields only secondarily, however. The passion that pushes him to continue revising and adding to his *Iliad* segments is the conversation he has through the poem about the legacy of war. By connecting Logue's translations to his body of original poetry and by exploring supplementary texts which he found especially enlightening throughout his work, I will show how the *Iliad*, possibly the greatest war poem in history, is the perfect vehicle for Logue to make a statement on, among other episodes of violence, the Vietnam War, the war in Iraq, and the current trend of international terrorism.

Isolation and Characterization of a Novel Heterotrophic Anaerobic Thermophile from the Uzon Caldera (Kamchatka, Russia)

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Microbiologists have been seeking to characterize the microbial ecology of systems such as deep sea vents, geothermal hot springs, salt lakes, and acid-mine drainage sites, hoping to form a more complete picture of the environment in which organisms on ancestral earth would have thrived. The anaerobic chemolithoheterotrophs and chemolithoautotrophs living in these ecological niches are reminiscent of the earliest life forms present on earth, anaerobic archaea and bacteria. The Kamchatka Microbial Observatory is an international/interdisciplinary program supported by the National Science Foundation which has as a goal the elucidation of the interactions that connect the geology, microbial ecology, and geochemistry in the terrestrial hot springs of the Uzon Caldera. Located on the far-eastern Russian peninsula of Kamchatka, the Uzon Caldera is a host for microbial diversity that is found across a wide range of physical and geochemical gradients, including magmatic and meteoric (atmospheric) water sources. Twenty-

five isolates were obtained from samples retrieved during the 2003 field season, in addition to four isolates acquired from samples brought back in 2004. The glycolitic and peptidolytic anaerobic thermophile that was isolated from these field samples indicates a novel species, exhibiting 98% 16s rDNA sequence similarity to Caldanaerobacter subterraneous subsp. tencongensis. This isolate has a temperature growth range from 44-76°C, with an optimal temperature for growth at 62-63°C. The optimal pH25°C for growth of the isolate fell between 6.3-6.7, while incubated at 72°C. Future research will seek to further describe the geology and geochemistry of the hot spring in which this new species was discovered

Para Risas?: The Relationship between Sports and Gender in an Ecuadorian Fishing Village

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Golosina, Ecuador is a small fishing village in which there are clear gender divisions between males and females. These divisions are brightly reflected in the sporting activities that are common throughout the village. However, sport is also a site in which ordinary gender roles are relaxed and challenged. It offers individual women ways to temporarily transcend their gendered social restrictions; but as an institution, it serves to strengthen, reinforce, and magnify entrenched gender divisions in Golosinana life. This paper explores articulations between sports and gender in Golosina. The cultural significance given to sports in this small village allows its effects to ramify beyond the court or field and into other domains of village life. By examining the behavior of the town's athletes and the construction of their sporting events, I will show how some gender roles in the village are reproduced. I will analyze the disparities in formal opportunities for males and females and the differences in how male and female athletes view themselves and each other. Through these comparisons, I discuss how gender roles are reflected in the institution of sport and how this institution itself serves to reinforce such roles. This study is specific to Golosinan life, but the patterns and social forces it reveals can be applied to other cultures as well.

Matrigel Invasion Assay for Ovarian Cancer Cell Lines

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Ovarian cancer is the fifth most common cancer in women, and approximately 16,000 women die annually from this disease. Metastatic invasion, one hallmark of cancerous growth, can be viewed as a series of stages: escape from the primary tumor and intravasation into the vascular systems, survival in the circulation and avoidance of host defense mechanisms, arrest at a new site and extravasation into the tissue, and finally growth at the new site. Several in vitro assays mimic this in vivo metastatic process. The objective of this project was to develop and implement an assay for cell invasiveness which could be used to determine the metastatic effects of hormonal stimulation of the luteinizing hormone receptor. Using a Boyden chamber insert design, cells invading through Matrigel, a synthetic tissue barrier, were stained and counted. Percent invasion was determined by dividing the average number of invading cells by the average number of migrating cells for each cell line. The invasion index was determined by dividing the percent invasion for the test cell line by the percent invasion of the control cell line. The invasive properties of the BG-1 ovarian cancer cell line (70% invasion) were similar to the positive control cell line HT-1080 (60-70% invasion), whereas the CaOV3 ovarian adenocarcinoma cell line was considerably less invasive (15% invasion). The invasion indexes for BG-1 and CaOV3 were calculated to be approximately 1.2 and 0.2, respectively. In addition, the luteinizing hormone receptor (LHR) and a constitutively active LHR mutant were introduced into BG-1 cells to compare the invasive properties of wild type and mutant receptor. Comparing invasion through matrigel after stimulation of the introduced receptor, the results show no significant contribution of LHR

stimulation to the invasive properties of the cells. Therefore, metastasis will occur with or without LHR stimulation, and further research will determine pathways to increased cellular invasion.

Attention!Deficit-Hyperactivity:Disorder?
Joseph Hutto
Prof. Rebecca Enghauser, Department of Dance, University of Georgia
(Joseph Hutto, Mary Mattman, Laura Henry, Montez Nash, and Leah Chapman)

With this project I set out initially to create a piece that was very personal and about some very serious issues but also to create a piece that was light hearted and entertaining at the same time. I intended to create from my own personal experience of my childhood and adolescence and thus created characters out of my actual family members. I then decided to put this personal history up against my own personal relationship history and created characters out of all of my ex-girlfriends or ex-crushes. This covers my life story from early childhood to today and highlights certain events throughout. I then decided to satire each of these moments and to make the piece humorous. I titled the piece "Attention!Deficit-Hyperactivity:Disorder?" in reference to the fact that I do actually struggle with this disorder and have for a long time. This allowed me to utilize the image of changing channels on the television screen, which is a frequent example of what ADHD feels like. This helped me to incorporate the TV sitcom elements and tied in the music as well. I was originally greatly inspired by the music, which is all from television shows, movies, and video games from my childhood to today. I chose music that was appropriate to each scene or scenario and also that was without lyrics, so that they would not interfere with my artistic expression in each case. I attempted to weave all of these elements together to create a colorful fantastic farce of actual events and to better tell my story.

Assessing Opinions of Georgia Residents on Poverty and Labor Markets in 2005
Jamarri J. Ivy – CURO APPRENTICE
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Poverty inflicts some 210,000 families in the State of Georgia. Identified as a social problem, poverty has far-reaching and detrimental effects on Georgia's economy, as well as overall society. A 2004 poll by the Carl Vinson Institute of Government concluded that Georgians are highly concerned with the problem and show pessimism about a future solution to poverty. My research examines the opinions of 500 Georgia residents during October 2005 on issues relating to poverty. Census Bureau reports released in August of 2005 show that poverty rates are still on the rise, and household incomes failed to increase for the 5th straight year. The Georgia Poll directly deals with opinions on causes of poverty, definitions of poverty, labor markets across various demographics, and how the worsening state of the economy has had an effect on Georgians. The statewide RDD telephone survey was conducted at the Survey Research Center. Based on the fact that poverty is one of the major problems afflicting the state, the research will examine whether the results of the Carl Vinson Institute of Government Poll still apply to the opinions of Georgians in 2005, in light of higher poverty levels since the 2004 poll. The results help to further knowledge of the public's perception of poverty, the relationship between the current poverty level and the opinions of Georgians, and the overall resolve of Georgia residents to solve the problem. When a social problem is as sweeping as is the case with poverty, a collective effort becomes ideal.

Hepatic Expression of Deiodinase-1 in the Rat
Natalie M. Jennings – CURO APPRENTICE
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This study examined the effects of thyroid-inhibiting drug PTU on the hypothalamic-pituitary-thyroid regulation of pregnant rats and their offspring. The thyroid gland regulates basal metabolism and is critical in growth and development. The purpose of this research is to understand the developmental differences of rat

thyroid status through the comparison of data from each level of PTU exposure among various age groups. Pregnant rats were exposed to PTU in drinking water from gestation until weaning. There were three levels of PTU exposure: 0, 3, and 10 ppm, and three age groups under study: pup (offspring), dam (mother), and adult (pup 2 months after weaning, last exposure to PTU). Deiodinase 1 (D1) enzyme, which converts thyroid hormones T4 to T3 through the removal of iodide, was examined in liver homogenates. To determine D1 mRNA expression, mRNA was extracted and D1-specific mRNA was quantified with real-time PCR. Liver assays measured D1 activity based on the amounts of 125I produced when D1 removed iodide from radioactive rT3. Relative D1 levels are expected to decrease with increasing PTU doses, with the thyroid status of the dams affecting that of their offspring. The relative amount and expression of liver D1 can then later be analyzed along with other data to broaden the understanding of developmental interruptions. The information using this standard anti-thyroid drug will establish a foundation for other studies evaluating other thyroid disruptors such as perchlorate, a chemical that is an environmental hazard in human drinking water in many areas of the U.S.

Design of an Inducible System for Expression of the Human Luteinizing Hormone Receptor

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The human luteinizing hormone receptor (hLHR) is a G-protein coupled receptor that is vital for human reproduction, but its expression may influence the formation or progression of ovarian cancer. hLHR expression has been shown to decline from low-grade to high-grade ovarian cancer and is much lower in malignant ovarian epithelial tumors than in benign ovarian epithelial tumors. An inducible expression system which provides regulated expression of hLHR in ovarian cancer cells may allow for the elucidation of a correlation between hLHR expression and ovarian cancer. The goal of this project was to produce a plasmid that, when introduced to ovarian cancer cells, places the expression of hLHR under the tetracycline responsive element. Primers were designed and synthesized for PCR amplification of hLHR that provide the correct restriction sites needed for insertion into the pTRE2hyg2-6xHN expression vector. Attempts made to ligate the insert and vector and transfect competent E. coli cells with the ligation mixture were unsuccessful. In the future, once the ligation is successful and the hLHR-pTRE2hyg2-6xHN plasmid is complete, the plasmid can be introduced into ovarian cancer cells that lack hLHR since residual expression could compromise control over the total hLHR expression levels in the transformants. The transformants can then be monitored at different hLHR expression levels for matrigel invasion characteristics and be compared to wild type ovarian cells from the same line to reveal any changes in cancer aggressiveness.

Creative Writing

Betsy Jones
Dr. Phil Williams, Franklin College of Arts & Sciences, University of Georgia

This piece is a non-fiction narrative that explores the theme of home (what it is and how it is constructed) and how a sense of place and a relationship with the natural world directly affect the creation of home.

Edward Abbey begins *Desert Solitaire* with a simple observation: “Every man, every woman, carries in heart and mind the image of the ideal place, the right place, the one, true home, known or unknown, actual or visionary.” Locating that true home can be a life struggle.

Writing about “home” is tricky. Home is the topic of many a bumper sticker and crocheted pillow. It’s where the heart is, there’s no place like it, and it’s where they have to take you in. Home depends on many factors: rooms, memories, people, tastes and smells. But, it also involves an understanding of the natural world outside of the kitchens and Christmas decorations. This understanding and

relationship, what Emerson calls "an original relation to the universe," is key in connecting with the past and the future, key to crafting a home.

The Role of Sympathetic Nerves in Leptin-induced Loss of Body Fat

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Leptin is an adipocyte-derived hormone involved in energy metabolism and body weight regulation. Leptin reduces body fat when administered to experimental animals, but it is unclear why obese individuals remain fat while possessing high circulating levels of leptin. Understanding leptin's functions and mechanisms could provide insight about possible leptin malfunction in these individuals. One possible mechanism by which leptin could reduce body fat is by activating the sympathetic nervous system (SNS) to increase lipid mobilization from adipocytes. Here the effect of continuous infusion of leptin on peripheral sympathetic nerve activity, as measured by norepinephrine turnover (NETO), was investigated in both white adipose tissue (WAT), the major fat storage site, and brown adipose tissue (BAT), the major site for thermogenesis in rodents. It was hypothesized that leptin would increase NETO in these tissues. Fifty-five male Sprague-Dawley rats were divided into three treatment groups: leptin-infused, control, and pair-fed. Pair-fed rats were used to control for the inhibitory effect of leptin on food intake and were restricted to food intake of leptin-infused rats. Rats were infused for four days with 40µg per day of leptin or phosphate buffered saline from intraperitoneal miniosmotic pumps. Leptin affected sympathetic activity in a depot-specific manner. NETO in inguinal WAT was significantly increased in leptin-infused and pair-fed rats compared with controls. NETO in intrascapular BAT was significantly increased in leptin-infused rats compared with controls and was even further increased in pair-fed rats. Leptin did not increase NETO in retroperitoneal, epididymal, or mesenteric pads. There was no relationship between increased NETO and reduction in size of fat pads, suggesting that the SNS does not account for the specific reduction of body fat in leptin treated animals.

Tangerine Blush: Engineering Soybean to Produce β-carotene in Seed Cotyledons

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Consumers associate quality of food with color and flavor. Without certain carotenoids egg yolks, butter, and even shrimp would be white instead of their expected color. Soybean meal is a chief source of animal feed in the US but is devoid of carotenoids. If soybean feed already contained carotenoids, farming industries would have a more economical choice for animal feed. The goal of the project was to genetically engineer soybean to produce carotene, the precursor for other agriculturally important carotenoids. Soybean embryos were transformed using microprojectile bombardment with a plasmid containing the phytoene synthase (crtB) from Erwinia uredovora gene for phytoene, placed behind a cotyledon specific promoter and with hygromycin resistance as the selectable marker. Endogenous soybean enzymes then change the phytoene into β-Carotene. Three engineered lines were obtained. One line of the three turned orange, denoting the successful expression of carotene in the seed tissues. Engineering with additional genes for carotenoid synthesis should allow for production of other carotenoids, such as canthaxanthin.

Development of a Diagnostic Test for *Mycobacterium avium*

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(Simon Kahsay, Russell Karls, and Craig Greene)

Mycobacterium avium is a bacterium that resists common antibacterials due to the presence of very long fatty acids (mycolates) in its cell wall that constitute an extremely hydrophobic barrier. *M. avium* is virtually ubiquitous in soil and water and can cause tuberculosis-type diseases

in immune-compromised humans, birds, and genetically-predisposed pet animals, such as miniature schnauzer and Bassett hound dogs and Abyssinian cats. Effective treatment of infected pets requires the prompt institution of anti-mycobacterial therapy; however, no clinical test is available to veterinarians for the rapid diagnosis of *M. avium*. The work presented in this report describes progress toward the production of a polymerase chain reaction (PCR) assay for the rapid detection of this bacterium in clinical samples. Oligonucleotide primers designed to recognize a discriminatory region of the *M. avium* 16S rRNA operon produced the expected PCR product with purified *M. avium* DNA. Annealing temperature, extension time, and number of cycles were optimized to enhance the efficiency of the PCR reaction and the product yield. The PCR assay was used with crude DNA templates obtained from *M. avium* bacilli following various cell lysis approaches (boiling, mechanical disruption, and use of detergents). Mechanical lysis was found to be essential for detection of the PCR product. Current research is investigating modifications to cell lysis procedures to detect these bacteria in the presence of host cells and tissues. The results of these experiments are anticipated to aid production of an assay that will enable clinicians to rapidly screen for the presence of this bacterium.

