Summer Fellowship chair: Dr. Martin P. Rogers, Associate Director of Honors Program and Center for Undergraduate Research Opportunities

Book of proposals: Matthew Jordan, Program Coordinator, Center for Undergraduate Research Opportunities

Edited and proofread by: Matthew Jordan, Elizabeth Sears, and Eleana Whyte

Cover design: William Reeves, UGA Printing

Published by: Honors Program, The University of Georgia

Printed by: Central Duplicating, The University of Georgia

Welcome

April 23, 2013

Dear UGA Faculty and Students:

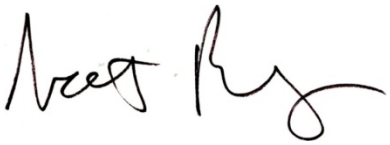
We are delighted and honored to recognize this year's CURO Summer Research Fellows, each of whom is featured here with a summary of his or her faculty-mentored research proposal. The goal of the CURO Summer Research Fellowship is to provide opportunities for intensive, immersive, faculty-guided research experiences for academically talented undergraduates. The program advances the students' knowledge and abilities to think critically, solve problems, and contribute to a greater understanding of the world.

We are exceptionally proud of the quality of the contributions of present and past CURO Summer Fellows and with the mentorship provided by our exceptional faculty. The Summer Fellowship program has contributed to building a culture of undergraduate inquiry at the University of Georgia, and the CURO Summer Fellows serve as ambassadors, sharing their enthusiasm and expertise in a variety of professional forums on campus as well as at regional, national, and international meetings.

The 2013 CURO Summer Research Fellowship is funded through the Honors Program, the Office of the Senior Vice President for Academic Affairs and Provost, and the Alumni Association.

Please join us in congratulating these young scholars on the occasion of being awarded these prestigious fellowships. Please join us also in thanking the faculty research mentors whose support and guidance are crucial to the CURO Summer Fellows' success.

Sincerely,



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

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

Table of Contents

Table of Contents

2012 CURO Summer Fellowship Selection Committee:

Dr. Brian Cummings	Department of Pharmaceutical & Biomedical Sciences, College of Pharmacy
Dr. Monica Gaughan	Department of Health Policy & Management, School of Public Health
Dr. Patricia Hunt-Hurst	Department of Textiles, Merchandising & Interiors, College of Family & Consumer Sciences
Dr. William Kisaalita	College of Engineering
Dr. Martin P. Rogers	Associate Director of Honors and CURO

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Photochemical Production of Reactive Oxygen Species in the North Pacific

2013 Summer Fellow: Meg Adams
Research Mentor: Dr. William Miller, Department of Marine Sciences

There is an intimate connection between the ocean and the Earth's atmosphere. The exchange of carbon between the ocean and the atmosphere plays a big role in the global carbon budget. At the ocean-atmosphere interface, carbon exchange, in the form of carbon dioxide (CO2), makes the ocean either a source or a sink for carbon. The amount of dissolved organic carbon (DOC) in the ocean is equal to the carbon in the entire atmosphere. Therefore, interconversion between DOC and CO2 is essential to understanding air-sea carbon exchange and global carbon budgets. Complex models have been developed to predict the critical pathways controlling the global carbon budget, but in order for these models to be quantitative, modelers need great amounts of good data that show which reactions are important, at what rate these carbon transformations occur, and the efficiency of production for critical compounds. The better and more complete the data, the better the models will be.

Photochemistry is important to carbon cycles because it drives reactions involving DOC that produce carbon monoxide (CO) and carbon dioxide (CO2) that can be directly released into the atmosphere. Photochemistry can only occur to depths that sunlight penetrates into the ocean (approximately 100 meters in blue water). Current photochemical models only address DOC compounds in this surface layer. However, in the deep ocean there are huge reservoirs rich in DOC. These pools of carbon come to the surface very slowly, so models in the past tended to ignore them. However, when these pools do come to the surface after approximately 800 years in the dark, they may exhibit a significant increase in photochemically produced CO and CO2. The question is, how should models account for this photochemistry?

In order to answer this question, I will participate on a research cruise aboard the RV Thompson, where we will take water samples from the Gulf of Alaska and stations along the P-line in the North Pacific, a very well-studied and well-characterized area. We will collect water samples from three depths at each of about forty stations, at abyssal, mesopelagic, and shallow depths. For each sample, we will analyze the hydrogen peroxide (H2O2), carbon monoxide (CO), and superoxide (O2-) photoproduction rates and quantum reaction efficiencies in photochemical experiments at sea. H2O2 and its photochemical precursor O2- give an excellent indication of overall DOC photoreactivity. CO represents a direct loss of DOC to the atmosphere and can be directly related to CO2 photoproduction, which is extremely hard to quantify in blue water. The water samples will be irradiated using a solar simulator, and the concentrations of the three analytes (H2O2, CO, and O2-) will be determined at several time points throughout the irradiation using chemiluminescence and gas chromatography.

These experiments will be carried out on all samples with 3000 meters depth, and photochemical analyses performed on the research vessel. I will be involved in all phases of this part of the project, from collecting water, to irradiations, manipulating data, and interpreting results. I will prepare an in-depth scientific paper detailing the results of one of the stations. The paper will be submitted to a scientific journal for publication.

Detailed results comparing deep and shallow DOC pools from a representative station will form the basis of the required CURO poster presentation, and a paper to be submitted to JURO.

The Importance of Local Grassroots Organizations in the Reshaping of Afro-Argentine Consciousness

2013 Summer Fellow: Tiffany Brown
Research Mentor: Dr. Nicolás Lucero, Department of Romance Languages

In her 2007 study, historian Erika Edwards notes the apparent non-existence of Argentines of African descent in the mind of the general populace[2]. My personal experience in this Latin American country attests to this statement. As a person of color living in Argentina for three months, I was often mistaken for an Afro-Brazilian or an African. "There are no black people in Argentina," observed many Argentines I met. This repeated declaration piqued my interest. How could a demographic that once made up roughly 33% of the total population of Buenos Aires be decimated so thoroughly within a century that many do not acknowledge their existence[1]?

Throughout history, the narrative of Afro-Argentines has generally been silenced or ignored. As a result, few studies exist on this particular population of Argentine society. However, as government support and social consciousness increase so too does the need to educate the public. In recent years, Argentina has experienced a resurgence in "orgullo negro" or black pride. Afro-Argentine groups like *Misibamba* and *AfricaVive* have dedicated themselves to promoting awareness and reconstructing the Afro-Argentine's role in Argentine history and society[2]. The founders and members of these organizations work to dispel the myth that "there are no black people in Argentina" and that no cultural remnants of their existence remain. Through cultural events and programs, they serve to educate the Argentine public about the persistence of the Afro-descendant population and preserve the traditions of their African inheritance.

My investigation will add to the discourse surrounding Afro-Argentine history and traditions as well as address the scarcity in this area of research. This study will take me to Argentina in the midst of the black consciousness movement, and I will examine the importance of grassroots organizations and local efforts in the fight for self-identification and reaffirmation of self-worth in a society that has long dismissed their contributions. Through interviews with experts, leaders of grassroots organizations, and a cultural anthropologist who has written extensively on Afro-Argentine culture, I will gain insight in to the black consciousness movement and its implications on Argentine society. I will also consult non-black Argentines, related literature and other media to augment the perspectives provided by the Afro-Argentines I encounter. Through this study, I aim to provide a clearer picture on the Argentine black consciousness movement. I believe this research is important in lending a voice to a movement and perspectives that until very recently have not been given much funding or consideration in documenting the experiences of this often forgotten segment of Argentine society. It is my sincerest hope that this study serves to spread awareness about the importance of self-identity and local organization in the fight to redefine and reconstruct history.

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Exploring the Content and Structure of Proteoglycans in Rice Suspension Culture Cells

2013 Summer Fellow: Stanislav Bushik
Research Mentor: Dr. Debra Mohnen, Department of Biochemistry & Molecular Biology

The rice plant is arguably the most important source of sustenance for a large portion of the world, and a successful and plentiful harvest is the only thing standing in the way of starvation for countless people around the world. If there was a way to engineer the rice plant to produce a larger yield of food, be more resistant to pathogens, and be able to grow in adverse conditions, the threat of famine could be eliminated from many regions of the world. In addition, if the rice plant could be engineered to produce more usable biomass, the non-edible portions of the plant could be used to create biofuels by converting them to sugars and then to ethanol. The focus of my project in Dr. Mohnen's lab will be to identify genes that code for functional proteoglycans in rice cells, and find a way to modify these genes in order to make the rice plants provide more biomass, make them more resistant to pathogens, and/or make them more durable by being able to survive high salt conditions and drought. The importance of proteoglycans in plant cell wall structure and growth has only very recently been discovered in the Mohnen lab[1]. My proposed research will be among the first to investigate this area in rice and other grasses.

The first step of the research will be to separate and purify the proteoglycans that rice cells in suspension culture secrete into the liquid media. This will be accomplished by using high performance liquid chromatography (HPLC) as well as anion exchange, size exclusion, and reverse phase chromatography to separate the multitude of secreted proteoglycans into fractions that can be individually identified. The second step will be to perform structural analysis of the proteoglycans. The techniques to be used include the identification of protein sequences through proteomics and the characterization of the sugars through glycosyl residue composition and linkage analyses based on Mass spectroscopy and nuclear magnetic resonance. The glycans will also be characterized by chemical and enzymatic degradation. These studies will eventually lead to the identification of the proteoglycans secreted by the rice cells. The third step of the research will be to determine the function of the genes encoding the identified proteoglycans. Once the amino acid sequence of the proteins is determined, a Basic Local Alignment Search Tool (BLAST) will be used to identify the genes that encode the proteins. Transgenic rice plants with modified expression of the discovered genes encoding the protein core of the proteoglycans will be generated to analyze the function of the proteoglycan in the rice plant. This will be accomplished by mutant studies where the genes may be knocked out, knocked down, or over expressed, which will show the function of the genes *in vivo*. The goal is to attempt to discover genes that show potential for modification in diverse ways that result in beneficial effects on the plant, as described above.

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Sex Ratio and Risky Behavior on College Campuses in the United States

2013 Summer Fellow: Anne Chen
Research Mentor: Dr. Christopher Cornwell, Department of Economics

This study aims to focus on areas where there are surplus women in America, and the effects it has on individual risky behavior. *The Atlantic* correspondent Hanna Rosin focuses on this issue in a series of articles published in the magazine, and in a recently published book, *The End of Men: And the Rise of Women*. Rosin describes the end of the industrial revolution, where men dominated and supplied the labor market, which demanded heavy lifting and intense physical labor. In today's economy, women occupy 13 of the 15 industries with the highest projected growth over the next decade (Rosin 2010).

Additionally, Mara Hvistendahl notes in *Unnatural Selection* that "75 percent of sperm sorting patients Genetics and IVF Institute takes on" request for baby girls for simple reasons that girls are "more likely to perform [well in school] and less likely to misbehave" (Hvistendahl 256). It is unclear just how much the recent surplus of women in environments such as the corporate workplace and higher education will affect social behaviors. The World Bank recently published a commentary on the topic, highlighting "cities will increasingly need to give young men a hand in helping them to get where they're going," as more women dominate today's labor markets, noting that 60 percent of the Wall Street Occupiers were men (Hoornweg 2012).

Several recent studies focused on the role of mass incarceration in creating imbalanced sex ratios, emphasizing the effects on the spread of sexually transmitted infections, including Blankenship, *et al* in 2010 and Cornwell and Cunningham in 2008. Indeed, these studies suggest that areas of high incarceration rates in specifically black males lead to higher incidences of STI rates.

The context for this study will largely focus on college campuses – national universities, such as the University of Georgia, where females are represented in large majorities. I will be concerned with whether these imbalanced sex ratios induce risky behavior, such as excessive alcohol consumption and unprotected sexual activity. The idea is that the shortage of men in the college dating market encourages women to engage in riskier behaviors in an effort to secure and maintain a relationship. Using data on alcohol arrest records, enrollment, and STI rates, we will analyze the relationship between schools with shortages in men and the rates in alcohol arrests and STI.

The college campuses in this study serve as a microcosm of communities in the United States, where women are pulling away from men on economic grounds. This leaves a minority of men who receive exemplary credentials to compete with their female counterparts. The biggest question in this equation is how behaviors will shift in this type of environment, and how this may affect future policy in education, law enforcement, and beyond.

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Investigation of CRISPR/Cas Viral Defense System in *Streptococcus thermophilus*

2013 Summer Fellows: Megan Chesne
Research Mentors: Drs. Michael and Rebecca Terns, Department of Biochemistry & Molecular Biology

Bacteria and archaea have adapted a versatile immune system called the CRISPR (Clustered, Regularly Interspaced, Short Palindromic, Repeat) -Cas (CRISPR associated) system to defend against invading nucleic acids of viruses or plasmids. Considering that approximately 1025 infections occur every second[1], an efficient defense mechanism is of great necessity for the survival of these microorganisms. The CRISPR-Cas system is present in approximately 85% of archaea and 50% of bacteria[2]. CRISPR loci are composed of identical short repeat DNA sequences separated by variable spacer sequences. The spacer sequences are identical to those found in invaders. When a microorganism is attacked by a phage, the CRISPR system identifies a segment of the invading DNA then incorporates it into the CRISPR array. The foreign DNA is then used as a template to generate CRISPR RNAs (crRNAs)[2]. The Cas-protein complexes within the microorganism use the crRNA as a guide to target and disrupt the specific invading sequence[2]. The CRISPR-Cas system is advantageous for prokaryotes, as it provides heritable immunity that builds with each successive infection.

For my summer research project, I will use *Streptococcus thermophilus* as a model organism, which possesses four total CRISPR systems (CRISPR 1-4). Previous research in our lab has shown that CRISPR systems 1, 3, and 4 are active for defending against invading plasmids with engineered target sequences. CRISPR2, however, was shown to be inactive in this process. Sequence analysis shows that Csm6, a protein that is intact in other active Csm type CRIPSR systems[3], is truncated in CRISPR2. We hypothesize that the Csm6 is essential for the defense mechanism of CRISPR2. To test this hypothesis, we will obtain another *Streptococcus thermophilus* strain (JIM 8232) that possesses the CRISPR2 module of interest with an intact Csm6. We plan to test the CRISPR2 defense in the JIM 8232 strain. We also plan to complement the defect in the original *Streptococcus thermophilus* CRISPR2 system by overexpressing Csm6 from JIM8232. My ultimate goal is to understand the defense mechanism of CRISPR2 system and the role of Csm6 in this process.

Investigating the defense mechanism of CRISPR2 module in *Streptococcus thermophiles* will contribute greatly to understanding the complexity of the entire CRISPR-Cas immune system. The CRISPR-Cas immune system is a young and exciting field. A greater understanding of the intricate mechanisms of the CRISPR-Cas system can lead to breakthroughs in biomedical research and related biotechnology.

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Influence of Octopamine in Parental Behaviors of *Nicrophorus vespilloides*

2013 Summer Fellow: Mary Douthit
Research Mentor: Dr. Allen Moore, Department of Genetics

Scientists have long thought socialization to be one of the most significant evolutionary factors differentiating humans from other animals. Social interactions may dramatically influence an individual's fitness, resulting in a type of natural selection termed "social selection " (Wolf et al. 1999). One of the most commonly studied social interactions for many organisms is that between parents and offspring; however, few studies have quantified patterns of genetic variation in parent and offspring behaviors expressed during this interaction (Lock et al. 2004). Evolutionary and behavioral geneticists explain that "genetic analyses of behavior are central to topics ranging from understanding past selection and predicting future evolution to explaining the neural and hormonal control of behavior" (Boake et al. 2002). Here I propose to study the influence of an important neurotransmitter, octopamine, on the parental behavior of a beetle.

Burying beetles (*Nicrophorus* spp.) are unusual among insects and animals in general, because both males and females directly care for offspring. Parents bury vertebrate carcasses as food for their larvae. They then maintain this resource against intruders and microbial decay until larvae arrival. After the larvae arrive, they feed them individually. This unique behavior makes burying beetles a model organism for studying the evolutionary and behavioral genetics influencing parental behaviors, and more broadly social interactions. By measuring the expression of specific candidate genes I will help elucidate if and how varying amounts of a neurotransmitter affect *N. vespilloides'* social behavior.