"Fracturing Fairy Tales": Lu Xun's Old Tales Retold Reveal Power in Ancient Chinese Mythology

Laura B. Kearns
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A society's mythology often represents its belief system and cultural practices. The study of mythology as it changes over time thus allows one to perceive and understand stages in history. Lu Xun's Old Tales Retold, written from 1922 to 1935 following China's 1919 May Fourth Movement, exaggerates mythology's historical value to comment on a pivotal piece of Chinese history. The text's eight short stories find their basis in classical Chinese myths that had once been the core of China's culture. These ancient myths had helped shape the ancient feudal and Confucian society that subsisted until its collapse in 1911 with the birth of the Republic of China. As an outsider seeking an insider's knowledge of Chinese culture, I read not only English translations on the May Fourth Movement and Lu Xun's life, but I also translated and compared the Chinese texts of Lu Xun's Old Tales Retold and the vernacular and ancient Chinese myths that were the basis of Lu Xun's book. When the ancient government and society were drastically shifting, Lu Xun transformed ancient, essential myths into modern stories to convey his opinion on the permanency and significance of the changing circumstances. Native Chinese scholars have done studies on Lu Xun's Old Tales Retold, but a foreigner's comparative study of Lu Xun's text and ancient Chinese myths allows a fresh perspective. By explaining how Old Tales Retold reveals both the significance of a certain historical period and the perception of an individual's (Lu Xun's) beliefs, this analysis will permit me to demonstrate the true insight mythology has of mankind.

The Effects of Social Experience on Aggressive Behavior in Drosophila

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Aggressive behavior is observed in all animals, including humans. Prior data showed that aggression is influenced by genes as well as environment. To determine what affects aggression in fruit flies, and ultimately humans, both *Drosophila melanogaster* and *D. pseudoobscura* were observed. The amount of aggression exhibited by flies with varying amounts of social interaction and by flies of different ages was compared. It is predicted that socially-isolated flies will exhibit more aggression than socialized flies, while older flies should display more aggression than their younger counterparts. In order to test these predictions, a plastic arena and a video camera were used to observe pairs of similar flies in three combinations. These included: isolated (I) vs. isolated (I), socialized (S) vs. socialized (S),

and isolated (I) vs. socialized (S). Isolated flies represented those raised with no social interaction since before birth, while the socialized flies were those raised in groups since birth. During observations seven behaviors were tallied: chasing, wing vibration, wing threat, fencing, boxing, holding, and lunging. Social isolation seems to play a part in the amount of aggression exhibited by the flies. This is supported by the fact that, in regard to a few of the aggressive behaviors, the isolated flies demonstrated significantly more aggression than the socialized flies for both *D. melanogaster* and *D. pseudoobscura*. We did not see the effect of age on Drosophila aggressive behavior, but further research with substantially different age groups may provide further insight into this topic. By determining what influences aggression in Drosophila, including a lack of social experience and age, we obtain a better understanding of the factors that may affect aggression in humans.

Healing Arts: The Use of Drama Therapy in Treating People Suffering from Trauma

Carey J. Kirk – CURO SUMMER FELLOW
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This study investigates the use of a relatively new field in the treatment of trauma survivors: drama therapy. Bosnian teachers suffering from trauma were interviewed on their experiences participating in a five-year drama therapy program provided by the ArtReach Foundation. Questions included describing themselves before the program began, how they felt while taking part in the drama therapy sessions, and how they believe the program affected them personally and as a teacher. The effectiveness of drama therapy as a treatment for trauma is assessed through the improvement of these teachers as measured by their self-reported changes. Possible reasons for the teachers' improvements were inferred by comparing the teachers' self-reported experiences to themes that emerged in my participant observations of drama therapy sessions in Atlanta, Bosnia, and New York, and in literature on drama therapy and trauma. These reasons include: the use of metaphors and props to provide distance, a heavier reliance on movement and visual stimuli that is shown to better access the implicit memories formed during a traumatic event, the incorporation of 'surplus reality', and techniques such as role-reversal and scene directing that provide the trauma survivor with insight and a safe and guided environment in which to enact their repetition compulsions. Based on these results, further research could more quantitatively measure symptom improvement by using the Trauma Symptom Checklist or Harvard Trauma Questionnaire and compare the effectiveness of drama therapy to talk-based therapies in the treatment of trauma.

Systems Biology of the Quinic Acid Cluster in *Neurospora crassa*

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Neurospora crassa is a widely used model system for biological research. This bread mold contains the quinic acid gene cluster, which encodes the organism's pathway for utilizing quinic acid as a carbon source. When *N. crassa* is grown on sucrose medium, the quinic acid gene cluster is inactive. When the organism is shifted to a medium that has quinic acid instead of sucrose, the quinic acid cluster genes are activated. To see the gradual changes in expression of these genes, samples were taken at multiple time points after the shift to quinic acid. The RNA samples from these time points were analyzed with micro array chips, which gave the precise measurements of the RNA levels of each of the 11,000 genes in the genome. These RNA measurements at the multiple time points were compared to predictions of a genetic network model. A genetic network has three collections of reactions with genes and their products as species: (i) Central Dogma describing how genes make proteins; (ii) a biochemical pathway describing what the proteins do; (iii) how certain proteins regulate gene expression. This model makes predictions of the changes in the quantities of RNA under the same experimental conditions. If the data agree with the predicted values of the model, then the genetic network is

validated. We would have a validation, for example, of what proteins do and how genes are regulated. Thus, measured RNA levels of all genes allow us to validate the molecular mechanism by which *N. crassa* utilizes a carbon source.

Identification of a New IS Element from *Streptomyces coelicolor*.

Alina Kuo
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(Alina Kuo, Karen Stirrett, and Janet Westpheling)

Insertion sequences (IS) are genetic elements (in most cases, self mobilizing DNA fragments) that move from place to place in the genome. In the process, they may alter gene expression, inactivate genes, or cause gene rearrangements. These elements may also be used as tools to direct changes in gene expression or insert foreign genes of interest into chromosomes and thus allow for stable genetic manipulation.

Streptomyces are common soil bacteria that produce the vast majority of natural antibiotic products and pharmacologically active metabolites used in human and animal health care. Many of the most important strains are genetically uncharacterized and do not respond to classic genetic manipulation. Here we report the identification of a previously unknown IS element from *Streptomyces coelicolor* that is capable of genetic transfer to a variety of relatively uncharacterized antibiotic producing strains. An 836 bp DNA fragment containing an IS element isolated from the *Streptomyces* phage MRT displayed the capacity for phage mediated recombination between various *Streptomyces* spp. Subsequent conjugation experiments revealed differences in the frequency of insertion for three species of *Streptomyces*. Using phage DNA as a probe, the presence of an IS element in these strains was confirmed by Southern hybridization which showed that insertion was apparently random. A series of experiments and techniques are being used to identify the element's target sequence by locating the junction fragment between the IS element and the site of insertion in the chromosome. The broad host range of this element, the fact that it inserts randomly, and its relatively small size make it a potentially excellent tool for the genetic manipulation of important antibiotic producing strains for which there are relatively few genetic tools.

Striking A Balance: How Young Children Hammer

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Dr. Dorothy Fragaszy, Department of Psychology, University of Georgia
Dr. Kathy Simpson, Department of Kinesiology, University of Georgia

Striking an object using a tool (a hammer), has been an essential manual skill in human history. Based on a dynamical systems perspective, a person 'self-organizes' movements relative to factors shaping the movement, e.g., gravity or motor development. The study's purpose was to determine if older versus younger children would move more joints to produce increased hammering velocity and striking accuracy and exhibit more posturally stable positions during hammering. We videotaped 26 children (12, 18 and 24 mo.) while they hammered a peg. The child's body positioning and arm striking technique were coded. The youngest children typically sat in symmetrical leg positions, with their legs in full contact with the ground. Older children sat with an increased variety of leg positions. Younger children used shoulder extension or rotation to move the entire arm as a unit; older children primarily utilized elbow flexion/extension with some wrist motion. The leg positions adopted by the younger children increased postural stability to resist gravitational torques. The developmental shift from moving the arm primarily about the shoulder to the elbow and wrist joints during striking follows Schöner's and Dounskaia's predictions that a multi-joint movement skill progresses from single to multi-joint motions and from proximal to more distal joints. Biomechanically, the elbow flexion and extension strategy is more likely to require less muscular torque to produce the movement. These findings are, to date, the first to portray the progression of motor patterns

from less to more biomechanically effective striking when using a tool.

Student Willingness to Pay to Avoid Unpleasant Odors on Campus

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The city of Athens is proud to be home to the University of Georgia, with its renowned academic and athletic programs. Unfortunately, the city is also home to a number of problems linked to the University's successful growth. Among these problems are those faced by the wastewater treatment facilities which serve Athens. These treatment plants, built in the 1960s, were not designed to handle the volume of wastewater which is now generated in Athens. One of the results of these outdated and under-equipped facilities, is a foul odor which permeates the east side of the campus. Replacing the plants will cost approximately $170 million. This study will examine the students' attitudes about the odor and determine their willingness to pay for eliminating the problem. Students living in University Housing will be randomly selected to participate. The study will be administered as a contingent valuation survey through interviews and the mail. A key goal of the survey is to eliminate possible bias. This will be accomplished by asking both closed and open ended questions and by varying the payment vehicles and the numeric starting point of the valuation question. Full results from the survey have not been attained at this date. Preliminary data, however, suggest that underclassmen, students who do not work to support themselves, and students who live closest to the treatment plant will be willing to pay the most money to eliminate the smell. Resultant data provide significant information concerning the value students place on public goods.

Pulmonary Responses to Ozone in Obese Mice

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Recent epidemiological data suggest that obesity can be a causative factor for asthma. The mechanistic basis of this relationship is yet to be fully discovered. Data from this lab indicate that obese mice as a result of a genetic deficiency in either leptin (*ob/ob* mice) or the long form of the leptin receptor (*db/db* mice) have increased responses to ozone, an asthma trigger, compared to lean wild-type mice. To determine the reason for these differences, we measured pulmonary expression of TNFα and IL-1β since both have been proposed to play a role in the induction of neutrophil chemotactic factors following ozone exposure. We also measured the short form of the leptin receptor, Ob-Rα, in *db/db* versus wild-type mice to determine whether leptin can signal through Ob-Rα in *db/db* mice. The experimental procedure began with exposing *ob/ob*, *db/db* and wild-type mice to 2ppm ozone or room air for 3 hours and harvesting the lungs 4 or 24 hours after the cessation of ozone or room air. RNA was extracted from homogenized lung tissue and reverse transcribed for real time RT-PCR. Our results showed that there is a direct incremental increase in TNFα and IL-1β pulmonary mRNA expression only for the *db/db* mice after ozone exposure. The real time PCR for the Ob-Rα gene indicates that it is very strongly expressed in both wild type and *db/db* mice. Our data indicate that *db/db* mice differ from *ob/ob* likely as a result of leptin signaling through the short leptin receptor isoform, which may account for observed differences in responses to ozone in these mice.

The Evolution of Virulence in a Two Disease System

Andrew Leidner – CURO SUMMER FELLOW
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An important issue in population biology is the dynamic interaction between pathogens. Interest has focused mainly on the indirect interaction of pathogen strains, mediated by cross immunity. However, a mechanism has recently been proposed for ‘ecological interference’ between pathogens through the removal of individuals from the susceptible pool after an acute infection. In 2003, Rohani et al. explored this

possibility through modeling historical measles and whooping cough records. They showed that ecological interference is particularly strong when infections are fatal and permanently remove susceptibles. Based on these interactions between two competing diseases, Rohani et al. demonstrated disease interference has substantial dynamical consequences, making multi-annual outbreaks of different infections characteristically out of phase. This ecological interaction between diseases may have even more profound implications for the evolution of competing pathogens. To examine the evolutionary aspects of multi-pathogen communities, we have formulated a stochastic agent-based model. We show that the evolutionary consequences of interference for pathogen virulence are substantial and counter-intuitive.

Family Involvement in Education: Is there a Magic Bullet?

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Resonating with voters and seemingly necessary, education reform has become a growing concern in the American political climate. This anxiety seems justified, as an alarming 10% of all individuals between the ages of sixteen and twenty-four have not completed high school and are not currently enrolled (Child Trends DataBank 2004). Empirically, parental involvement has been touted as an answer to America's educational woes. Still, as is evidenced by the Family Involvement Initiative of 1994, policies to improve involvement are undeniably general and lack specific emphasis on socio-ethnic variations between parents. This is an interesting approach, considering the discrepant rates of dropout for different ethnicities: Hispanic individuals at 24%, Black American individuals at 12%, and White American individuals under 7% (Child Trends DataBank 2004). This policy analysis, through an exhaustive academic literature review, argues that the overall effect of parental involvement on academic achievement is moderated by ethnicity. More specifically, different parenting styles and forms of involvement are noted to be more or less efficacious for varying races. Upon a comprehensive synthesis of the literature, I conclude with an examination of the flaws in current American policy and recommendation for necessary changes. A holistic approach that recognizes the importance of ethnic diversity and its relation to parenting styles and involvement, as well as the value of long-lasting outreach programs, is found to be most effective.

Identifying GPI-Anchored Proteins in Breast Cancer Cells

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According to the American Cancer Society, more than 200,000 people are diagnosed with invasive breast cancer in the United States alone. If preemptive symptoms can be identified, this number will be significantly reduced. The linkage between glycosylphosphatidylinositol (GPI), anchored proteins found on the plasma membranes of eukaryotic cells, and cancer cells is a new frontier of science. Few GPI-anchored proteins have been identified, although their synthesis is associated with the Golgi and the rest of the secretory system. Most GPIs are recognized in their free form, or when covalently linked to proteins or sugars. They serve many roles that include acting as enzymes and as receptors in cell adhesion. Another characteristic of GPIs that has been previously shown is that they bind to Clostridium septicum (a bacteria) alpha toxins, which will help us identify these proteins. We used these alpha toxins to explore GPI-anchored proteins in relation to cancerous breast cells. Mass spectrometry was used to identify the GPI-anchored proteins present. The purposes of these experiments were to collect and identify GPI-anchored proteins from membrane fractions and determine if breast carcinoma cells display significantly more GPI-anchored proteins than non-diseased breast tissue. If there appears to be a correlation between GPI-anchored proteins and their prevalence in breast cancer cells, then they can become possible indicators for the cancer,

which will aid in developing early detection diagnostic techniques in the future.