The biogenic amine octopamine (OA), a structural analog of vertebrate norepinephrine, is a molecule that acts as both a neurotransmitter and a neurohormone (Farooqui 2012). Within my study, I will confine assays to its neurotransmitter role where increased expression has been linked to increased aggression in *Drosophila*, crickets and other related insects (Susanne C. et al. 2007; Stevenson et al. 2005). My project will focus on the expression of the five octopamine receptors and tyramine β-hydroxylase (Tβh), the enzyme responsible for producing OA, in males and females when mating as well as in male beetles when placed in a "fight or flight" environment. Within our study species, males and females must act in a coordinated fashion and be extremely tolerant of each other during larval care. Outside of a parental state, adults are not very tolerant of each other and can harass each other until one is seriously injured. I therefore predict that OA expression will be high in the beetles outside of this parental behavioral state but low in individuals actively caring for or preparing to care for larvae

As a continuation of my spring 2013 research, I will hunt for octopamine genes and receptors and PCR verify their sequence and identity. I will then run qRT-PCR with cDNA brain samples from *N. vespilliodes* sampled from both sexes from five behavioral states: virgin, mated with a mouse, mated without a mouse, individuals actively caring for larvae, and post-caring. Because I believe that aggression needs to be depressed during periods of sociality, I hypothesize to find the least OA expression in individuals actively caring for larva, followed by individuals mated with a mouse, then mated without a mouse. I hypothesize that I will find the highest OA expression in virgin and post-caring individuals. Once differential gene expression has been observed, I plan to pharmacologically manipulate the amount of OA within the beetle and determine what alternate effects the neurotransmitter may have on the insect's social behavior.

This work has the potential to help elucidate the molecular influences on parental behavior and more broadly sociality. The evolution of mammalian social behavior and social selection largely helped allow humans to separate themselves from other mammals thousands of years ago. As

genetic tools for studying adaptation in behavior advance and recognition of widespread genetic homology increases, studies analyzing candidate genes like mine show more promise for understanding the evolution of social behaviors as well as genetic diseases affecting human social interactions. Such studies may ultimately lead to the advancement of treatments for individuals afflicted with psychological and developmental disorders.

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Exploring the Clinical Association between Placental Malaria and Preeclampsia: Assessing the Possibility of a Parasite-induced Imbalance in Tissue Factor and Angioregulatory Protein Production

2013 Summer Fellow: Allison Doyle
Research Mentor: Dr. Julie Moore, Department of Infectious Disease

In 2010, the World Health Organization estimated that over 200 million malaria infections occurred globally, resulting in 655,000 deaths. Pregnant women and children under five years of age are the most vulnerable and severely impacted groups, with 55 million pregnant women exposed to malaria annually. Ninety percent of all malaria deaths occur in Sub-Saharan Africa, where infection with Plasmodium falciparum, which causes severe malaria, is most common[1, 2]. Pregnancies in women living in malaria-endemic regions are associated with high levels of P. falciparum parasitemia and high rates of maternal morbidity, including severe anemia and placental malaria (PM)[1]. PM is associated with increased risk for adverse perinatal outcomes, including low birth weight and stillbirth.

PM is characterized by sequestration of the malarial parasite in the placenta, which results in the accumulation of parasitized red blood cells (pRBCs) and the infiltration of inflammatory cells in the placental intervillous space. However, exactly how malaria infection during pregnancy contributes to the development of disease is not well characterized[1]. One adverse health outcome clinically associated with PM is preeclampsia (PE), which is defined as pregnancy-induced maternal hypertension and proteinuria. Clinical studies have shown significant imbalances in the levels of angioregulatory proteins and hemostatic factors in pregnant women with PE or PM relative to healthy ones[3,4]. An investigation of these pathways will provide insight into the mechanisms by which PM may induce PE in infected pregnant women.

We hypothesize that exposure of the placental syncytiotrophoblast cell layer (the fetal epithelial tissue in contact with maternal blood) to the parasite induces an imbalance in angioregulatory protein production by these cells in a tissue factor (TF)-dependent manner. TF is a protein necessary for formation of thrombin, which is vital to blood coagulation. Our objective is to determine the extent to which this synctiotrophoblast exposure to malaria disturbs production of the angioregulatory factors Fms-like Tyrosine Kinase-1 (sFlt-1), Vascular Endothelial Growth Factor-A (VEGF-A), Angiopoietin-1 (ANG-1), and Angiopoietin-2 (ANG-2). To achieve this, we will perform experiments in two stages to test two working hypotheses. The first proposes that pRBCs induce an imbalance in the production of these angioregulatory proteins by the syncytiotrophoblast. To assess this, we will expose cultured human trophoblast cells to either medium, uninfected red blood cells, hemozoin (product formed from parasitic digestion of hemoglobin), or pRBCs. Subsequently, levels of sFlt-1, VEGF-A, ANG-1, and ANG-2 secreted by the trophoblasts will be measured by ELISA. RNA will be isolated from trophoblast cell lysates, and sFlt-1, VEGF-A, ANG-1, and ANG-2 mRNA expression will be measured by RT-PCR as an additional measure of angioregulatory factor production.

It has previously been shown that thrombin can directly stimulate the release of sFlt-1 from the trophoblast. Additionally, work in the Moore lab has shown that coagulation likely plays an important role in the pathogenesis of PM. Therefore, our second hypothesis proposes that TF expressed on the surface of trophoblasts influences the secretion of angioregulatory proteins during malarial infection of the placenta. We will stimulate the trophoblast cells as in the first stage. Cell lysates will then be assayed for TF concentrations using a hemostasis analyzer. We expect to observe that the parasite stimulates increased trophoblast secretion of sFlt-1. Since increased sFlt-1 has been clinically associated with PE, pRBC-induced secretion of sFlt-1, either directly or through increased

TF expression, could provide an important mechanistic link between PM and PE. We also expect that TF secretion by the trophoblasts will increase after malaria exposure. Increased TF should generate thrombin during TF-mediated activation of the extrinsic pathway of coagulation and further upregulate the release of sFlt-1 and other angioregulators. These results together would suggest that exposure of trophoblast cells to pRBCs in PM induces an imbalance of angioregulatory proteins in the placenta that could result in vascular dysfunction. This malaria-induced disruption of angioregulation may be an important link between PM and PE.

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The Preliminary Investigation of Whether Switchgrass SND1 Orthologs Can Activate the Secondary Wall Biosynthesis

2013 Summer Fellow: Jane Egbosiuba
Research Mentor: Dr. Zheng-Hua Ye, Department of Plant Biology

In plants, there are two types of cell walls that are formed: primary and secondary cell walls. Primary cell walls provide mechanical strength for the cell as it grows and divides. Secondary cell walls are produced once the cell has ceased to grow. For plants, secondary cell walls help produce strong xylem fibers, which are used to transport water and minerals from the roots to the remaining parts of the plant. The secondary cell walls all offer strong rigid structure, which allows trees and other woody plants to stand tall for many years. Secondary cell walls serve a very important impact for human life because they are huge components for woods and other products such as paper, musical instruments and many others (Zhong and Ye 2009). Secondary cell walls in wood and fibers are also important renewable sources of biofuels. Therefore, this could reduce our dependency on other resources such as petroleum. My research focuses on the transcriptional regulation of secondary cell wall production in biofuel crop plants. Transcription factors control the activation of genes in the genome. The transcription factor binds to DNA and other proteins, in order to turn genes off or on. Transcription factors work by recognizing certain nucleotide sequences before the gene on the chromosome. The transcription factor that this research will be focusing on is SND1. This particular transcription factor is known to activate the biosynthesis of the secondary wall and particularly the secondary biosynthesis of Arabidopsis. We will be investigating whether switchgrass SND1 orthologs can activate the secondary wall biosynthetic program, as does Arabidopsis SND1. Switchgrass, also known as Panicum virgatum, is a warm-season tall grass found in North America. It is very versatile and adaptable. Today, it is mostly used to control erosion. Switchgrass is also known to provide excellent habitat for wildlife. Research has proven that switchgrass is a good renewable bioenergy crop because of its ability to produce high yields on marginal farmlands. Benefits such as stand longevity, drought and flooding resistance, relatively low herbicide and fertilizer input requirements are some of the many advantages of producing switchgrass.