A Conserved Neural Signaling Pathway Regulates Hunger-induced Stress Tolerance in Drosophila

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All animals have an innate tendency to avoid stress. Moreover, their stress tolerance can be modified based on physiological needs. This study is designed to test the hypothesis that the regulatory mechanism(s) underlying stress response might be evolutionarily conserved in diverse animals, including humans. Using the fruit fly, *Drosophila melanogastor*, as a model, we previously showed that Drosophila neuropeptide F (NPF, a homolog of human neuropeptide Y, NPY) and its receptor NPFR1 promote acquisition of less accessible/palatable foods in starved larvae. Here we describe a simple assay to assess foraging activities of larvae under stressful conditions (noxious, low temperatures). In the assay, larvae (deprived or non-deprived) are introduced to pre-chilled foods, ranging in temperatures from 11°C-20°C. Their feeding activities are indicated, semi-quantitatively, by the presence of dyed food in the gut. At 11°C, wild-type fed larvae showed little feeding response, while a majority of larvae fasted for two hours displayed feeding activity. We further show that the NPF system is responsible for hunger-driven, cold-resistant foraging: overexpression of NPFR1 in fed larvae proved sufficient to significantly increase feeding activity. Conversely, down-regulation of NPFR1 expression in deprived larvae suppressed feeding response. These findings suggest that activity of the conserved NPY-like system is an essential component of the dynamic regulation of stress tolerance in response to an animal's physiological needs. A conserved Drosophila insulin-like signaling system has been shown to directly regulate the NPY-like system. We are currently investigating the role of fly insulin-like signaling in stress response.

Risk Communication among Non-Clinical Healthcare Employees: The Key to Preserving Infrastructure in a Medical Emergency

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During a threatening medical outbreak, non-clinical hospital employees play an essential role in maintaining a functional healthcare environment. An intact infrastructure allows healthcare professionals to provide immediate quality care. However, without proper knowledge of an infection's risks, many employees fail to arrive at their workplace out of fear for their personal safety. The events at the Morgan Processing and Distribution Center, where traces of anthrax caused absenteeism rates to reach thirty percent, evidence the consequences of such a scenario. To prevent situations of this nature, it is imperative the Department of Health and Human Services, in conjunction with the Centers for Disease Control and Prevention, develop a curriculum for risk communication. In this circumstance, risk communication means providing employees with an empowering knowledge of disease that creates a sense of personal safety and security which, based on literature reviews and interviews with hospital employees, will serve as an effective means of reducing absenteeism rates. Then, hospital leaders should be responsible for communicating risk and protection methods to staff members. This proposal recommends the first curricula on risk communication focus on anthrax, a biological agent, and avian flu, an emerging infectious disease. These curricula should communicate general risks of both infectious diseases and bioterrorism. Further, they should aim to dispel common public misperceptions of the two genres of threat. Additionally, there must be official records of all employees who have received available vaccinations, in the unlikely spread to hospital workers. Risk communication among non-clinical workers is crucial in cultivating a sense of security, thus ensuring

fully capable healthcare systems in the face of a medical emergency.

Permethylation of 2-Aminopyridine Labeled Oligosaccharides: Facilitating the Analysis of Complex Glycan Mixtures

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(Lindsay Looft, Gerardo Alvarez-Manilla, and Michael Pierce)

Oligosaccharide moieties from glycoproteins are responsible for many physiological functions including cell-cell and cell-matrix interactions. The structural analysis of these oligosaccharides facilitates the understanding of their role in oncogenesis and development. Through labeling with fluorescent tags, such as 2-aminopyridine (2-AP), oligosaccharides can be easily detected and quantified when separated by high performance liquid chromatography (HPLC). Despite this sensitivity, it is difficult to assign oligosaccharide identity using this methodology without suitable standards. Another means of analyzing oligosaccharides is through permethylation, which homogenizes charge density and creates a non-polar compound that can be easily analyzed by matrix assisted laser desorption ionization-time of flight (MALDI-TOF) mass spectrometry. Though this particular method enables glycan identification with excellent resolution, it can be difficult to analyze glycans in complex mixtures due to the presence of many peaks. Additionally, permethylation is not suitable for glycan quantification and modifies the chemical nature of oligosaccharides, thus rendering them useless for other physiological studies. For these reasons, it is desirable to fractionate and quantify oligosaccharides prior to permethylation; however, the current standard procedure for permethylation results in incomplete derivatization when applied to 2-AP labeled oligosaccharides. In this study, oligosaccharides prepared from glycoproteins, such as human orosomucoid, bovine thyroglobulin, and fibrinogen, were purified after proteolysis and Peptide N-glycoamidase F (PNGase F) release and a portion of them was labeled with 2-AP. A method of permethylation is being developed for an accurate and reliable structural analysis of these oligosaccharides using MALDI-TOF. Ultimately, the successful permethylation of 2-AP labeled glycans will facilitate the analysis of complex biological samples such as tissues, serum, or cell lines.

Migration of the Avant-garde in Early Modernist Visual Art: The Question of Sequence in Innovative Form and Ideology

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My research explores the intellectual and artistic migration from Europe to the United States—from Paris to New York City—that occurred during the first few decades of the twentieth century. I examine the adoption and adaptation of Europe's Early Modernism by the American cultural elite. In particular, I discuss New York's Greenwich Village—Alfred Stieglitz and the 291 Gallery, the Arensberg Circle, the Armory Show, the cohabitation of European and American members of the avant-garde—and the place it held in further Modernist innovation, both in America and abroad. I treat my study of the intellectual migration of Early Modernism as a case in which I examine how such phenomenal innovation proliferates among individuals and whole cultures. Specifically, I am interested in the relationship between avant-garde technique and avant-garde idea. Analyzing the relationship between form and ideology, scholars often conclude that technique necessarily succeeds idea in the arts. In "Early Modernism: Literature, Music, and Painting in Europe, 1900-1916," for example, Christopher Butler favors the notion that new techniques develop to accommodate and express new ideology. Not convinced that this chronology accurately describes the relationship between Modernist form and ideology, I critically examine the historiography of this pivotal moment in Early Modernism—the movement of the avant-garde from Europe to America—in order to test analyses like that of Butler. Even if ideological innovation conventionally precedes technical innovation, the phenomenon of Modernism may have

manipulated this sequence. Perhaps innovation in form played a more influential role in the development of Modernism than many scholars acknowledge. Citing the unique occasion of the artistic and intellectual migration in the early twentieth century, I argue that Modernist form and idea developed simultaneously, and that often avant-garde technique even inspired innovative ideology.

Effect of Introduced Predator, the American Mink (*Mustela vison*) on Ground Nesting Songbirds in the Cape Horn Archipeligo, Chile

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Invasive species are one of the greatest threats to global biodiversity. The American mink, *Mustela vison*, was introduced to Tierra del Fuego Island (southern Chile) to begin a fur trade in the 1940s. The fur industry was not successful, and now the predatory mink has invaded a large part of the Fuegian/Cape Horn Archipelago. The mink has only been present on Navarino Island, where our study was conducted, for approximately three years. We expected mink to have a significant negative impact on ground-nesting songbird nests via egg predation because mink are known to be predators of such nests, and they lack an evolutionary history with birds in this area. To test this hypothesis, we used artificial nests and eggs and the Mayfield method to quantify nest predation in four different habitats: anthropogenically impacted shrublands, beaver meadows, secondary forest, and primary forest. Predators were identified by the teeth marks in the plasticine eggs. The mink was found to be the most frequent nest predator, with birds being the other major source of attack on artificial eggs. Mink depredation events were more frequent in disturbed habitats, i.e. shrublands and beaver meadows than in less disturbed habitats. While artificial nests may overestimate the importance of small avian predators, this study showed that mink can be a major threat to ground nesting songbirds in the Cape Horn area. Further, the greater effect of mink in more disturbed habitats suggests that conservation and management efforts may need to be prioritized in those areas.

Female Choice in Sexual Selection in *Drosophila pseudoobscura*

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In some Drosophila species, single females are surrounded by multiple males in nature. Classically, females are choosy and perhaps select high fitness males. Therefore, genes of high fitness should be passed to future generations. Using isofemale lines from *D. pseudoobscura*, we tested the hypothesis that Drosophila females mate randomly among males, expecting to find that females chose males of higher fitness more often than males of lower fitness. For each observation period, fourteen sexually mature males were individually marked with fine dots of paint and released into a glass cage where they were allowed to mate with single females that were later introduced to the cage. Cuticular hydrocarbon levels and mating speeds were subsequently measured for the males that did not mate or mated multiple times. Current data show that approximately 20% of males were not accepted by females, about 30% mated 1-2 times, and about 10% mated more than 10 times during the 5-day period. Similar trends were observed for *D. melanogaster* and *D. hydei*. Also, differences were found in the levels of male-dominant cuticular hydrocarbons between males that mated multiple times and ones that did not mate. Multiply-mated males produced significantly more male pheromones and mated more quickly with females. Due to the variation in mating frequency among males, these results suggest that *D. pseudoobscura* females mate non-randomly. The results also suggest cuticular hydrocarbon levels and mating speeds can serve as indicators of individual vigor and physical status in males.

The Employment of Fiscal Policy as the Primary Means of Controlling Inflation and Promoting Short-Term Stabilization, with

Focus on the 1980s and 1990s in the United States

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The purpose of this research was to analyze the various effects of fiscal and monetary policies on inflation and real GDP from 1980 through 2000. At present, most officials in Congress, the Executive Branch, and the Federal Reserve propound that the central bank is better suited to promoting stabilization in the short-term, defined here as less than one year. Using data compiled from the St. Louis Federal Reserve's archive of economic information and the IRS website, average tax rates, average Federal Funds rates, levels of changes in federal funds rates and tax rates, inflation rates, and GDP were calculated for the years 1980 through 2000. Data were compared against one another to identify trends as to which policy method produced greater effect in the short term. It was predicted that fiscal policies, usually involving a longer inside time lag than monetary policy, reflected a much shorter outside time lag, implying that fiscal policies are more effective in the short run. As expected, the data illustrated that increases in the money supply or decreases in interest rates did not see an associated increase in GDP until an average of one year later. By contrast, fiscal policies produced an associated increase or decrease in GDP within an average of two to three months after being signed into law. Congress should thus make greater use of its ability to foster economic growth. The concluding recommendation would then be for increased coordination between Congress and the Federal Reserve to promote stable short-term GDP growth.

Evolution of US Trade Policy: A Reconsideration of US Anti-Dumping Laws

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The purpose of this research was to analyze the malignant effects of anti-dumping margins on American trade with China. Congress has continued to maintain its stance toward China as a non-market economy. This leaves China open to punitive damages when goods produced in China sell at a price in the United States varying either from the price of the good sold in China or at a price lower than marginal cost of production. In recent years, Congress has displayed a proclivity to enact stringent anti-dumping margins on Chinese imports. More detrimental than general tariffs, anti-dumping margins compel foreign producers to collude with domestic manufacturers, damaging consumers and downstream manufacturers by forcing them to negotiate with collusive producers. When the price of imported unfinished production factors rises, export sector manufacturers must lower expenses to remain in business, usually accomplished by reducing employment levels. Thus, antidumping margins protect a small segment of the population at the expense of a larger segment. After reviewing Congressional Budget Office and Commerce Department data, we compared estimated losses, including legal fees and rent seeking, to estimated benefits computed by the Commerce Department, thus ascertaining that anti-dumping margins impose a net loss on society. Fortunately, there are numerous policy options to increase American competitiveness without anti-dumping margins. Government subsidization of tertiary education will allow more American students to pursue higher studies and contribute more effectively to global commerce. Additionally, reducing the Federal budget deficit will reduce the trade deficit by helping US goods sell less expensively overseas.

Adapting Yeast for the Study of Pitrilysin and other M16A Enzymes

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Pitrilysin is a zinc-dependent metalloprotease found in *Escherichia coli*. Although it was first discovered more than a decade ago, there is still little known about its function in *E. coli*; not

even the natural substrate of pitrilysin is known. Pitrilysin shares significant homology with several other proteases, including Ste23p and Axl1p, involved in the production of the a-factor mating pheromone in the yeast *Saccharomyces cerevisiae*, and human insulin-degrading enzyme (IDE), which has been implicated as a potential factor both in Type 2 diabetes, and in the formation of beta amyloid plaques found in Alzheimer's Disease. All four proteases, when inserted into yeast, can cleave a-factor in vivo. All four proteases share several highly conserved sequence motifs, but only one, the HXXEH motif common to this family of metalloproteases, is known to be important for protease function. Site-directed mutations were introduced into the HXXEH motif and several other conserved motifs of pitrilyisn through PCR-mediated recombinational cloning. After verifying the presence of the desired mutation through DNA sequencing, the activity of the mutated proteases were determined through an in vivo yeast mating assay. Several of the mutations showed a complete loss of measurable activity, suggesting that those residues are necessary for function. This is the first time there has been any demonstration of sequences outside the metalloprotease motif being necessary for protease function. The success of this assay also demonstrates the effectiveness of the yeast mating pheromone pathway for functional studies of these enzymes.

Effects of a Boring Lichen on Shell Strength of the Marsh Periwinkle Snail *Littoraria irrorata*

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The marsh periwinkle snail *Littoraria irrorata* is an herbivorous gastropod commonly found in tidal salt marshes of the eastern United States. It has been observed that the shells of many *L. irrorata* individuals are colonized by the lichen *Pyrenocollema halodytes* which bores into and erodes the snail shells. This study is an investigation of how the degree of colonization of the lichen affects the snail shell strength. The hypothesis is that increased colonization by the lichen leads to decreased shell strength, and decreased shell strength could make the snails more susceptible to predation by blue crabs and diamondback terrapins. The experimental snails will be collected from salt marshes near the University of Georgia Marine Institute on Sapelo Island, Georgia. Snails of different sizes and differing degrees of lichen colonization will be tested. Forces needed to cause cracking of the shell will be applied and measured using an Instron 2401 materials testing machine. The biomass of lichen on each shell will be measured by weight from the cracked and then decalcified shell. Changes in the snail density could have ecosystem-wide implications. Silliman and Bertness (2002, PNAS 99:10500) have described salt marsh trophic dynamics as a cascade of predation by blue crabs on snails which graze on the salt marsh cordgrass, *Spartina alterniflora*.