Using various scientific techniques, we will investigate whether switchgrass SND1 orthologs play a role in the biosynthesis of secondary wall biosynthesis. This research project involves the use of the GenBank database to identify switchgrass transcription factor genes that show close sequence homolgy to the Arabidopsis SNDI gene. The PCR will be used to amplify the swtichgrass transcription factor cDNA, and they will be engineered between the CaMV 35S promoter and a terminator in an expression vector. The engineered genes will be transferred into Arabidopsis protoplasts to test their ability for activation of secondary wall biosynthesis genes.

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The Use of Motion Picture Narrative to Capture the Relationship between Gender Identity and Expression

2013 Summer Fellow: Barry Ervin
Research Mentor: Dr. Jennifer Smith, Department of Telecommunications

> Gender is, above all, a social construct, arbitrary and varying from one society to another, related to sex but not identical with it . . . Moreover, the relations between gender and sex are as various and problematic as those between signifying words and signified meanings or between poetic fictions and the elusive "realities" they imitate.
>
> *-Androgyny, Mimesis, and the Marriage of the Boy Heroine on the English Renaissance Stage,* Phyllis Rackin

In the dissolution of gender binaries, there is no simple explanation connecting gender and sexual orientation. Rackin reaches for her own expression of gender's relationship to sexuality in the signifier and signified corollary. She relates sexuality to an arbitrary object that is inevitably expressed and ultimately seen through gender. In this way, Rackin positions gender as an art in observation and expression, not unlike the forming of poetry based on experiences, or in the case of my research, the capturing of light within a camera.

In the film *Boys Don't Cry* directed by Kimberly Peirce, the protagonist Brandon seeks peace within his identity. Born female, Brandon actively rejects his biological gender and the gender binary present within his Southern, agrarian, environment. Peirce positions Brandon's battle as a transgender male as the focus of the film, often allowing the immediacy of Brandon's changing gender to replace narrative relevance. Many films like *Boys Don't Cry* that explore transgender conditions assume a similarly chaotic and overwhelming representation, discouraging nuance in the realms of narrative structure and cinematography. This extreme representation verges on creating another binary, failing to communicate the reality of gender as a complex spectrum. As part of this research and analysis, I will write and direct a narrative short film that embodies the immediate role of the gender spectrum in the progression of film as art, focusing on the concentrated decisions of cinematography and narrative progression.

This research contains the survey and analysis of film works, literature, journal articles, and philosophy, searching for other directors', artists', and scholars' interpretations of the gender spectrum. I will explore the interplay between gender as an expression of sexuality and seek to convey this signified and signifier relationship through the mimetic relationship of manipulated light to exposed film or sensor. In this sense, the execution will be both philosophically and technically applied, verging on a manipulated view that communicates a complex notion of transgender life.

From these philosophical and technical underpinnings, I will complete a screenplay that I will have worked on incrementally during my research this semester. As the director I will concentrate on authoring the actors' performances and planning the cinematic shots, keeping in mind the need for a nuanced expression of gender as a spectrum. I will also lead a crew that will handle the other aspects of the filmmaking process, cooperating towards the vision expressed in the screenplay. Due to the nature of filmmaking, the preproduction process needed to make a polished film must start months prior. My current research with Prof. Smith has begun this process to ensure that if granted a CURO Summer Fellowship, the summer period can be dedicated to the research towards and finalization of the script, its characters, the shooting of the film, and the editing of the footage into its final form.

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The Heritage of Slavery on the Shields-Ethridge Farm

2013 Summer Fellow: Seth Euster
Research Mentor: Christopher Lawton, Department of History

In his essay "Coming to Terms with Slavery," historian Ira Berlin discusses the anonymity of the "plantation generation" of slaves; writing, "[t]he biographies of individual men and women, to the extent that they can be reconstructed, are thin to the point of invisibility.[1]" This is a troubling and thankfully untrue assertion. Through my research, I will continue to prove that contrary to Berlin's statement, 21st century historians can erase the invisibility of the lives of the "plantation generation" of slaves by creating detailed biographies and fully developed historiographical analyses of the slaves' lives and communities. I will continue to expand the sizable foundation of research that I have amassed (and presented) on the slave community that existed on the Shields plantation (currently known as the Shields-Ethridge Heritage Farm) in nearby Jefferson, Georgia. Through analysis and reconstruction of the lives of the slaves who served the Shields family (a feat possible due to the vast array of primary documents on the farm as well as courthouse and census records), I will tell the story of slavery on the Shields plantation. This is not an insignificant story, and thus research on this slave community will allow me to broaden the scope of my analysis to the general slave experience in the rural lands that surround Athens, Georgia.

The slave experience on the Shields plantation was one filled with the same forces of white fear, capitalism, and paternalism that slaves everywhere were forced to confront. Thus, by "linking the particular with the universal," as historian David E. Kyvig would put it, I will show how the story of slavery on the Shields plantation fundamentally tells the story of the slave experience in the antebellum South[2].

The continuity in the documentation of slavery on the farm, as well as of African-American sharecropping after emancipation, provides a tremendous opportunity for African-American genealogical tracing. An integral part of this research project has been, and will continue to be, mapping the genealogy of the slaves on the Shields-Ethridge Heritage Farm. Already, I have traced the genealogy of the first slave Leah, purchased by the family in 1799, to modern times. Amazingly, her family is having a family reunion this summer in Stone Mountain, Georgia, and I (along with Susan Chaisson the owner of the farm) will be in attendance. African-American genealogical tracing has been a task I have sought to incorporate into my project this semester, and I intend to make an even more significant contribution to African-American genealogy through my research over the summer.

In an effort to add depth to the biographies and analysis on the lives of these slaves, I will be working on obtaining (and possibly creating) compelling visuals to accompany my extensive written work. Hope Hilton, the curator of the Athens Institute for Contemporary Art, will advise and guide my use of the various photographs of people and documents that help in "fleshing-out" the story of slavery on the Shields plantation. Amazingly, a photograph exists of a slave named Jarva, as well as a 1946 Christmas family photograph picturing the children and grandchildren of Shields slaves sitting with the white Shields-Etheridge family.

On one hand, the story of slavery on the Shields plantation is filled with the many complexities that highlight the challenges of recreating a slave community and tracing African-American genealogy. On the other hand, the story of slavery on the Shields plantation is crucial to expanding our understanding of slavery in the lands surrounding Athens. Furthermore, the focus of this project on understanding the lives of individual slaves will expose and possibly ameliorate some of the struggles that inevitably arise in dealing with the place of slavery in our state and national memories.

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2. David E. Kyvig, *Nearby History: Exploring the Past Around You*, (Blue Ridge Summit, PA : Rowman and Littlefield Publishing Group, 2010), 227.

Investigating Female Re-mating Rates in Wild *Drosophila neotestacea* and Their Association with Sex-ratio Drive

2013 Summer Fellow: Emily Fawcett
Research Mentor: Dr. Kelly Dyer, Department of Genetics

Selfish genetic elements are portions of DNA that increase rates of their own transmission without benefitting the organism itself or increasing its fitness. Sex ratio (SR) drive is a specific type of selfish genetic element found on the X chromosome that acts in males to destroy sperm that carry a Y chromosome. Thus, males that carry a SR drive X-chromosome produce almost exclusively female offspring. If the SR drive chromosome spreads and the population becomes heavily female-biased, many females will go unmated because males are rare. This can ultimately lead to the extinction of the population and the selfish element (Jaenike 2001).

In the fly *Drosophila neotestacea*, the frequency of SR varies among populations from 0 to 30%, although the exact cause for this variation is unknown (Dyer 2012). One factor that may be important in this variation is the mating rate: since SR drive kills half of a male's sperm, an SR male may become sperm limited and thus sire fewer offspring when flies mate often (Price et al. 2010). The Dyer Lab has found that in the lab, females from populations with a higher prevalence of SR drive mate less often than females from populations where SR is rare. Polyandry, or multiple mating by a female, may lower levels of SR in a population because it leads to increased sperm competition and thus lowers SR male fertility relative to non-SR males.

I will investigate female mating rates in wild-caught female flies and determine whether patterns of female mating in the wild are the same as those found in the lab (Price et al. 2011). I will focus on two populations in the Great Smoky Mountains in Tennessee that are known to differ in SR frequency between high versus low elevation populations (13% and 25%, respectively). I hypothesize that if levels of female mating are important in the persistence of SR, then there will be a difference in number of males a wild-caught female has mated with between high and low elevation populations. Specifically, I predict that wild-caught females from high elevation where SR is rare will have mated with more males than females from low elevation where SR is common.

Last summer, the Dyer Lab collected flies from high and low elevations in the Smokies, and froze the wild females and their offspring. I will use 20 of these wild-caught females from each elevation and 20 offspring from each female. I will extract DNA from these samples and use four highly polymorphic microsatellite loci to examine each of them. I am currently continuing the work that I started last semester by determining which microsatellite loci are the most variable (Dyer 2007).

Microsatellites are sequences found in genomes that vary in length. They are the basis of analyses such as genetic fingerprinting and are commonly used in human paternity analysis and crime scene forensic studies. The more variable a particular microsatellite locus is, the more useful it is in paternity analysis because it has a greater confidence in assigning whether two individuals are sired by the same father.

From here, I will use statistical analyses, specifically Bayesian methods, to infer how many males sired each female's brood and thus estimate the female mating rate in the wild. First, I will determine if there is a difference in female mating rate in high versus low elevation populations. Second, since we already have estimates for the prevalence of SR in high versus low elevation populations, I will also determine whether the female mating rate is associated with local SR prevalence. This experiment will allow me to determine if patterns found in the lab are also found in the wild. Through studying levels of multiple mating in natural populations, this experiment will lead

to a greater understanding of the evolution of selfish genetic elements and the mechanisms that affect their spread in the wild.

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Investigating the Genetic Factors Responsible for Postzygotic Isolation between Two *Mimulus* Species

2013 Summer Fellow: Austin Garner
Research Mentor: Dr. Andrea Sweigart, Department of Genetics

According to the biological species concept, a species is a group of interbreeding organisms that are reproductively isolated from other like groups (Mayr 1942). With respect to this concept, many biologists have sought to elucidate the evolution of reproductive barriers to understand the forces that drive speciation. The evolution of prezygotic reproductive isolation (e.g., behavioral or ecological differences that prevent zygote formation) is often a straightforward consequence of divergent natural selection for distinct environments (Coyne and Orr 2004), but the evolution of postzygotic reproductive isolation (hybrid lethality and hybrid sterility) has captivated biologists because it cannot be favored by natural selection (Darwin 1859). Although we now have genetic models to explain how such hybrid incompatibilities arise (Bateson 1909; Dobzhansky 1937; Muller 1942), their underlying molecular and evolutionary mechanisms are still enigmatic. With the proposed research, I will investigate the genetics of hybrid lethality between two species of *Mimulus*, *M. tilingii* and *M. guttatus*. It is known that imprinted genes, which are differentially expressed depending on their parent of origin, regulate endosperm development in flowering plants (Gehring et al. 2004). Because endosperm defects often cause embryonic lethality (Lin 1984), I hypothesize that this reproductive barrier between *Mimulus* species could be due to an incompatibility between imprinted genes (e.g., Kohler et al. 2010; 2011).

The *Mimulus* genus is a rising system for studying the genetics of speciation, especially in regards to reproductive barriers (Wu et al. 2007). In this study, we will focus on the genetics of early embryonic lethality between inbred lines of *M. tilingii* and *M. guttatus* (derived from a high-alpine population in California and a coastal population in Oregon, respectively). These two species exhibit strong postzygotic reproductive isolation in spite of their recent divergence, providing an opportunity to examine the evolution of such barriers (Coyne and Orr 1989).

With this study, I propose to measure the strength of reproductive isolation and to identify the genes that cause early embryonic lethality in *Mimulus*. First, to quantify the strength of hybrid lethality I will perform interspecific crosses between 20 individuals of each parental line. I will also artificially self-pollinate each individual to provide a baseline for the fertility of our individual inbred focal lines. Seeds from these crosses will be analyzed by eye for viability and then planted and germinated under controlled conditions at the UGA Botany Greenhouses; after four weeks without germination individual seed will be deemed inviable. This experiment will determine whether visual inspection of seed viability is an accurate predictor of germination rates. Second, to investigate the genetics of hybrid lethality, I will cross first generation hybrids, F1s, with both parental lines to form two backcross mapping populations (N = 150 each) with individuals that carry a variety of genomic combinations. I will classify phenotypes by crossing individuals back to the parental lines and scoring their corresponding proportion of viable seed. For each mapping population, I will perform genotyping-by-sequencing using methods developed by Andolfatto et al. 2011 and our lab (A. Kenney unpubl.). To identify genomic regions that contribute to hybrid lethality, I will create a linkage map using JoinMap and will perform quantitative trait locus (QTL) mapping using rQTL. These regions will be screened for candidate genes known to be involved in genomic imprinting in other flowering plant species.

To date, I have seeds for parental lines and reciprocal F1 hybrids. I am also currently performing backcrosses to generate our mapping populations. With this research I will gain insight

into the forces that guide the evolution of speciation and learn the molecular genetics and evolutionary basis of hybrid incompatibilities.

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The Connection between Glycosaminoglycans and Pectins

2013 Summer Fellow: Elizabeth Guarisco
Research Mentor: Dr. Carl Bergmann, Department of Biochemistry & Molecular Biology

Glycosaminoglycans (GAGs) are polyanionic macromolecules localized in the extracellular matrix that have important structural roles, but also affect the properties and mechanism of cell function. The chondroitins, a class of GAG, have been shown to act directly upon cell receptors or via interactions with growth factors, and serve as biomarkers for disease diagnosis and progression. Chondroitins interact with a diverse assortment of proteins due to their ubiquitous appearance in the extracellular matrix and on cell surfaces (Prabhakar et al. 2005). Chondroitinases cleave chondroitins at specific glycosidic linkages (Capila et al. 2002). Chondroitins and the enzymes capable of their destruction warrant understanding due to the diverse cellular processes they are involved in: differentiation, communication, proliferation, adhesion, and migration (Haung et al. 2002). Furthermore, the application of chondroitin degrading enzymes extends to wound healing, tissue growth, angiogenesis in abolishing tumors, and curing diseases involving GAG-binding proteins on the pathogen (Fikri et al. 2007).

The corresponding plant matrix polysaccharides are the pectin polysaccharides, partially esterified macromolecular polygalacturonic acids (Gemeiner 2012). Glycosaminoglycans and pectins provide, in separate species, similar functions. The exploration and utilization of the natural properties of pectins has resulted in diversified and varied applications. Pectins are currently utilized as antidiarrheal substances, toxin adsorbers, and are capable of immunostimulating activity, antiulcer activity, anti-metastasis activity, anti-mutagenic activity, anti-nephrosis, cholesterol decreasing activity (Yamada 1996), and even induction of apoptosis in colonic adenocarenoma cells (Olano-Martin et al. 2003).

The similarity between the functions of pectins and GAGs suggests possible insights into the mechanism by which pectins impact human health. The three-dimensional structures between bacterial enzymes which degrade chondroitins and fungal enzymes which degrade pectins (PDEs or pectin degrading enzymes) show striking similarity. Previous studies in our lab, based on this three-dimensional structural similarity, revealed that pectins are able to bind glycosaminoglycan degrading enzymes and alter their glycosidic activity. Likewise, chondroitins are able to bind pectin degrading enzymes and alter activity. Pectin degrading enzymes could alter cell processes moderated by GAGs and how chondroitins perform, opening up the utilization of these molecules in treatment of conditions such as spinal cord injury, where improper deposition of chondroitins leads to inhibition of new axon growth. Those results were based on activity assays and changes in fluorescence to demonstrate predicted conformational changes in binding. What was needed was direct evidence of the thermodynamics of binding of pectins to chondroitinases and chondroitins to PDEs. This can be obtained using SPR (surface Plasmon resonance).

I began this project in fall 2012 by working out the initial conditions to immobilize PDEs and chondroitinases on an SPR sensor chip. I have begun testing combinations of the pectins, chondroitins, PDEs and chondroitinases. This will continue through the summer, and should provide the data to add to the fluorescence and activity results to more fully understand the interaction among these molecules.