Development of Real-time PCR to Measure mRNA Expression of Stress Peptides in Specific Brain Nuclei of Rats

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Stress induces release of the neuropeptides corticotrophin releasing factor (CRF) and urocortin (UCN), which, generate a variety of stress responses including activation of the hypothalamic-adrenal pituitary (HPA) axis and release of the stress hormone corticosterone. Previous findings reveal that feeding high fat (HF) diets increased weight loss and corticosterone release in stressed rats. The next step is determining whether the increased response to stress is associated with increased release of CRF and UCN in areas of the brain that influence food intake and the HPA axis. Real-time PCR is faster and more quantitative than in-situ hybridization. Therefore, methodology has been developed to measure mRNA expression of CRF and UCN in specific brain nuclei. A rat brain atlas was used to identify the coordinates of the paraventricular nucleus (PVN) of the hypothalamus, which expresses CRF mRNA, and of the Edhinger

Westphal nucleus, which expresses UCN mRNA. A cryostat was used to make 500 um slices at appropriate coordinates in the brain, and then small tissue punches were made from these nuclei. Total RNA was extracted from the tissue and used to measure mRNA expression by Real-time PCR, using 18S rRNA expression as an internal standard. Total RNA extraction from very small amounts of tissue was optimized, and we determined that 35-50 ug of tissue collected from bilateral 0.75 um diameter PVN punches was adequate for measurement of CRF mRNA. This technique will be used to measure the effects of HF diet and of stress on neuropeptide expression in specific brain nuclei.

Carolina

Ezinne A. Okwandu – CURO SCHOLAR, CURO APPRENTICE
Dr. Pamela B. Kleiber, Center for Undergraduate Research Opportunities, University of Georgia

This dance is choreographed to a song called "Carolina," in which the singer praises a beautiful girl named Carolina. The dance reflects my belief that each girl is an embodiment of the beautiful Carolina. The style of the dance and the dancers' dress is contemporary/traditional West African.

Forwarding the Agenda of the Right: The Intercollegiate Studies Institute's (ISI) Influence on Campus Student Newspapers

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The Intercollegiate Studies Institute (ISI), founded in 1953 by Frank Chodorov, aims to further the ideals of the conservative movement. Under the presidency of E. Victor Milione in the 1970s, the ISI began paying special attention to eliminating the liberal bias in higher education. The ISI's Collegiate Network now sponsors 95 college newspapers around the country to mentor young members as part of a larger conservative agenda (deMarrais 2005, Saloma 1984). The purpose of this study is to examine how ISI's College Network influences young adults through their involvement in campus-based student newspapers. This paper uses a case study approach to examine the CN's national Campus Magazine Online in comparison to three other ISI/CN-sponsored newspapers at Dartmouth, UCLA, and the University of Georgia. Research questions include: 1. How does the CN's Campus Magazine Online influence the content of the three university publications? 2. What structure does ISI use to attract and inform student members? An analysis of the Campus Magazine Online in comparison to the three other ISI-sponsored newspapers demonstrates there are large sums of money given to these alternative student newspapers. Second, the ISI uses specific, well-developed strategies to inculcate students into the rightist ideology through the use of networking, lectures, internships, conferences, and fellowships. Third, the ISI introduces young members to influential, high-powered conservatives, many of whom came through the ISI system themselves, to give the students something to aspire to. Through these student publications, future leaders in the conservative cause learn how to forward the agenda of the right.

Construction & Expression of Fusion Protein yHCG1 & LHR ECD & ECLs for Expression in Insect Cells

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The luteinizing hormone receptor (LHR) is a vital component to the overall scheme of reproduction and differentiation in many male and female vertebrates. The LHR belongs to an even larger category called Glycoprotein Coupled Receptors, which is composed of an extracellular domain (ECD), seven transmembrane section, three extracellular loops (ECLs), and three intracellular loops. Previous research suggests that the ECD of the LHR is sufficient for high-affinity binding of the hormone and that the ECLs of the receptor are not required for this high-affinity interaction. However, experiments also suggest that the

ECLs may contribute to signal-transduction events and may directly contact the hormone. Therefore, the construction and subsequent use of a single-chain ECD-ECL fusion protein (which contains both the alpha and beta subunits of hCG, the LHR ECD, and its three ECLs) in binding studies may measure any contact between the ECLs and hCG. This fusion-protein construct was designed to include the appropriate ECL DNA segments. These segments were amplified by the use of the Polymerase Chain Reaction (PCR) and will be subsequently ligated together to form the complete fusion-protein construct. After infection of this construct in an insect-cell system, binding studies will provide insight into the structural mechanism by which hCG binds LHR and activates a signal cascade. Understanding this important mechanism may contribute to the understanding of constrictively-activated and other malfunctioning Lars that lead to either infertility or precocious puberty.

The Genomic Instability of Human Embryonic Stem Cells

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Human Embryonic Stem Cells (hESCs) are undifferentiated, pluripotent cells obtained from the blastocyst stage of the human embryo. Before these cells can be used for different medical applications, it is crucial to address the fundamental question of how hESCs maintain their self-renewal properties without increasing genomic instability. It is known that the proliferation of most cell populations results in alteration of telomere (ends of chromosomes that are involved in the replication and stability of DNA molecules) dynamics. This is significant because alteration in telomere dynamics can induce chromosomal abnormalities that could eventually trigger cancer mechanisms. It is crucial to understand which method of culturing hESCs is least likely to induce telomere shortening. This project was designed to compare the different methods of culturing hESCs and to investigate the correlation between telomere length and the integrity of hESCs and how both are affected by different passaging conditions. Our hypothesis was that bulk-passaging techniques resulted in more telomere shortening of hESCs than manual passaging. Genomic DNA was extracted from hESCs cultured by enzymatic and manual passaging techniques and digested using the restriction enzymes Hinf1 and Rsa1. Southern blotting was done to the digested DNA using a radioactively labeled oligo A10 probe specific to telomeres. The telomeric repeats did not appear in many of the samples, primarily due to insufficient DNA loaded. However, one of the bulk-passaged samples did exhibit bands corresponding to a high molecular weight (>20kb). This result is interesting in that normal hESCs have been found to exhibit telomeric DNA of molecular weight (8-10kb), and we expected shortening of telomere length due to bulk passaging. We assume that this data could be due to inefficient restriction digestion. The procedure will be repeated with new samples generated using different passaging techniques.

Activation of Innate Immune Response by Wild-type and Attenuated Rabies Virus

Marlena L. Pichon – CURO APPRENTICE
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Rabies virus (RV) infects the Central Nervous System (CNS) beginning at the spinal cord and continuing up to the brain. Despite extensive research in the past 100 years, the pathogenic mechanism by which RV causes neurological diseases is not completely known. At the time of death, only mild inflammation and neuronal damages were seen in patients. Recently, our laboratory has shown that wild-type RV evades the innate immune responses, thus contributing to its pathogenicity. Functional genomics investigation has indicated that attenuated RV activates host innate immune responses, particularly the interferon (IFN) and chemokine pathways. On the other hand, wild-type RV does not activate these pathways. We have used real time-polymerase chain reaction (PCR) to confirm the microarray data. Mice infected with attenuated B2C or wild-type silver-haired bat

RV (SHBRV) were sacrificed and brains were removed for RNA extraction. Real time-PCR was performed on the expression of chemokines such as Rantes, IP-10, MIP-1, and MCP. Our data show that attenuated B2C consistently up-regulated the expression of these chemokine genes. SHBRV, on the other hand, showed little up-regulation of chemokine expression. These results further demonstrate that the wild-type RV evades the body's innate immune response whereas attenuated RV activates them.

Morphogenesis of the Rat Cerebellum
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The cellular composition of the cerebellum is conserved throughout all vertebrates, and the five major cell types are present in all regions of the cerebellum. The cerebellum is made up of three distinct layers including: the molecular layer, the Purkinje cell layer, and the granular layer. Four fissures initially divide the cerebellum into five cardinal lobes that further divide and become ten distinct lobules. Using histological and immunohistochemical markers we studied the regional changes that occur during foliation in the developing rat cerebellum. Cresyl Violet stains the nuclei of all cells and was used as a counter stain on the 7-10mm cerebellar sections while the Purkinje cells, granule cells, and glial cells were stained using the antibodies Calbindin, Kip1/P27, and GFAP respectively. Sections of cerebellum from various ages of rats were used in this study including embryonic day 20, postnatal day 0, postnatal day 4, and postnatal day 6. Interestingly, regional differences in the phenotypes of Purkinje cells, granule cells, and glial cells can be seen as early as embryonic day 20 while the cerebellar cortex still maintains its smooth, unfolded appearance. When comparing lobe 3 to lobe 5 at various stages in development, striking differences can be seen in Purkinje cell and granule cell organization and maturation as well as in the protein expression patterns of calbindin, Kip1/P27, and GFAP. This study provides an evolutionary perspective on what is being conserved during cerebellar foliation when comparing the rat and mouse cerebellum on the cellular and molecular level; and this study shows that each of the five cardinal lobes of the cerebellum takes on a unique identity and unique time of maturation based on characteristic protein expression patterns and cellular morphology.

NADH/Flavoprotein Imaging of the Zebrafish Lateral Line System
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The purpose of this research is to develop a noninvasive method that uses the measurement of metabolic load in order to build a three-dimensional reconstruction of the electrical activity of the neurons in zebrafish and neuron-like cells. The method uses a two-photon fluorescence microscope and sensory stimulation to measure the ratio of certain mitochondrial coenzymes across cell membranes. This ratio reveals the metabolic load being placed on the cell during sensory stimulation. The coenzymes NADH and flavoproteins show distinct behavioral patterns of fluorescence during the aerobic respiration that occurs during sensory stimulation. The auto fluorescence of the coenzymes allows the microscope to detect the membrane potential which develops as NADH and flavoproteins enter and leave the cell. With the correlation of a time course, these fluctuations give the ability to quantify a relationship between changes in the metabolic load and in the fluorescence indicators as a measurement of neuronal activation. In these analyses, the input and output of the neurons can be separately identified and can be used to establish a quantitative model of cellular interactions in the sensory neurons.

The Interaction of Geography and Identity in Ruth Klüger's *Still Alive*
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Holocaust memoirs encompass a significant portion of WWII literature and are essential to

our understanding of the details and emotional impact of this genocide upon the persecuted, as well as upon German and Western society as a whole. In studying Ruth Klüger's Holocaust memoir *Still Alive,* I am interested in discovering the influence of geography on the formation of Klüger's sense of identity. *Still Alive* was received with great acclaim when it was originally published in German in 1992, winning, among other accolades, the prestigious Prix Memoire de la Shoah. Audiences were fascinated by its stark, understated portrayal of the Holocaust. Klüger's work is unique in the canon, not only because she is one of few female, widely-known Holocaust authors and was a child during her imprisonment, but also because she writes in what could be considered a revisionist, "post-Holocaust" milieu. Her work therefore provides an unusual perspective on the influence of geography on identity for survivors. I am specifically interested in addressing how Klüger's work relates to the greater body of memoir literature and how within her work the issues of her identity in relation to geography and space, are examined. My initial impressions suggest that Klüger uses places, rather than time periods, as the building blocks of her recollection. Klüger also allows the physical geographic aspects of a place to influence her general intuitions and recollections of that locale. Thus, this study will also allow me to observe whether the interaction of geography and identity is a common thread in Holocaust memoir or if such a relationship is unique to Klüger, due to the circumstances of her childhood, her camp experience, and the social and political context of her writing.

Reforming the Kingdom: Educational, Economic, and Political Change in Saudi Arabia

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The U.S.-Saudi relationship has traditionally been dominated by narrow energy interests; in return for Riyadh's continual stabilization of world oil prices, Washington provided advanced weaponry and overlooked the country's turbulent internal affairs. The presence of 15 Saudi citizens amongst the September 11th hijackers and the threat posed by the growing militant Islamist movement demand a harsh reevaluation of the U.S.-Saudi relationship. Alarming trends within Saudi Arabia, including the monarchy's growing political instability, the economy's unstable dependence on oil, a glaring lack of political representation, and an education system that radicalizes Saudi youth, threaten to further destabilize the country and undermine U.S. efforts to combat the worldwide terrorist movement. The situation calls for nothing less than a widespread reform of Saudi society. However, change will not come easily to the Kingdom; power is concentrated in the hands of entrenched interests that profit from the explosive status quo. The prospect of empty promises and token reforms will be appealing but ultimately insufficient. In our paper, we examine the dangers confronting Saudi Arabia and propose a comprehensive overhaul of U.S. policy toward Riyadh. We assert that Washington should use its considerable diplomatic and economic resources to encourage reform in three areas. The Saudi education system must be significantly retooled to prevent the continued radicalization of Saudi youth. Economically, Saudi financial transactions should be subjected to stringent and transparent regulations. Lastly, cautious political reform in the Kingdom should continue, driven by economic and social progress that prepares Saudi society for meaningful decentralization of power.

Differences in Environmental Reporting: China & the United States

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Although China is rife with environmental problems, government-censored newspapers have not always presented the whole, dirty picture. Now the burgeoning economy is making the country more progressive. Newspapers are more willing to report on the environment—and

sometimes on the government corruption and other problems that may hamper environmental cleanup efforts.

This project charts the environmental coverage of two Chinese newspapers, the progressive *JieFang Daily* and the more conservative *NanFang Daily*, compared with the *New York Times*. During a 15-week period, I analyzed the international news, national news, local news, science, education, opinion, and business sections of these three newspapers. Next, I observed the number of news items, the size of the items, frequency, attitude, and subject.

I found that Chinese newspapers relied overwhelmingly on government sources and reported from government meetings. While the *Times* spoke with government as well, its reporters also spoke with citizens affected by pollution. Its articles were longer and more frequent. Also, Chinese newspapers almost exclusively quoted and praised Chinese officials' progressive plans for environmental cleanup, without reporting conflicting opinions. However, there was slightly more balanced reporting within Guangdong's *JieFang Daily*, which is in a more commercialized zone than Shanghai's *NanFang Daily*, and thus must rely on better journalism (as defined by American standards) to hook readers.

Although these two Chinese newspapers still seemed reluctant to criticize the government in the style of the *New York Times*, this project suggests that with financial incentive from the country's burgeoning consumer class they may be more willing to do so in the future.