During the summer, I will also begin to test the effects of EPGs, a class of PDE, and pectins in vivo. The common fruit fly, *Drosophila melanogaster*, provides a useful model system to investigate the biological function of molecules. Drosophila makes chondroitin and heparin sulfate and also has its own set of GAG degrading enzymes, but it does not have any pectin degrading enzymes. By generating transgenic Drosophila strains that do express the PDEs or that express inhibitory

proteins that block PDE activity, we will be able to assess whether changes in GAG biosynthesis or degradation affect development. Depending on the phenotypes that we observe, it may be possible to identify specific cell signaling pathways that are most sensitive to altered GAG levels. This in vivo approach is likely to reveal new functions for GAGs and new ways to manipulate the availability of these important extracellular molecules.

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Norse Mythology in Modern Popular Culture

2013 Summer Fellow: Joseph Hopkins
Research Mentor: Dr. Alexander Sager, Department of Germanic and Slavic Studies

Norse mythology, the historical mythology of the North Germanic peoples, has returned as a major cultural force in modern popular culture in recent years. Recent international blockbusters such as "Thor" (2011), "The Avengers" (2012), "The Hobbit" (2012), and "Django Unchained" (2012) borrow core elements from Norse mythology, including characters, plot lines, and even wholesale lists of names, and upcoming sequels, such as "Thor: the Dark World" (2013) and two upcoming sequels to "The Hobbit," show that this widespread cinematic fascination will only continue. Meanwhile, a seemingly never-ending stream of video games featuring references to Norse mythology continues to flow, such as "The Elder Scrolls V: Skyrim" (2011) and "World of Warcraft" (2004, ongoing expansions). These successes have generated millions upon millions of dollars in revenue.

Other forms of the arts, too, are replete with references to the subject; particular genres of music show a consistent fascination with the topic, with musical groups such as the melodic death metal band Amon Amarth (Sweden), who have recently conducted regular tours of the United States. Outside of the subcultural arena, companies such as Odin (designer clothing, New York) and Loki (active wear, Colorado) directly reference Norse gods. And this is but a small sample; references such as these are seemingly everywhere.

As a new religious movement, Germanic Neopaganism (or Germanic Heathenry) is also growing. A form of Germanic Neopaganism now constitutes the largest non-Christian religious sect in Iceland[1] and forms continue to grow in North America, where the first heathen politician, Dan Halloran, now holds office in Queens, New York as a member of the New York City Council from the 19th district[2].

Norse mythology was, to varying extents, deleted under Christianization. Yet with secularism as a component of society and with the advent of the internet it has again appeared among its linguistic descendants[3] as a cultural component at multiple levels of Western society. Is some sort of cultural metamorphosis occurring? Are these old myths taking on a new life of their own under the influence of modern popular culture? Will they eclipse the influence of Classical mythology? With our proposal we hope to shed light on the place of Norse mythology in modern popular culture.

Analyzing a diverse yet targeted data sample may provide some answers. The public understanding of this material and currents of influences at play have been little studied, however. Therefore, under the guidance of Dr. Alexander Sager of the Germanic and Slavic Studies Department here at UGA, we propose that I, Joseph Hopkins, interview individuals in both Georgia and Scandinavia (based primarily in Copenhagen, Denmark) from a variety of walks of life—from bankers to neopagans—on their understanding of Norse mythology.

Using interview questions developed by Dr. Sager and myself (with the assistance of graduate student Matthew May of UGA's Department of Sociology), these targeted interviews will be recorded, transcribed, and made publicly available. We aim to process at least several dozen interviews. This data will be analyzed and lines of influence will be identified.

As I have some background in photography, consenting subjects will also be photographed. The results of this survey will be detailed in future presentations. Data gathered will inform future projects of my own on the topic of the modern relevance of Norse mythology in popular culture.

The raw data sample and its results will be of particular interest to philologists, anthropologists, folklorists, theologists, sociologists, and academic departments considering the addition of a Norse mythology course. Additionally, while conducting research in the field, a syllabus

based on the reception of Germanic mythology in the modern era developed by Dr. Sager and myself will be adhered to.

Notes:

1. For a statistical breakdown of religious groups in Iceland, see Statistics Iceland: http://www.statice.is/Statistics/Population/Religious-organizations

2. Pillifant, Reid. "'Heathen Halloran Captures Council Seat". *The New York Observer*. September 4, 2009. Online: http://observer.com/2009/11/heathen-halloran-captures-council-seat/

3. Old Norse was a major influence on its sister language, Old English. Anglo-Saxon mythology descended from the same source as Norse mythology; the religion of a common people speaking a language generally referred to as *Proto-Germanic*.

Effects of Music on Male Aggression: Do Lyrics Really Matter?

2013 Summer Fellow: Courtland Hyatt
Research Mentor: Dr. Amos Zeichner, Department of Psychology

Since the beginning of the 20th century, human accessibility to media has increased substantially. Technological advancements like radio, television, and the Internet have revolutionized our ability to consume media, both in quantity and content. Like all other media, this explosion has inextricably transformed music in availability. Listeners no longer need to be physically present for a piece's performance to experience it. In fact, it is difficult to escape the presence of music in modern social life. As the pervasion of music in human life grows, so does its impact on psychological health and behavior. Thus, elucidating the relationship between music and behavior is imperative, specifically deleterious behavior such as aggression.

Previous studies on music, lyrics, and aggression have confirmed the presence of a relationship among these constructs, but its parameters remain uncertain. Anderson and colleagues conducted a study that found that exposure to music with violent lyrics related to aggressive cognition and affect (Anderson et al. 2003). Unfortunately, this study did not examine the relationship between these risk factors and actual aggressive *behavior*. In a seminal paper, Fischer and Greitemeyer (2006) conducted a study wherein participants listened to songs with either misogynous or neutral lyrics followed by participation in an aggression paradigm. Findings indicated that men who were proximately exposed to misogynous lyrics aggressed significantly more toward a female confederate than they did toward a male, and that these men also aggressed significantly more toward the female than did men proximately exposed to neutral lyrics.

Despite this study's important findings, its methodology had important limitations, which include the stimuli used, such as extreme disparities in lyrical content between the songs within the misogynous condition, and genre inconsistency; one variation of the misogynous condition contained a "punk rock" song, another a "hip-hop" song, and the neutral condition contained neither. As each of the aforementioned musical styles is traditionally upbeat and energetic, the subsequent aggressive behavior observed in the study could have resulted from arousal (being "hyped up" and "energized") by the music rather than being inspired by the lyrical content. The present study will attempt to address these limitations and reexamine the relationship between misogynous lyrics and male aggression toward women. It is hypothesized that men in the misogynous lyric condition will exhibit higher levels of aggression toward a female confederate than a male, and these men will also aggress more toward the female than men in the neutral lyric condition.

One hundred-twenty men will be recruited as volunteers for a two-part study. In Part 1, participants will complete questionnaires designed to gather information about past aggressive behavior and personality traits (e.g. narcissism) that have been associated with aggressive behavior. In order to control for demand characteristics, participants will wait at least two days before completing Part 2, in which they will be exposed to one of two pieces of music, one with misogynous lyrics, and the other with neutral lyrics. The two pieces of music will have *identical* accompaniment tracks and will only differ in lyrical content. Furthermore, in order to control for music-related arousal, the accompaniment track will not be upbeat and energetic. To ensure attendance to the stimuli, participants will be informed that they will be asked to express their opinion of the piece at the end of the experiment. The songs will be specifically constructed for this project to ensure that participants have not had differential levels of prior exposure to the song. To measure aggression, the present study will make use of the Response-choice Aggression Paradigm, which involves a bogus reaction time competition against an ostensible confederate (Zeichner, Frey,

Parrott, & Butryn 1999). Opponent gender will be systematically varied in order to examine the lyrics' effects on male aggression toward both women and men. During the summer, I will conduct several pilot studies to ensure that the stimuli are interpreted as intended, and begin to run male participants from the Psychology Department research participant pool.

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The Effects of Autophagy and Necroptosis in the Murine Model of Placental Malaria

2013 Summer Fellow: Mathew Joseph
Research Mentor: Dr. Julie Moore, Department of Infectious Diseases

A major health issue in the developing world during pregnancy is malaria; nearly half the world's population lives in a high-risk area (warm and humid areas) and the infectious disease results in close to one million fatalities yearly[1]. *Plasmodium falciparum*, transmitted by the *Anopheles* mosquito, is the deadliest protozoan parasite which causes malaria in humans[2]. The Moore Lab works with two types of malaria: cerebral and placental. Placental malaria is characterized by the accumulation of parasitized red blood cells and migration of leukocytes into the placenta[3]. This disease is known as placental malaria (PM) and leads to stillbirth, low birth weight, and abortion[4]. My intended project proposal for this summer will seek to study the mechanisms underlying PM.