Detection of *Babesia microti* in Human Tissue through In Situ Hybridization

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In the northeastern United States, the emerging tick-borne disease *Babesia microti* is the causative agent of human babesiosis. Ticks of the Ixodes species serve as vectors. The white-footed mouse and meadow vole have been identified as reservoirs. Although traditionally considered a strict intra-erythrocytic parasite, much debate has arisen in recent years concerning a possible extra-erythrocytic phase during the life cycle in the host. In this study, formalin-fixed, paraffin-embedded tissues (liver, lung, and spleen) from five experimentally infected hamsters, one uninfected hamster, and spleen from a confirmed non-fatal human case of babesiosis were examined using a recently developed in situ hybridization assay. Using a digoxigenin-labelled anti-sense riboprobe to hybridize to the 16S-like small subunit of the parasitic rRNA in the tissue samples, the sites of parasite infection were located. *Babesia microti* rRNA was detected in erythrocytes within blood vessels throughout the infected hamster tissues and human spleen. In addition, cytoplasmic staining was noted within fixed macrophages in the hamster livers and spleens and in the human spleen. These results indicate the possibility of a previously unrecognized extra-erythrocytic stage of Babesia microti in the mammalian host.

Scientific Illustration

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Most often, scientific illustrators use their artwork as visual communication to teach scientific concepts. Although a unique path, I use scientific illustration to blend my passion for art with my interest in science and medicine. It not only allows me to express myself, but also to combine the precision and academics of a scientist with the passion and creativity of an artist. I have always had a strong desire to share knowledge and my art with others, and through this major I am able to accomplish both.

After graduating from Georgia with an interdisciplinary degree in scientific illustration, I plan to attend graduate school to obtain my medical illustration degree. Having an interest in a variety of medical fields, I am excited to have the opportunity to explore each of them in depth. I will be able to study with experts in a range of medical fields, while also exploring new techniques in my artwork. Even more thrilling is the possibility of my illustrations being used to teach scientific concepts to students ranging from elementary school to medical school.

Effect of Trait Anxiety on Explicit Memory for Positive and Negative Words Presented Under Divided and Restricted Attention

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The current study investigates memory biases in anxious participants to clarify how anxious participants' memory differs from that of non-anxious participants. A memory bias in high trait anxiety participants for negative words has been demonstrated, suggesting that highly anxious individuals may remember a greater number of negative words versus neutral or positive words (Aureille, 1999; Eysenck & Byrne, 1994). The current study examines the effects of divided attention during encoding on memory in non-anxious and anxious participants through a number identification task completed while studying the target stimuli. This study also utilizes a restricted attention task in the form of a lexical decision task and full attention task in order to establish a negative bias in anxious participants. All memory tests will be completed on the computer. Past research has demonstrated that divided attention during encoding hinders recognition, a measure of explicit memory. The current study will use the State Trait Anxiety Inventory (Spielberger, 1983) to measure the participants' trait anxiety levels and a remember/know/new paradigm to test their memory. The remember/know/new paradigm, a valuable memory test, examines the strength to which an item was encoded, with "remember" representing a stronger encoding experience than "know." Because a negative memory bias for negative/threatening words has been found for anxious participants, the amount of "remember" responses for negative/threatening words should be higher in anxious participants. The division and restriction of attention during encoding should prevent the negative memory bias from occurring and therefore eliminate the higher proportion of "remember" responses in anxious participants.

ATB & the Angel of History: A Case Study of the Dialectic in Trance Music

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As a subgenre of techno, trance is among the most innovative and integrative forms of music. As an area of study, it is not yet quite so rich. Often dismissed or misinterpreted by researchers or journalists who are far removed from the world of trance, the music and its culture rarely leave the clubs and record stores. Up to this point, no one has been able to successfully fuse a passion for the music with an interest in its theoretical and conceptual basis. In order to identify the musico-historical legacy of trance and where it fits in our society, my research focuses on a particular DJ/Producer (ATB, the only trance artist to have reached the #1 spot on the UK's pop charts) and uses constructs such as aura, the trance, and the "Angel of History" theorized by the German dialectical sociologist Walter Benjamin to analyze ATB's lyrics and how they interact with the music. From the lens of the Frankfurt School, launched by Benjamin and Adorno, the case study will shed light on the

general features of trance music. The goal of this multidisciplinary approach to trance is to examine what exactly trance is, where it came from, and where it is going in terms of academic inquiry.

The Effect of Land Use Strategies on the Functional Diversity of Neotropical Nematode Communities

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Managed ecosystems often differ greatly in structure and function from unmanaged ecosystems. Shade-grown coffee resembles tropical forest more than coffee monocultures due to higher plant diversity, consequently supporting greater biodiversity at other trophic levels. The increase in biodiversity is thought to lead to a reduction in pest effects. Coffee is also economically important, being the world's second most traded commodity. The ability to adjust the proportion of plant-feeding nematodes in an organic cropping system without chemical inputs is critical. These nematodes cause a reduction in root structure, leading to yield reduction and crop failure. This study seeks to test the hypothesis that shade-grown organic coffee may be grown with a lower proportion of plant-parasitic nematodes than monoculture coffee. Cropping system samples were taken from a four-year-old garden plot experiment on the Maquipucuna Foundation's Orongo Research Farm in Palmitopamba, Ecuador. Nematodes were identified into five functional groups: bacterial feeders, fungal feeders, predators, omnivores and plant feeders. Plant-feeding nematodes were proportionally more abundant in the coffee monoculture treatment (T5) than in the coffee/plantain polyculture (T1) (T5 avg: 28.5%; T1 avg: 3.3%; α=0.05). Statistical significance was not discovered among predator nematode populations, indicating that they were not directly responsible for lowering plant-parasitic nematode numbers. Soil temperatures in the edge coffee monocultures were significantly higher (2°C) than in the other polyculture cropping systems (α=0.05). Soil temperature seems to play some role in mitigating parasitic nematode infestation, perhaps in combination with other factors such as biodiversity. The results from this short-term study are promising and warrant further investigation.

Analysis of *Mycobacterium shottsii* Pathogenesis Using Zebrafish as a Model System

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(Rebecca Satterfield, Frederick Quinn, Donald Evans, and Russell Karls)

Mycobacterium shottsii, a newly-identified bacterial species, was the most prevalent mycobacteria detected in diseased striped bass (*Morone saxatilis*) from the Chesapeake Bay during an epizootic outbreak in the year 2000. By 16S rRNA sequence analysis, *M. shottsii* was found to be closely-related to *M. marinum*, the cause of skin and soft tissue lesions in fish and human fish-handlers. *M. shottsii* would not likely cause a similar disease in humans due to its inability to grow at human body temperatures. However, this pathogen, like *M. marinum*, has proved devastating to fish-associated industries. In order to identify virulence mechanisms employed by bacterium, zebrafish (*Danio rerio*) were employed as a surrogate host for infection. Our laboratory and others have demonstrated that *M. marinum* bacilli replicate within the phagosomes of fish macrophages in vivo. The studies presented here were designed to determine if *M. shottsii* can also survive and replicate within fish macrophages. An *M. shottsii* strain was engineered to express green fluorescent protein to facilitate detection by fluorescent microscopy. To study the interactions of the bacilli with zebrafish macrophages in tissue, the fish coelomic cavity was first injected with mineral oil to recruit immune cells. Seventy-two hours later, infection was established by injection of 106 to 107 *M. shottsii* into the peritoneum. Twenty-four hours later, host cells from the coelomic cavity were extracted and purified by a 45.5% percoll gradient. Macrophage phagosomes were labeled with a specific

fluorescent dye and fixed with formalin. Preliminary fluorescent microscopic examination of host cells indicated that GFP-labeled bacilli co-localized with labeled phagosomes of some host cells. Since the GFP was not degraded, it suggests that these bacilli survived within host macrophages. Therefore, approaches that target the killing of intracellular pathogens should be applied when designing vaccines or therapies against *M. shottsii*.

Sequence Polymorphisms in the Mismatch-repair (TcMSH2) and Glutathione-S-transferase (Tc52) Genes of *Trypanosoma cruzi* Isolates from United States

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Trypanosoma cruzi is a vector-borne parasite that infects a wide range of mammals and causes clinical disease in domestic animals and Chagas disease humans. Studies in South America have identified single-nucleotide polymorphisms (SNP) in two gene targets (TcMSH2 and Tc52) which support the existence of two major phylogenetic lineages (Types I and II). These lineages have been shown to differ in their ability to cause clinical disease. Based on previous studies, we hypothesize that these two lineages will be in North American wildlife. In this study, we analyzed the sequences of these two genes from seven isolates of *T. cruzi* from the United States including four raccoons, one opossum, one dog, and one vector (*Triatoma gerstackeri*) and compared them to South American isolates. DNA from each isolate was extracted, and the amplification of two genes was conducted by PCR analysis. The two genes targets, Tc52 and MSH2, were then sequenced and compared to South American isolates to identify any SNP. The MSH2 gene of the raccoon and dog differed from South American strains by three SNP and were of Type II, while the opossum and Triatoma isolates differed by two SNP and were of Type I. For the Tc52 gene, no SNP were identified in the raccoon and dog isolates, while five SNP were detected in opossum and Triatoma isolates. Although several SNP were identified, none resulted in amino acid substitutions in the proteins. These data show that the two major phylogenetic lineages of *T. cruzi* are present in North America, but that there are genetic differences between South American and North American strains. Further studies will characterize the virulence of these genetic variants of *T. cruzi* for laboratory animals.

Determining What Causes Certain Carbohydrates to be Expressed in Certain Cells

Rouhin Sen – CURO APPRENTICE
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Cell-surface carbohydrates play an extremely important role in various cell functions such as cell recognition and adhesion, protein stability, receptor ligation, and transmembrane signaling. Such functions require regulated carbohydrate expression. The mechanisms that determine what causes carbohydrates to be differentially expressed in specific tissues are mostly unknown. To determine the genetic pathways that control glycan expression, we are investigating a carbohydrate known as the HRP-epitope, which is expressed predominantly in the neural tissue of arthropods, including Drosophila. Synthesis of the HRP-epitope requires the activity of at least one synthetic enzyme known as fucosyltransferase. There are four identified fucosyltransferases in Drosophila, FucTA, FucTB, FucTC, and FucTD. By introducing each of the fucosyltransferases into mutant flies that fail to make HRP-epitope we are testing their ability to synthesize the glycan in vivo. FucTA has shown the ability to synthesize HRP-epitope in vitro and in vivo. FucTD transgenics do not rescue HRP-epitope expression in embryos, but the enzyme is expressed in the nervous systems. The effect of FucTD expression in neural and non-neural tissue will clarify its potential role in glycan synthesis and normal development.

Changes in the Synaptology of Corticostriatal and Thalamostriatal Innervation in the

MPTP-treated Monkey Model of Parkinson's Disease

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The key pathological feature of Parkinson's disease is the loss of dopaminergic neurons in a brain structure named the substantia nigra pars compacta (SNc). The loss of these neurons causes numerous morphological and physiological changes in the basal ganglia, a group of tightly interconnected brain nuclei, to culminate in the symptoms of Parkinson's disease (PD). Following dopamine depletion, altered glutamatergic transmission from the cerebral cortex (cortex) and the thalamus induces dysfunction of the striatum. However, the exact mechanisms by which projections from the thalamus contribute to these changes remain poorly understood. To address this issue further, we studied potential changes in the synaptic organization of thalamic and cortical inputs to the striatum in a nonhuman primate model of Parkinson's disease. Recently, the loss of glutamatergic axo-spinous innervation of striatal neurons has been reported in both the rat model of PD (Ingham et al., 1988) and in human PD (Stephens et al., 2005). Because of the traditional view that axon terminals from the cortex form asymmetric axo-spinous synapses, while afferents from the thalamus primarily form axo-dendritic synapses in the striatum (Smith et al., 2004), corticostriatal afferents were thought to be mainly affected in PD. However, data from this project demonstrated that about one-half of all axon terminals from the thalamus also form axo-spinous synapses in the monkey striatum. These findings, therefore, suggested that thalamostriatal afferents forming axo-spinous synapses may also be affected in PD. To explore further the effect of nigrostriatal dopamine depletion on thalamostriatal synaptology, an electron microscopic analysis of the synaptic organization of corticostriatal and thalamostriatal axon terminals in the dopamine-depleted striatum of MPTP-treated monkeys, the gold standard animal model of PD, was used. Results indicated that the density of corticostriatal, but not thalamostriatal, innervation increases in the MPTP state, providing the first neuroanatomical substrate that accounts for the increased glutamatergic transmission in the striatum of animal models of PD. These findings appear paradoxical in light of spine loss reported previously in rodents and human PD. Studies are currently underway to determine the extent of spine loss in MPTP-treated monkeys. Evidence for increased corticostriatal activity in PD paves the path for developing novel therapeutic approaches that modulate specific glutamatergic pathways in PD.

Integrating Computational and Experimental Analysis to Study Transposable Elements (TEs) in *Medicago truncatula*

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(Deep J. Shah, Paul Ruddle, and Dawn Holligan)

Transposable elements (TEs) are genetic elements that can move (transpose) from one genetic locus to another and, in doing so, frequently increase their copy number. To date, TEs have been found in all characterized eukaryotic genomes where they frequently are the most abundant component. The availability of large quantities of genomic sequences from several eukaryotic species has, in recent years, facilitated the study of TEs. Although several studies in the last decade have provided insight into the impact of TEs on genome structure and organization, many aspects of TE biology are still not well understood. In this study, we analyzed a significant fraction (~100Mb) of the available *Medicago truncatula* (Medicago) genome sequence. Medicago is a member of the Leguminosae family, which includes several agriculturally important crops such as soybean and garden pea. Within the legume family it is considered to be a model organism because of its small genome size (~500Mb), relatively fast generation time (~3 months, seed to seed), and capacity for genetic manipulation including transformation. For the analysis of the Medicago database, we devised bioinformatics strategies,

such as BLAST and RepeatMasker, to identify and characterize a wide variety of TE types and used the output of this computational analysis to develop experimental tools, specifically Transposon Display (a modification of traditional Amplified Fragment Length Polymorphism). Based on preliminary results, we find that Medicago contains all of the classes of TEs found in previous analyses of plant genomes, including transposase encoding elements, retrotransposons, Helitrons and miniature inverted-repeat transposable elements (MITEs). The information generated from this study will facilitate annotation of the Medicago genome as well as the genomes of other legumes and will furnish valuable tools, such as molecular markers, for the genetic analysis of Medicago.

An Exemplary Being: The Prostitute in the Early Plays of Bertolt Brecht

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Prostitution is an unavoidable image in the early works of the German playwright Bertolt Brecht (1898-1956). The female population of his early plays is comprised of women who, even if they are not explicitly prostitutes, are bought and sold in their romantic relationships. My research attempts to determine what purpose the ever-present prostitute serves in Brecht's early works. I analyze two of Brecht's lead female characters for this purpose, Marie of *In the Jungle of Cities* (1922) and Jenny of *The Rise and Fall of the City of Mahagonny* (1930). My analysis of these characters shows that the image of the prostitute fits into Brecht's larger commentary on the commodification of human relations, which he viewed as a given fact of capitalist society. The world of Brecht's early plays is one in which individuals, isolated in their struggle for material survival, inevitably treat each other as objects for their own selfish purposes. It is how his characters negotiate the disconnection between their ideals and the dehumanizing rationality of capitalist society that determines their situation. When Brecht's female characters hold onto an ideal of romantic love and refuse to recognize the practical nature of their relationships, as Marie does, they become powerless. It is only the prostitutes, who acknowledge their sexuality as a commodity and are willing to use it as such, that hold any control over their situation, as in the case of Jenny. By fully embracing the capitalist ethos, Brecht's prostitutes absurdly become exemplary, attaining a level of self-determination rare in his early plays.

Cloning, Expression, and Verification of *Pyrococcus furiosus* Protein, PF1476

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Transcriptional regulation is one mechanism whereby the expression of various genes in an organism can be coordinated in response to various environmental factors and the needs of an organism. In the archaeal domain of life, the mechanisms of transcriptional regulation are not fully understood. Studies in this area could have important research and industrial applications such as providing proteins and enzymes functional at higher temperatures. This investigation seeks to characterize a potential transcription factor that could regulate the expression of genes in the archaeon *Pyrococcus furiosus* in response to cold shock. The protein of interest is encoded by the gene PF1476, a member of the PadR-like family which includes the PadR protein, a bacterial transcriptional regulator. PF1476 protein (PF1476p) was previously identified from cell extract by a pull-down assay using the promoter of PF1479, a gene determined to be regulated during cold shock by microarray analysis. A plasmid containing recombinant PF1476 with an N-terminal histidine tag was transformed into *Escherichia coli*. Then, protein expression was verified using sodium dodecyl sulfate polyacrylamide gel electrophoresis and mass spectrometry. Finally, a culture was grown for large-scale protein expression, and cell extract was prepared for a Fast Protein Liquid Chromatography procedure in order to purify the expressed protein. Since PF1476p had a histidine tag, a nickel affinity column was used to purify it from the *E. coli* cell extract. Future

studies will include an electromobility shift assay, which will determine if the protein binds to the promoter DNA, and characterization of the potential transcription regulator.

Johnny Cash, Mythology, and the Possibilities of Experimental Historiography
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Microhistory uses a variant of the Scientific Method to explore how a historical problem can be solved through an attention to detail. Like scientists, microhistorians do not automatically assume that one diagnosis is better than another. A set of incoherent narratives or cultural meanings often arises after researching an event. Such narratives materialize from the careful interpretation of primary sources, wherein the microhistorian assumes a detective-like role, sifting through artifacts to better understand cause-and-effect. Each narrative or strain of cultural meaning is researched in time, until the microhistorian determines what social or cultural impetus drove a certain mode of historical understanding. Microhistorians discount the type of intellectual shortcuts and broad-stroke generalizations sometimes used by biographers or historians. Microhistorians are not indicting conventional historians or biographers, though; rather, their primary purpose is to show how conventional histories often speculate on how people fit into the larger structure of society. Johnny Cash's life serves as a good example of how history and biography often create an imbalance between a man's real life and the way history evaluates his legacy. In researching the reactions to the Folsom concert of January 1968, I have concluded that the Folsom live performance was both spontaneous and unique. By focusing on one event in Johnny Cash's life, I will show how certain historical truths are more evident when the scale of observation is smaller. The Folsom event allows microhistorians to analyze a well-chronicled event, without the mythmaking and hindsight revision often present in contemporary historical narratives.

Drawing & Painting
Samuel Stabler
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My work is an assimilation of the many things that I experience day to day, from the mundane to the extraordinary. The subject, imagery, color palette, and techniques come from things I have observed. I have had the fortune to spend time in Italy, central Europe, and Cuba. It is primarily from these travel experiences that I have found the content that drives my work. I am inspired by the deep greens of the Cuban rainforest and the pastels of Caribbean architecture. I documented the vibrant earth tones of Italy and the countless shades of gray from the cities of Eastern Europe. I sketch the lines in the architecture and the textures of the land as I move from place to place. In every location, I seek out the local artists. My subject matter is sparked by the many people I meet. Most importantly, I notice subtle cultural differences and how that might define me and my own beliefs.

Grandma Wobbly's Olde Fashioned Fudge Shoppe

Angela Still
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I have always had a fascination with magic, with other worlds, liminal spaces. I used to dream of slipping off sideways into a parallel universe, tumbling out of my bed and landing in Nod, of doing an Alice down the rabbit-hole. Most people will tell you that their favorite childhood memories revolve around a special birthday, or a favorite pet, or a well-tramped vacation spot. My favorite childhood memories tend to lean more toward exploring that strange, secret garden just off Misselthwaite Manor, or walking headlong into an old wardrobe hidden in a dusty attic space, or crying over the death of a wise old spider.

Almost all of the books I dearly love are, in their own way, magical. Whether about a lonely, pining millionaire on an exclusive island or a hobbit that must save the world, all of the stories that I carry with me take me away from my own world, be it for good or ill. Books are my parallel universe, my rabbit-hole. Somewhere along the way, I decided that I wanted to be the one who told the stories, the one who brought other people along on wonderful adventures into the unknown. I wanted to be the magician. So I turned to the greatest liminal space of all—my imagination—and I started to write.

I am reading a fairy tale called "Grandma Wobbly's Olde Fashioned Fudge Shoppe" about an interesting young lady named Serpetina. She is one in a long line of fudge makers, serving up chocolaty goodness in a tourist town. Each day, she creates a special batch, just for the visitors, though I'm not sure they'll be coming back for more.

Three Republican Archetypes Square Off in North Georgia

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The centuries-long political isolation of north Georgia is gradually coming to an end. Historically, North Georgians have elected Southern Democrat candidates. As the Georgia Democratic Party moves away from its roots, North Georgians increasingly support the more conservative Georgia GOP, and some of the state's most politically active individuals and organizations are based out of the area. The "Flaggers" are one such case; the group became nationally known in 2001 and usually supports Republican candidates. Nonetheless, Republicans' fate in North Georgia remains undecided, since the influential wealth of suburban Atlanta counties backs priorities radically different from those of North Georgians. An explanation of how North Georgians view certain Republican candidates reveals what's required for political success in the region from both individual candidates and the GOP. The subject of this study is the Republican primary race for the 50th state Senate seat, in which a staunch conservative activist, comparatively liberal lawyer, and gentleman educator battled out two races. This paper explores the reasons for activist Nancy Schaefer's victory in both elections, using sources that best capture North Georgia's political climate, including interviews with candidates, their managers, and influential local figures; state records, especially those regarding finance and election results; and local news outlets' reports on the issues. In conclusion, this study finds that Nancy Schaefer was able to mobilize Republicans' base, Christian conservatives, by casting her opponents as too liberal for North Georgia on the hot issues of the campaign. Future key issues in North Georgia politics are also discussed.

The Case for Increased Federal Funding of Embryonic Stem Cell Research

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The debate over providing federal funding for embryonic stem (ES) cell research is shaped by two conflicting ideals: alleviating the suffering of those afflicted with a number of diseases versus safeguarding the value of nascent human

life. ES cells are undifferentiated cells that have the potential to give rise to all specialized cells in the body (i.e. neural cells) and are capable of self-renewal for a prolonged period of time (years). The controversy surrounding these cells arises because they are derived from a group of cells called the inner cell mass in four to five day old human embryos, usually excess or discarded embryos from IVF (in-vitro fertilization) procedures. This paper addresses the moral questions surrounding the controversy as well as the likely benefits of increased federal funding for ES cell research. Specifically, the proposal focuses on the shortcomings of President George W. Bush's 2001 decision regarding federal funding for ES cell research and advocates for the lifting of the ban against using federal funds for research involving ES cells derived from embryos after the August 9, 2001 cut-off date. Passage of The Stem Cell Research Enhancement Act (H.R. 810) would lift this ban, allowing scientists the opportunity to developed new and improved cells that could be used in research and the clinics. At this time, the bill has been passed by the House and is slated to come to a vote in the Senate early this year. Lesser known benefits of government investment in ES cell research such as the creation of new jobs and overall improvement to the US economy are given special emphasis.

Molecular Epidemiology of *Salmonella enterica Typhimurium* on Poultry and Dairy Farms in Georgia

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Salmonella colonizes cold- and warm-blooded animals and, with exceptions, exists as an innocuous transient component of the animal's normal flora. In humans, Salmonella causes a self-limiting gastroenteritis in most healthy adults, and life-threatening septicemia in the young and elderly. Many foodborne illnesses associated with this organism have been linked to consumption of meat or eggs tainted with Salmonella. In order to reduce human cases of salmonellosis, it is necessary to better understand the ecology of Salmonella on the farm. *Salmonella enterica serovar Typhimurium* has been determined as a primary cause of salmonellosis and has been isolated from multiple dairy and poultry farms. We determined the genetic relatedness of this *S. enterica serovar* by Pulse-Field Gel Electrophoresis. The PFGE gel patterns were compared to each other within and between the two groups. A greater degree of genetic diversity was observed in bovine isolates compared to the avian *S. serovar Typhimurium* strains. The difference in diversity between these isolates may be attributed to the management and production practices employed in raising the two different animal species. In the case of poultry production, a company owns or controls all aspects of poultry production, contracting with local farmers and providing them the birds, feed, and technical service necessary for raising meat birds. This practice potentially limits birds' exposure to Salmonella and may explain the paucity of strains. In contrast, dairy cow production tends to be individually owned and operated, where animals acquire Salmonella from their immediate environment, and therefore may explain the greater genetic diversity in bovine isolates from multiple dairy farms. Therefore, for dairy farms, an on-farm biosecurity program and possible intervention strategy, e.g., vaccination may prove best at reducing Salmonella. Poultry farms may need to direct methods of prevention and treatment toward preventing vertical transmission of Salmonella from parental genetic stock of birds to the progeny, meat birds slated for consumption.

The Albany Movement: Black and White Perspectives in Albany, Georgia, 1961-62

Courtney M. Thomas – CURO APPRENTICE
Dr. Barbara McCaskill, Department of English, University of Georgia

In December 1961, the sleepy southwest Georgia town of Albany dramatically changed when the black community, discontented with a separate-but-not-equal transportation system and recreational, educational, and social facilities, attempted to desegregate the town. Members of the Southern Christian Leadership Conference (SCLC) and the Student Nonviolent

Coordinating Committee (SNCC), two organizations that worked for equal rights for people of color, traveled to Albany to assist the local blacks. These efforts became known as the Albany Movement. The demonstrations against segregation in Albany lasted for nearly nine months and attracted the involvement of prominent Civil Rights leaders such as the Rev. Dr. Martin Luther King, Jr., Ella Baker, and Ralph Abernathy. Yet the stand-off ended in August 1962 with no concessions for the town's black citizens. My presentation will focus on my role this year in creating a pedagogical website about the Albany Movement, as a student member of The University of Georgia's Civil Rights Digital Library Initiative. After discussing the Initiative's history and its goals to support research and instruction on the Civil Rights Movement, I will share my research on the differing perspectives of Albany's black and white citizens toward the Movement. I will illustrate my talk with quotations from newspaper articles in 1961-62 issues of *The Albany Herald* and *The Albany Times*, as well as news footage of demonstrations by protestors during the Albany Movement and interviews with prominent figures in the Movement. My research on the Albany Movement proves significant because it focuses on the forgotten civil rights movements in southern Georgia which are often overshadowed by the civil rights activities that occurred in the Atlanta area.

NIRS Detection of Brain Activity During Low Intensity Exercise

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Brain activity has previously been mapped using expensive techniques such as fMRI and PET. Recent studies have suggested that near infrared spectroscopy (NIRS), a noninvasive and relatively inexpensive technology, can also be used to detect brain activity. The aim of this study was to determine if NIRS is useful for detecting brain activity during either exercise or a cognitive task. The experimental subjects were assigned to one of two conditions: (1) low-moderate intensity cycling on a stationary bike while undergoing cycles of on/off cognitive activity (using a cog task), or (2) a sub-maximal one arm hand grip exercise. In each condition, two eight channel probes were secured on the subject's head; the device emits low power light which is scattered by the brain tissue. Differential absorption of light by HbO2 and Hb was used to identify brain activity. Increases in oxygen saturation were interpreted as increases in blood flow and thus increases in regional brain activity. Preliminary results suggest that the NIRS device can detect cognition. If confirmed, the results of this experiment could result in a simpler, more cost-effective and noninvasive way of detecting brain activity in comparison to currently accepted methods.

Development of a Trypsin Assay in a Permeabilized Cell System to Characterize the Luteinizing Hormone Receptor Induced Activation of G-Proteins

Dan W. Thon
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Certain mutations in the human luteinizing hormone receptor (hLHR), a G-protein coupled receptor (GPCR), are believed to cause a constitutive activation of the Gα-subunit of the stimulatory G-protein signaling pathway (Gαs). The stimulatory G-protein signaling pathway is activated by hLHR due to binding of the ligand, luteinizing hormone (LH), which is secreted by the pituitary gland and is essential to normal sexual function. The constitutive activation of the Gs pathway in the absence of ligand creates various reproductive pathologies such as precocious puberty in boys. The nucleotide bound state of the Gα-subunit changes during activation from the inactive, GDP-bound state to the active, GTP-bound state. This study utilized an assay exploiting trypsin's ability to selectively digest the inactive conformation over the active conformation of the Gα subunit to characterize the mechanism(s) of Gαs activation by native and mutant hLHRs through monitoring the nucleotide bound state of Gαs. A membrane permeabilization step was added to the assay in order to allow reagents to interact with intracellular proteins of the HEK-293 cells,

which were transiently transfected with hLHR, to prevent the uncoupling of hLHR from Gs. A toxin produced by Streptococcus pyogenes, Streptolysin O (SLO), creates large pores (~35nm) in the plasma membrane in a controlled and reproducible manner. The use of a SLO permeabilized cell system during the adaptation of the trypsin assay may allow for a better characterization of how mutations in the hLHR cause a constitutive activation of the Gs signaling pathway, and consequently, reproductive pathologies in humans.