Autophagy is a catabolic process and a vital cellular response. This occurs during periods of nutrient deprivation, low energy levels, and intracellular stress. Autophagy describes the process by which cells use lysosomal machinery to degrade and recycle organelles into their organic components for energy. We hypothesize that accumulation of parasitized red blood cells and infiltration of leukocytes in the placenta during malaria infection will induce excessive autophagic activity in the placenta, thereby contributing to poor birth outcome. We intend to initiate studies of malaria during pregnancy using *Plasmodium chabaudi* AS (a rodent-infecting plasmodial species that resembles *Plasmodium falciparum*) to infect C57BL/6J (B6) and A/J mice as model platforms for understanding the immunopathogenesis of PM. On day zero of pregnancy, mice will be infected with 1,000 *P. chabaudi*-infected red blood cells. Throughout gestation, secreted cytokines and chemokines will be assayed by ELISA, an assay which uses antibodies and visual color changes to identify substances. In this case, we will be looking for inflammatory proteins that may stress the placenta and initiate the autophagy pathway. Tissues from mice spleens and fetoplacental units will be collected at sacrifice and homogenized for proteins and RNA isolation. cDNA will be made from the RNA and real-time PCR will be performed to assess levels of autophagy-related genes relative to the housekeeping gene 18S rRNA. Markers for autophagy to be used in PCR include LC3a, LC3b, BEC-1, and Atg5. These markers all correspond to transcripts of activated proteins in the autophagic pathway. Immunohistochemistry will be performed to histologically view markers for autophagy-related proteins in situ. Using fluorescence microscopy, we will also be able to visualize details of the cell and localize autophagy occurrences. We will compare the data obtained for four autophagy markers between infected pregnant (IP) A/J and B6 mice and their uninfected pregnant (UP) counterparts. If our hypothesis is correct, we expect higher levels of autophagy in IP B6 mice as compared to the other experimental mice.

We are also interested in necroptosis, a programmed and regulated process leading to the formation of necrotic tissue. This has been implicated to occur in malarial infections, and necrosis of the placenta and embryo has been observed in the Moore lab. The RIP1/RIP3 necrosome, part of the cellular growth pathway, is known to be activated during necroptosis[5]. Following the autophagy experiments, we intend to use real-time PCR to compare levels of RIP1and RIP3 between IP and UP B6 and A/J mice to note any possible differences in expression of the necroptosis pathway. If results are positive, a future direction would be to conduct the same experiments using RIP3 knockout mice, to see if these mice still undergo necroptosis.

Preliminary data indicate that *Plasmodium chabaudi* induces local and systemic profinflammatory responses, and autophagic response data will be analyzed to assess correlation with pregnancy outcome. In conclusion, our research analyzes the mechanistic basis for malaria-

induced compromise of pregnancy, especially midgestation, when high parasitic density is coincidental with pregnancy loss in our model. This proposal for the summer promises to reveal common and critical mechanisms which contribute universally to malaria compromised pregnancies.

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Assessing Potential Range Shifts of the American Alligator with Sea Level Rise

2013 Summer Fellow: Lara Mengak
Research Mentor: Dr. Nathan Nibbelink, Warnell School of Forestry and Natural Resources

Rising sea levels precipitated by climate change threaten the southeastern coasts of the United States. Specifically, models indicate a substantial loss of salt marsh habitat and a transition from current freshwater marsh to saltwater and brackish marsh habitat, which could significantly affect marsh-dependent species. Historically, species have responded to sea level rise by migrating further inland; however, the current rate of predicted environmental change may be too rapid for adaptation and important coastal habitat and species will be lost[1]. One such species, the American alligator (*Alligator mississippiensis*), functions as a keystone species and an ecosystem engineer by creating "gator wallows." Many other species depend on these wallows, or small freshwater pools, during dry months.

Despite its currently stable population size, the alligator is listed as "threatened due to similarity of appearance" to other endangered crocodilian species. As a top predator, alligators also pose the potential for conflict with humans. As sea levels continue to rise and alligator habitat distributions shift, alligators may be forced into increasing contact with humans. The alligator's conservation status and potential for conflict make an understanding of its potential responses to environmental change critical. Determining how alligator habitat may change with sea level rise will be important in guiding future management recommendations.

My research will assess the potential response of American alligators to predicted sea level rise by examining changes in their habitat location and quality. Using available literature, I have defined potential alligator habitat as brackish or saltmarsh habitat close to freshwater habitat. Potential habitat was classified into SLAMM (Sea Levels Affecting Marshes Model) habitat categories. We used SLAMM outputs in a preliminary model to show how the quality of alligator habitat is predicted to change. This model is based on the hypothesis that high quality habitat includes areas at the transition between fresh and saltwater habitat. Habitat in these areas best optimizes the distance between good habitat for nesting (freshwater) and the most productive foraging habitat (saltwater). The model outputs also show high quality habitat area increasing as it moves further inland. With sea level rise, this high quality habitat will move closer to human populated areas.

I will test hypotheses about what constitutes good alligator habitat during the summer by collecting occupancy and abundance data for alligators. Data will be collected using spotlight surveys at a gradient of sites along the Georgia coast from saltmarsh and brackish marsh to adjacent freshwater areas. Field data will then be used to predict suitable alligator habitat, which can then be projected into the future using SLAMM 6 land cover projections. Additionally, I will use the models to determine the distance between alligator habitat and developed areas to assess the potential for conflict.

Like all coastal species, the alligator may be significantly affected by sea level rise. The transition of marsh habitat coupled with changes in habitat area and quality will pose particular challenges to alligators and those that work to manage and protect their populations. This project will provide better estimations of the alligator's response to sea level rise and result in valuable management recommendations.

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Investigating the Indirect Effects of Guppy Introduction on Populations of a Shredding Caddisfly, *Phylloicus hansoni* (Trichoptera: Calamoceratidae) in Trinidadian Streams

2013 Summer Fellow: Kelly Murray
Research Mentor: Dr. Catherine Pringle, Odum School of Ecology

In Trinidadian streams, guppies (*Poecilia reticulata*) have naturally colonized or were introduced to regions where previously only one other fish species, the killifish *Anablepsoides hartii*, existed. Communities with and without guppies can be found in the same stream, less than 200m apart, separated by large barrier waterfalls, above which killifish, but not guppies, can migrate. Long-term research in this system has shown that guppy introductions to these low-predation sites can initiate evolution of guppy life history traits[1] and may cause changes in ecosystem-level processes[2, 3]. Here we will study how guppy presence influences populations of the leaf-shredding caddisfly, *Phylloicus hansoni*, which is a dominant decomposer in these tropical streams[4]. Leaf input is a key source of nutrients for headwater streams[5], and shredding invertebrates like *Phylloicus* have an important role in leaf breakdown within a stream ecosystem[6, 7].

A previous survey of macroinvertebrates in the paired killifish+guppy (KG) and killifish-only (KO) reaches of eight streams showed that regions with guppies generally have higher abundances of *Phylloicus*. Killifish, which consume *Phylloicus*, have densities typically 3-4 times higher in KO sites than KG sites. We hypothesize that differential predation pressure by killifish, due to niche partitioning in response to guppy presence, is also contributing to observed differences. This is currently being investigated with a gut content analysis project. To further examine *Phylloicus* population characteristics and leaf decomposition as a function of fish assemblage, studies focusing on *Phyllocius* abundances and life history will be continued in Trinidad this summer. Leaf-packs will be placed in both KO and KG reaches to be colonized by *Phylloicus*. These samples will provide data on abundances of *Phylloicus* in addition to changes in leaf mass over time as a function of shredding activity by *Phylloicus*. We predict that KG reaches will be associated with both larger *Phylloicus* populations and more rapid leaf breakdown.