Analyzing the Effects of Pectin Degrading Enzymes and Their Inhibitors on the Neurological Development of Drosophila

Annie Tran – CURO APPRENTICE
Dr. Michael Tiemeyer, Department of Biochemistry and Molecular Biology, University of Georgia
Dr. Carl Bergmann, Complex Carbohydrate Research Center, University of Georgia

The glycosaminoglycan moieties of proteoglycans modulate the growth, differentiation, and function of cells in animals. Glycosaminoglycans (GAGs) provide structural support and influence cell signaling events in many tissues. In addition, neural development and the maintenance of normal neural architecture are both sensitive to GAG-dependent signaling pathways. In comparing the enzymes used to degrade GAGs, structural similarities were found with the enzymes used to degrade pectins. Pectins are acidic polysaccharides that constitute a major component of plant cell walls. Anecdotal evidence suggests that pectins have medicinal benefits for human health, although the relevant mechanisms are unknown. Recently it was shown that the three-dimensional structure of some endopolygalacturonases (EPGs, a class of pectin degrading enzymes) are similar to those of chondroitinases (a type of GAG degrading enzyme). Therefore, we hypothesized that pectin degrading enzymes may interact with GAGs in animal tissues, perhaps interfering with normal GAG-dependent cell signaling activities. To test for potential GAG-EPG interactions in vivo, an endopolygalacturonase and a polygalacturonase-inhibiting protein were subcloned into a Drosophila transformation vector that places transcription of the enzyme or enzyme inhibitor under control of an inducible promoter (UAS element). By mating transformed progeny to Drosophila strains that express induction factors (Gal4) in specific tissues, the effect of altered GAG activity on tissue development will be assessed. Because of the sensitivity of normal neural architecture to GAG-dependent signaling pathways, our initial disruption studies have focused on axon pathfinding defects in the embryonic nervous system.

Testing the River Continuum Concept in Sub-Antarctic Streams

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The river continuum concept's (RCC) basic premise is that energy inputs and other abiotic properties vary along a stream gradient with predictable consequences for biota and ecosystem processes. However, the application of the RCC in particular situations has been refuted, given the inherent differences of ecosystems compared to the Eastern Temperate Deciduous Biome, where the idea was developed. Knowledge of streams in the temperate forests of southern South America is extremely limited, which has limited its incorporation into general explanations, such as the RCC that try to summarize important ecological processes. Therefore, we undertook to describe a longitudinal pattern of benthic invertebrates in the Cape Horn Biosphere Reserve, Chile (55°S) to see if a Sub-Antarctic River Continuum exists. Streams in this biome extend from sea-level to above tree line in short, steep catchments, which are therefore expected to be less predictable along a continuum, and rather more influenced by physical disturbance. To test this hypothesis aquatic macroinvertebrates were collected along an altitudinal gradient from sea-level to headwaters to describe species richness, abundance, composition, functional feeding groups, and biomass. The Robalo River did not follow the overall RCC predictions. Species richness and

biomass did not vary along the gradient. Functional feeding groups were also uniform through, with the exception that shredders did not occur above tree line (above 470 m). Our findings showed that sub-Antarctic stream benthos contained a large number of generalist species found throughout the stream reach.

Effects of Nitrate Contamination on Leaf Breakdown in a Stream at the State Botanical Garden of Georgia

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Groundwater contamination from the University of Georgia swine farm has resulted in nitrate concentrations consistently exceeding 15 mg/L in a small stream at the State Botanical Garden of Georgia. The effects of the high nitrate levels on ecological functioning in streams at the Botanical Garden are unknown. Breakdown rates of leaf species typically categorized as having fast (*Liquidambar styraciflua*), medium (*Acer rubrum*), and slow (*Quercus rubra*) rates of breakdown were measured in a nitrate-contaminated stream and nearby reference stream (nitrate <1 mg/L) during the winter of 2005 to test the hypothesis that leaves placed in the nitrate-contaminated stream would have faster breakdown rates than leaves placed in the reference stream due to the nitrate's nutritional enrichment of leaf matter to the microbial and macroinvertebrate organisms that break it down. Preliminary data showed a mixed response in leaf breakdown rates between the two streams. *Liquidambar styraciflua* leaves broke down faster in the nitrate-contaminated stream compared to the reference stream, while *Quercus rubra* leaves broke down faster in the reference stream. *Acer rubrum* breakdown rates were similar between streams. My data show that elevated nitrate levels affect and may negatively impact the breakdown rates of some leaf species, as well as the overall health of the stream.

Trans-sialidase Specific $CD8^+$ T Cell Responses in *T. cruzi* Infection of Balb/C Mice

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Trypanosoma cruzi, the causative agent of Chagas' disease, afflicts approximately 18 million people throughout Latin America. In both human and mouse models, peptides of the trans-sialidase (ts) gene family of *T. cruzi* have been identified as important targets of $CD8^+$ cytotoxic T cells in *T. cruz*i infection. Infected C57BL/6 mice develop strong and focused $CD8^+$ T cell responses to a few ts-derived MHC-I epitopes. However, in infected humans, the $CD8^+$ T cell response to ts peptides is lower and appears to be less restricted. To determine if the strong and focused response in C57BL/6 mice is also evident in other mouse strains, especially those strains exhibiting greater susceptibility to *T. cruzi* infection, this project examined immune responses in the Balb/C mouse strain.

Enzyme-linked immunoSPOT assays and in-vivo cytolytic T lymphocyte assays have been used to probe for immunogenic *T. cruzi* ts-derived peptides in Balb/C mice from a screening of ten predicted MHC-I binding peptides. One peptide, TSKD-14.1, elicited a focused immune response in the Balb/C mice. In recent intracellular cytokine staining experiments, the strength of the $CD8^+$ T cell response to TSKD-14.1 has been shown to vary according to infecting parasite strain. To determine whether there are other immunogenic ts peptides in Balb/C mice, future ELISPOT and in-vivo CTL assays will survey an additional pool of ts peptides selected on the basis of MHC-I binding affinity predictions and *T. cruzi* genomic data. By exploring the ts peptide response in Balb/C mice and other mouse strains, we hope to determine whether resistance to *T. cruzi* infection correlates with the magnitude of the ts-specific $CD8^+$ T cell response.

Identification of Transcription Factors that Bind to WhiB3 Promoter in Mycobacterium Tuberculosis

Katrin Usifo

Dr. Joel Ernst, Department of Microbiology,
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Mycobacterium tuberculosis is a global health threat that takes a life every fifteen seconds. Mycobacterium tuberculosis whiB3 is a postulated transcriptional regulator whose expression is markedly increased in bacteria isolated from the lungs of mice compared to bacteria grown in broth culture. WhiB3 expression peaks early after infection of mice, then decreases. In vitro experiments show that the whiB3 transcript is induced in aerated conditions compared to hypoxic cultures. The purpose of this project is to use Electrophoretic Mobility Shift Assay (EMSA) to determine whether transcription factors bind to whiB3 promoter under transcriptionally induced and repressed conditions. Reverse Transcriptase PCR was performed to determine the transcriptional start site of whiB3 and thus identify the promoter region. RT-PCR results confirmed the putative transcriptional start site of whiB3 at ~ –102 base pairs. EMSA was performed with four different regions of the promoter and proteins isolated from bacteria grown in broth in aerated and hypoxic conditions. EMSA results showed gel shifts under both aerated and hypoxic conditions. Binding patterns differed based on transcriptionally inducing and repressing conditions. However, binding patterns were the same with different regions of whiB3 promoter sequence. Although duplexes could out-compete each other, unrelated non-TB DNA and DNA from a coding region of another gene (acr) could not out-compete labeled duplexes. These results suggest that DNA-binding proteins under aerated and hypoxic conditions bind to whiB3 promoter. The specificity of DNA-protein interactions for whiB3 promoter remains to be determined.

Emotion, Identity, and Cardiovascular Response

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Contemporary sociological theories of identity make conflicting predictions about the relationship between identity disruption (i.e. the discrepancy between an outside observer's assessment of one's identity versus one's own views) and the valence of emotion. Identity control theory predicts that all identity disruption leads to negative emotion. Affect control theory, in contrast, predicts that negative identity disruption leads to negative emotion, while positive identity disruption leads to positive emotion. A critical test of these competing predictions would require measures that separately measure positive emotion, negative emotion, and identity disruption. This research will review the literature on the self-report and physiological measures of emotion and present the results of an experiment designed to independently manipulate positive and negative identity disruption. A sample of University of Georgia undergraduate students will participate in an IRB-approved experiment in which they receive positive and negative feedback in response to a social performance. Participants' views of their own social competence will first be assessed using the short form of the Texas Social Behavior Inventory. Research participants will then give a brief prepared speech, ostensibly to two unseen raters. Participants will be randomly assigned to subsequently receive feedback that is either (1) highly negative or (2) highly positive, or (3) to receive no feedback. Skin temperature, skin conductance, skin resistance, and peripheral blood flow will be measured through a skin temperature probe, Galvanic Skin Response electrodes, and an infrared plethysmograph and will be used to index both the type and magnitude of emotional response to the feedback. The devices for measuring physiological responses are relatively unobtrusive, so acclimation to the equipment is not necessarily critical. The subjects will, however, be given a moment to adjust during a brief seeing test before their performance. Self-views of competence will be crossed with the nature of the feedback to distinguish between those whose positive identities have been disrupted, whose positive identities have been confirmed, whose negative identities have been

disrupted, and whose negative identities have been confirmed. The self-report and physiological measures of emotion and identity disruption will then be used to distinguish between the predictions of identity control theory and affect control theory.

An Emerging International World Order: The Case for Mandatory Foreign Language Proficiency within the United States Public School System

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Both historically and within present times, the United States has maintained the English language as its unofficial yet universal channel of communication. While emphasis upon a central conduit of dialogue befits the interests of any nation, modern society has progressively become interdependent in many aspects of human existence, and, as such, the language barrier oftentimes poses a significant obstacle to cross-cultural cooperation. In refusing to allow modification and thus modernization upon the status quo of communicative expression within the United States, hindrances relative to economic interests, societal tolerance and understanding, and overall political cordiality among international counterparts have correspondingly emerged with the United States' failure to evolve with the progression of an internationally oriented state of mankind. This paper illustrates how the United States, existing among the world's foremost international actors, would greatly benefit economically, socially, and politically from the implementation of a mandatory foreign language curriculum throughout the national public school system, as this adaptation would support the United States' potential leadership stature within the emerging international world order.

Improving Ultrasound Arterial Assessment by Standardizing Probe Selection and Optimization Settings

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Ultrasound technology is widely used to make assessments of arterial function. However, the accuracy of these assessments has been called into question. A proportion of this variability may be controlled through standardizing measurement protocols. Therefore, the aim of this study was to assess variability due to probe selection and optimization settings. Ten healthy 20-26 year old male and female subjects were tested. Brachial artery size (diameter) was measured thirty times a second using a B-mode Ultrasound unit equipped with a high-resolution video capture device. To assess variability due to probe selection and optimization, we manipulated three parameters: 1. probe frequency; 2. measurement location; and 3. image display size. To assess variability due to probe selection, we compared three probes. To assess intersession variability, we continuously made recordings for twelve minutes, with the probe being removed and re-positioned between each four-minute duration. Coefficients of variation for probe frequency, measurement location, image display size, and probe selection were 2.2%, 2.2%, 1.1%, and 3.9%, respectively. Intersession variability was 4.0% while using constant probe and optimization settings. In conclusion, the optimization setting most likely to decrease reliability is probe selection. However, as long as probe selection and optimization settings are kept constant, our intersession variability shows that reliable measurements can be made.

Analysis of Interactions between EPGs/PGIPs/Pectins Using Surface Plasmon Resonance

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Endopolygalacturonases (EPGs) are important fungal pathogenicity factors and are among the first enzymes secreted when fungi are grown on isolated plant cell walls as a sole carbon source. As a defense against fungal attack, plants produce proteinaceous EPG inhibitors known as

polygalacturonase-inhibiting proteins (PGIPs). PGIPs are soluble, leucine rich repeat (LRR) glycoproteins, found in the extracellular matrix of most plants. PGIPs may form high-affinity complexes with EPGs in a reversible, stoichiometric manner. The mode of action of a particular fungal EPG and its inhibition by PGIPs may be critical factors in determining whether the fungus is a viable pathogen. To fully understand the interactions of these two classes of molecules and their role in host-pathogen interactions, the mode of action of EPG hydrolysis and of PGIP inhibition must be understood at the molecular level. Pectin is the natural substrate for EPGs, and our research and that of others indicates that the pectin binds both the EPG and the LRR inhibitor PGIP. This implies that pectin plays an active role in the formation of an EPG/PGIP/pectin complex and is not simply a passive substrate. This has major implications in understanding the role of this ternary EPG/PGIP/pectin in pathogenesis, as well as understanding the role of glycosaminoglycan/LRR/receptor complexes in animals. These interactions are studied through surface plasmon resonance (SPR) using EPGs from various fungal sources and site directed mutant PGIPs. SPR is also used to look at the interaction of PGIPs with pectins, as well as the effect of pectins on EPG-PGIP complexes.

A Tangled Topic: The Connect Sum of Mathematical Knots

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Mathematical knots are closed, three-dimensional curves that cannot be distorted to produce the unknot, a simple loop. They are categorized by their minimal crossing number, or the fewest number of crossings possible after distorting the knot to its simplest form. Knots which can be expressed as a joining, or connected sum, of other knots are called composite; otherwise, the knot is prime. Knot theory has many applications to the biological sciences, including the modeling of DNA and protein folding. One of the most prominent questions in knot theory is deceptively simple: determining whether two knots are equivalent. The VIGRE [Vertical Integration of Research and Education] Geometric Knot Theory group has been working to create a library of all knots with relatively low crossing number. While libraries exist to classify prime knots, one including composite knots would be beneficial. However, there is no distinct way to join any two knots; the knots' reversible, mirror, and amphichiral symmetry affect which composite knot is formed. Therefore, computer programs are necessary to test aspects of the symmetry of knots in order to compare them and determine equivalency. Our program, written in the C programming language, reverses the orientation of a knot or any number of specified components in a link (a collection of knots). Subsequently, our programs to convert the format of knots between VECT and Fe formats allow us to utilize Brakke's Evolver program to generate proportional representations of the connected sum knots for the library that are visually appealing.

Reconstructing Maginot: Missile by Missile

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Just over three-quarters of a century ago, the French senate approved the construction of the largest defensive structure the Western world has ever known. Although its shortcomings tend to be overstated, the series of concrete fortifications envisioned by War Minister André Maginot not only failed to prevent a German invasion but also served to cripple France's foreign policy altogether, ensuring France would be ill-prepared for the looming Nazi blitzkrieg. Today, critics accuse the United States of constructing its own, modern Maginot Line, only with rocket fuel and guidance chips replacing concrete and barbed wire. National missile defense—a program that has existed in varying forms since the 1960s—has, many political changes notwithstanding, remained a fixture of America's long-term strategic thinking. Consuming the largest single portion of the Defense Department's acquisition budget (some $8.8 billion for fiscal year 2006), national

missile defense has become a top priority in the United States' approach to countering the growing threat of nuclear, chemical, and biological weapons. Despite the tenuous consensus in Congress regarding missile defense, many still question the strategic worth, not to mention the feasibility and cost-effectiveness, of this so-called "star wars" system. The paper will analyze the strategic value of missile defense systems against some feasible alternatives aimed to mitigate the risks posed by weapons of mass destruction. Then, by approaching missile defense through the eyes of history, it will determine whether America's 21st century bulwark is doomed to share a fate similar to that of its infamous French predecessor.

Development of Transgenic Zebrafish to Understand the Role of Hyal-2 in Tumor Formation

Dustin Williams – CURO SUMMER FELLOW
Dr. Scott Dougan, Department of Cellular Biology, University of Georgia

Jaagsiekte sheep retrovirus (JSRV) is an infectious virus that encodes an oncoprotein that induces ovine pulmonary adenocarcinoma by transforming lung epithelial cells. This cancer shows similarities with bronchioloalveolar carcinoma in humans, a cancer not strongly associated with smoking. The oncoprotein is the virus envelope protein (ENV). The receptor for this protein is Hyal-2, a membrane protein of undetermined function. Hyal-2 is deleted frequently in human lung tumors, opening the possibility that it functions as a tumor suppressor. Currently there are few genetic model systems in which to study the role of Hyal-2 in oncogenesis. To study this problem, ENV will be overexpressed in zebrafish using the GeneSwitch system from Invitrogen. The system consists of two plasmid vectors, pSwitch and pGene. The pGene vector contains the gene to be expressed. PSwitch encodes a transcription factor, the GeneSwitch protein, which binds to pGene, resulting in the expression of the gene of interest. However, the GeneSwitch protein can only activate transcription in the presence of the drug mifepristone. Thus, gene expression can be induced ubiquitously at any stage of development upon addition of mifepristone. Traditional methods of introducing genes into fish yield low transfection rates of 1-5%. Instead, a transposon system will be used to insert ENV. Transposons containing the pSwitch and pGene-ENV constructs will be coinjected into early embryos with transposase mRNA, which will mediate integration randomly into the genome. This method yields significantly higher transfection rates of up to 50%. After the constructs are injected, the fish will be screened for tumors. If tumors are found, a variety of opportunities will be opened to study tumorigenesis and will allow use of zebrafish as a genetic system to dissect the role of Hyal-2 in tumor formation.

Beta-amyloid Immunoglobins as a Potential Early Marker for Alzheimer's Disease

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Recent developments in Alzheimer's Disease (AD) research show that certain immunoglobulins (IgG) circulating in the bloodstream may mark the presence of the amyloid plaques that characterize the progression of this disease. Gathering at receptor sites for advanced glycation end products (RAGE), amyloid peptides accumulate over time within cortical areas of brain tissue. Plaques formed in this process are associated with impairment of cognitive functioning such as memory and decision-making. In response to the increased presence of amyloid ABeta proteins and RAGE cells, data suggest an increase in levels of anti-RAGE and anti-ABeta IgG. Because this natural immune response can be observed in a simple blood sample, many of the previous limitations in diagnosing AD can be reduced. Current methods of diagnosis, such as neuropsychological testing or MRI scanning, are expensive, time-consuming, and can often only detect the disease in its later stages. This study examines the relationship between the levels of anti-Ab and anti-RAGE IgG biochemical markers, and changes in cognitive functioning over time. Levels of the IgG markers in blood

plasma samples were compared with test scores from the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). The purpose of the study was to determine which domains of cognition tested by the RBANS best correlated with concentration of the biological blood markers. Establishing correlations between the RBANS, and anti-ABeta and anti-RAGE IgG will help to explain differences in specific IgG levels within groups of individuals diagnosed with AD. This will further define the role of IgG blood sampling as a potential predictive method for identifying the disease and may help to establish a stratified approach to classifying individuals with AD, thus allowing treatment to be better tailored to the needs of each patient.

Genetic Manipulation of *Actinosynnema pretiosum*.

Charles Wooten – CURO SCHOLAR
Dr. Janet Westpheling, Department of Genetics, University of Georgia
(Charles Wooten, Brandan Hillerich and Janet Westpheling)

Actinosynnema pretiosum is a soil bacterium that produces the maytansinoid, ansamitocin, an important anticancer chemotherapeutic agent. Maytansinoids are effective antitumor agents derived from plants and microorganisms. Very little is known about the biosynthetic pathways that lead to their synthesis. *Actinosynnema pretiosum* is a member of the family of bacteria called actinomycetes. These Gram positive filamentous soil bacteria make most of the natural product antibiotics used in human and animal health care including a number of anticancer therapeutics. *Actinosynnema pretiosum* ssp. auranticum is an uncharacterized member of this family of bacteria and is particularly unresponsive to conventional genetic analysis. In fact, many of the tools developed for genetic manipulation of the model organism in the group, *Streptomyces coelicolor*, do not work in this strain. In an effort to develop genetic tools to manipulate the strain and to engineer the pathway for ansamitocin biosynthesis, we will test a number of plasmids and insertion sequences from *S. coelicolor*. Here we will report the development of protocols for the introduction of these tools into *Actinosynnema pretiosum* with the long term goal of using these tools for mutagenesis (by integration into genes), gene replacement, and the engineering of the ansamitocin biosynthesis pathway for novel antibiotic production.

Identifying IS*492* Chromosomal Insertions in *Escherichia coli*

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Pseudoalteromonas atlantica, a Gram-negative marine bacterium, produces extracellular polysaccharide (EPS), to which other marine organisms attach in the formation of biofilms on solid surfaces. EPS production is turned off and on and by MooV-mediated insertion and excision of the mobile element IS*492* at the *eps* gene. In *P. atlantica* IS*492* appears to insert specifically into one site within the *eps* gene. This study asks what is the specificity for IS*492* insertion in a naïve host, *Escherichia coli*. Studying IS*492* insertion in *E. coli* will provide insight into the mechanisms of DNA recombination by a novel family of DNA recombinases (Piv/MooV family) and will contribute to understanding medically important events associated with DNA recombination, including cancer.

An IS*492* insertion assay in *Escherichia coli* was developed using an IS*492* construct that contains a tetracycline resistance gene (IS*492*Δ*mooV*::*tet*) and an *eps* target plasmid. IS*492*Δ*mooV*::*tet* insertion events into the target plasmid were selected for by isolating *E. coli* strains resistant to tetracycline (Tet^R). Tet^R *E. coli* isolates that did not contain IS*492*Δ*mooV*::*tet* insertions into the *eps* target plasmid were screened for IS*492*Δ*mooV*::*tet* insertions into the chromosome using Polymerase Chain Reaction (PCR) designed to amplify the chromosomal DNA that border IS*492* insertions. The PCR protocols were optimized for specificity by changing primers, altering annealing temperatures, and adding dimethyl sulfoxide, but

sequencing of the PCR products from these PCR assays indicated that IS*492*Δ*mooV*::*tet* did not insert into the *E. coli* chromosome. It is possible that there is not an appropriate target site for IS*492* insertion on the *E. coli* chromosome. This will be addressed in future experiments by introducing the *eps* target sequence from *P. atlantica* into the *E. coli* chromosome and then assaying for insertion of IS*492*.

Graphic Design
Jennifer Xin
Prof. Lanny Webb, Department of Graphic Design, University of Georgia

Graphic design involves the use of typography, color, imagery, and concept to organize and deliver content, to elicit a feeling or response appropriate to the client's needs. In my work, I try to achieve a balance between a playfulness that will draw in the viewer and a sense of order to establish a hierarchy of information. The end product should be regarded as effortless and simple. To me, the overall message should never be obscured or overtaken by the artist's own whimsies or stylizations; otherwise it ceases to operate as a vehicle for communication and instead begins to call attention to itself as an end unto itself. Ultimately, my work is about using elements of design in its essence and letting that speak directly without attempting to embellish and clutter with excess.

Urban Sprout is a hypothetical seed company that caters to city-dwellers. It specializes in gardening kits that provide everything one initially needs to start planting. The company's aim is to promote awareness of nature in urban environments. Its main clientele include young professionals, teenagers, and children. I created a business stationary system, seed packaging, and cartons for a gardening kit that is playful and hip.

Effects of Market System Entry on Rural Indigenous Women in Ecuador
Sarah M. Yagoda
Dr. Jose Alvarez, Department of Romance Languages, University of Georgia

Indigenous communities in Ecuador's Andean region were not exposed to significant economic development until the 1980s. Because of the short time that business initiatives have been carried out in the area, limited research has been conducted on how indigenous women's gender and familial roles are affected by "empowerment" projects intended to increase their ability to earn independent incomes. Therefore, this research focuses on some effects of these development programs. This will in turn help to determine the validity of common assumptions about these types of projects, namely that they help women obtain more equality. This research will also explore how equality is defined by the women who are affected by these initiatives, as well as by the people who organize the projects. My research is being conducted in three phases. First, I am reviewing what has already been published in the U.S. and Ecuador on this topic. Second, women who are involved in one economic development project in the region have been interviewed, and I am transcribing the recorded conversations. Third, I will travel to the region from March 5, 2006 to March 17, 2006 to interact with the women involved in the project. Plans are also being finalized to interview representatives from Ecuadorian foundations which work with women's issues and economic development. The data collected so far suggest that economic development programs alter women's traditional roles in ways many women describe as positive, but they can also cause conflicts when male heads-of-household resist their female counterparts' participation in empowerment projects.

Regulation of Branched-Chain Amino Acid Catabolism in *Streptomyces coelicolor*: Applications for Metabolic Engineering of Polyketide Antibiotic Biosynthesis

Fei Yang – CURO SUMMER FELLOW
Dr. Janet Westpheling, Department of Genetics, University of Georgia
(Fei Yang, Karen Stirrett, and Janet Westpheling)

Streptomyces are soil bacteria that produce over 70% of antibiotics used in human and animal health care. Mutants of Streptomyces defective in the catabolism of the branched chain amino acids, valine, leucine, and isoleucine, are also defective in antibiotic production, suggesting that some of the precursors for antibiotic synthesis come exclusively from this carbon utilization pathway. The *Streptomyces coelicolor bkdA2B2C2* gene cluster encodes a putative branched chain amino acid dehydrogenase Complex, and *bkdR*, a leucine response regulator, represses these genes at the level of transcription. The promoter contains a nearly perfect 14bp inverted repeat that may be the binding site of the *bkdR* protein. To examine the regulation of the *bkdA2B2C2* cluster and to investigate the role of *bkdR* in its regulation, a transcriptional fusion between the *bkdA2B2C2* cluster promoter and the *xylE* reporter gene was constructed. Strains expressing *xylE* convert colorless catechol to a yellow oxidation product. The *bkdA2B2C2-xylE* construct was introduced into wild-type *S. coelicolor* M145 as well as the *bkdR* mutant; M145 containing a promoter less copy of the *xylE* gene was used as a negative control. The *bkdR* mutant containing the *bkdA2B2C2-xylE* fusion will be yellow as expression of the cluster in the mutant is constitutive. *bkdA2B2C2-xylE* expression in wild type will be assayed in minimal liquid media cultures with glucose, maltose, mannitol, leucine, isoleucine, or valine as sole carbon source for induction times and levels. In addition, degenerative PCR will be used to generate base changes in the promoter region of this cluster, and *xylE* assays will be used to examine their effect. As a result of this analysis, I hope to gain an understanding of the role *bkdR* plays in the regulation of the *bkdA2B2C2* cluster and identify the environmental signals that induce transcription. This work will contribute to the understanding of the morphogenic pathways that contribute to antibiotic production and their eventual manipulation for novel antibiotic synthesis.

Unraveling the Molecular Basis of the Role of Pectins in Human Health

Stephanie Yarnell – CURO SUMMER FELLOW
Dr. Carl Bergmann, Complex Carbohydrate Research Center, University of Georgia

Glycosaminoglycans (GAGs) are unbranched carbohydrate polymers. They are a component of the extracellular matrix and contribute to the general structure and permeability properties of connective tissues. GAGs have been implicated in binding of pathogens to particular target cells, maintenance of cellular activities, and development of metastasis in cancer cells. Pectins are the primary structural elements of the matrix of the plant cell wall and have been implicated in morphogenesis, pH regulation, ion balance, wall permeability, and plant defense. We noted that microbial enzymes that cleave GAGs and those that degrade pectin share structural similarities, and enzyme structure is often driven by the three dimensional structure of the substrate. The similarity in function of GAGs and pectins, and the structural similarities of the enzymes that degrade them, led us to wonder if these were clues that could shed light on the mechanism of the role of pectins in human health. As a first step, we have used reducing sugar and UV-based assays as well as fluorescence to investigate the effects of GAGs on selected pectin degrading enzymes (PDEs) and of pectin on GAG degrading enzymes. Our data demonstrate that pectins are able to affect GAG degrading enzyme activity, and GAGs are able to affect PDEs. Thus, it is a reasonable assumption that the receptors for GAGs involved in such activities as neural development and tumor development are potential targets for pectins and that the role of the GAGs themselves in development may be altered by PDEs.

The Relationship between Children's Emotional Responses to Puppet Vignettes and their Social Competence

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Young children's social and emotional competence is closely related to their peer relations. Children who lack understanding of appropriate emotional expressions in social contexts are more likely to engage in conflict and aggressive behaviors. It is thus imperative to seek early indicators of children's social deficiencies. Such indicators would allow early interventions to coach appropriate emotional competence to promote healthy social adjustment and successful interpersonal relations. In the present study, puppet vignettes were used to assess children's ability in recognizing appropriate emotions. The aim of this study is to discern whether children's emotional responses to conflict situations may be related to their social competence rated by their teachers. A total of 121 three-year-olds (boys = 59) from the local Head Start program were recruited to participate in a larger study conducted by Chiang and Zabell, et al (2005, 2006). The puppet vignettes, outlining imaginary scenarios to elicit various emotional responses, were randomly presented to the participant. The conflict vignette involved a child grabbing a favorite toy from the participant. Fifty–three participants whose responses were anger or sadness were used for data analyses. Their responses were correlated with the Teachers' Social Competence Behavior Evaluation (SCBE) rating. Two-Way (2 X 3) ANOVA (Emotion x SCBE) were further used to compare the differences. The results showed that children reporting anger were rated more aggressive and oppositional versus those reporting sadness; children reporting sadness were rated more calm and cooperative versus those reporting anger. More results and implications will be discussed at the conference.

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The CURO 2007 Symposium will be held on April 9, 2007 at the University of Georgia.

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