To analyze how life history traits of this caddisfly species could also be impacted by differential predation pressure between reaches, we will measure body size of *Phylloicus* specimens and study the progression of life stages of individuals from different reaches. We hypothesize that killifish in KO reaches place greater predation pressure on larger *Phylloicus* individuals, which would result in a higher frequency of smaller individuals in the stream community. Size-specific predation can induce life history evolution, because selection will favor individuals that reproduce earlier and at smaller sizes[8]. Predation pressure can cause faster rates of development in aquatic insects, which results in smaller size at metamorphosis[9]. We will test this prediction by investigating the life cycle of *Phylloicus* in Trinidadian streams with differential predation risk. We will study patterns of development in this species by collecting specimens of various sizes and observing growth of individuals in a laboratory setting. We aim to determine whether *Phylloicus* individuals from KO sites metamorphose at smaller sizes than those from KG sites.

Field work and experiments will be conducted in Trinidad over several weeks in May 2013, while sample processing and data analysis will be completed in Athens. Quantifying *Phylloicus* demography can further our understanding of how changes in a community of fish can impact macroinvertebrate populations, which also affects invertebrate-mediated processes, including the decomposition of allocthonous material. The effects on *Phylloicus* populations provide an opportunity to translate the impacts of guppy introduction and subsequent killifish predation response on the availability of resources through leaf decomposition rates, due to *Phylloicus*' function

as a shredding invertebrate. We can use this system to study how changes in community interactions can have cascading effects on ecosystem-level processes within the unique context of the evolutionary and ecological feedbacks within these Trinidadian streams.

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Analysis of Cancer Mutations in Protein Kinases using Semantic Web Technologies

2013 Summer Fellow: Anish Narayanan
Research Mentor: Dr. Natarajan Kannan, Department of Biochemistry & Molecular Biology

Protein kinases are essential regulators in the cell and constitute one of the largest and most diverse gene superfamilies in the genome. By driving cellular activities through a process of phosphorylating protein substrates, kinases play an important role in signal transduction pathways and the coordination of cell processes[1]. Currently, there is a vast amount of useful data present online regarding protein kinases collected from various high throughput studies. However, the information is scattered across many websites, such as *UniProt*, *Kinbase*, *COSMIC*, and *Reactome*, each of which specializes in one narrow aspect of kinase knowledge. How can we solve the challenge of data integration in a manner that can be used to formulate valuable and insightful conclusions?

Ontologies are one way to solve this problem of integrability. By combining the information from all of these data sources into one location, cross comparisons can easily be made between these different databases. Our lab developed *ProKinO* (the Protein Kinase Ontology) with this goal in mind[2]. Using this powerful tool, it is now possible, for example, to link mutation data (from COSMIC) to pathway and reaction data (from Reactome) by querying a single composite database to perform complex bioinformatics analyses. In order to illustrate the potential value of such a data-mining approach, I have written a series of simple data SPARQL queries for *ProKinO*. Then, by meticulously analyzing the data generated from them, I have drawn some interesting conclusions about the fundamental nature of kinases by studying the relationships between subdomains, structures, isoforms, mutations, and other intriguing kinase properties.

One of the unique benefits of *ProKinO* with respect to uncovering new results is that specific queries can readily be zoomed in on for further study. An example of this stemmed from a query which was designed to count the isoforms of all kinases across species. From the results gathered here, it was noted that there was one kinase, Kin1, which had thirteen different isoforms. Using this finding and sequence data gathered from the ontology, the various alternative splicings were determined. This agrees with fact that Kin1 expression is controlled post-transcriptionally in a manner that results in differential expression during embryo, larva, and adult organism development[3]. Another advantage to the ProKinO approach is that it allows for the accomplishment of global analyses that would otherwise be exceedingly tedious with the current tools available to biochemists. One interesting query that resulted from this top-down approach involved discovering trends in mutational distributions across kinases based on the amino acids that constituted the primary structures of those proteins. By scanning over 500 different human kinases for documented mutations found within their sequences, an interesting distribution of wild type amino acids prone to mutations was tabulated; some amino acids, such as arginine, appeared in the results several times more than what would be expected. Based on this peculiar finding, our group was then able to further explore the distribution for each of the amino acids across different defined regions of the kinase domain (assisted by even more data gathered from other ProKinO SPARQL queries).

Even with these connections made, there are still plenty of unique relationships that remain hidden. I hope to uncover and describe a handful of these over the course of the summer fellowship. Under the guidance of Dr. Kannan, one of the patterns that I will be examining is the natural co-occurrence of mutations in kinases. Based on the patient data that ProKinO had compiled, I am searching for groups of mutations that repeatedly appear together in patients and am studying what common phenotypes are expressed in such individuals. One kinase in particular, EGFR (epidermal growth factor receptor), is rich in the occurrence of pairs of mutations, which

agrees with previous work[4]. Combined with three-dimensional protein kinase structure data, I hope to find an explanation for the tandem appearance of these and other mutations.

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Characterization of the Light Signaling System in Fireflies

2013 Summer Fellow: Jennifer Pallansch
Research Mentor: Dr. David Hall, Department of Genetics

The universal nature of communication systems makes an understanding of their evolution a central question in biology. All signals, including chemical, sound, and light, must be produced, propagated through variable environments, and then received by target individuals, with little loss of information. In the vast majority of species, the molecules underlying signal production and reception are usually unknown or complex, which makes an understanding of their evolution essentially intractable. The system in which I work is one of few exceptions. Signaling in the firefly beetle family has a well-characterized molecular basis for both reception, controlled by proteins in the opsin family, and light production, which facilitates a genetic study of their communication (Branchini, Southworth, Khattak, Michelini, & Roda, 2005; Yuichi & Takahiko 2009). My project focuses on light production.

Light in fireflies is produced when the enzyme luciferase catalyzes the oxidation of its substrate, luciferin (da Silva & da Silva 2012). Across firefly species several different light colors are produced, ranging from orange to blue. However, this variation has not been precisely characterized outside of the luciferase gene in *Photinus pyralis* nor has its genetic basis been examined (Marques & da Silva, 2009). Further, there is essentially no information on light color variation within a species. My project will fill two gaps in our knowledge concerning firefly light production. First, I will characterize the light color produced across species and the variation within species. Changes in light color will be mapped to the phylogeny of fireflies to test several hypotheses for the evolution of changes in light color. Second, I will use molecular techniques to express luciferase from several species to test the hypothesis that this enzyme is the sole determinant of the light color variation (Hosseinkhani 2011).

To examine the variation within and among species, I will utilize field measurements of light production across several species. In the summer of 2012, I developed protocols for handling fireflies after capture to elicit flashes and record their emission spectra using a portable diffraction spectrophotometer (Jaz Optics). This summer, I will measure spectra across additional species and populations within species during extended field trips with a graduate student in the lab. This data will then be analyzed to test two primary hypotheses concerning evolution of light color. One hypothesis states that light color evolves in response to changes in activity period, which is determined by the time a species is most active. Another states that light color evolves due to changes in background vegetation. Primarily, these changes reflect field versus forest habitats. I will test these hypotheses using comparisons on a phylogeny and by examining the geographic distribution of color across populations within species and its association with ambient light and activity times.

During the fall, I was able to develop a protocol for the expression of the luciferase enzyme in a bacterium, *Escherichia coli*. In short, the sequence of the luciferase protein was determined for a species, and the intron-free coding sequence was obtained from a company and cloned into an expression vector. The substrate, luciferin, was added and the emission spectra measured. I am thus able to measure emission spectra of the enzyme *in vitro* to compare to field data. This summer, I will clone, express and measure spectra of luciferase enzymes from several species to test whether the enzyme alone determines the spectra measured in the field. This process allows the effects of changes in luciferase sequence to be established and tests for the involvement of other factors in color shifts.

Combining the *in vivo* and *in vitro* spectrum comparisons and field data, the luciferase system presents a unique opportunity to contribute to a complete understanding of the evolution of a signal in a communication system. Together with other work in the lab characterizing the receiver, my research will position the firefly light signaling system as one of the premier models for understanding the evolution of communication systems.

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Exploring Effects of Stress and Dominance on the Weaning Strategies of Female Rhesus Macaques

2013 Summer Fellow: Katie Partrick
Research Mentor: Dr. Laurie Reitsema, Department of Anthropology

I have set out to gain knowledge, through isotopic analysis, on how stress affects the weaning process of female rhesus macaques, a crucial aspect of parental investment. Parental investment and parent-offspring conflict are both important concepts in evolutionary and behavioral ecology. Parental investment refers to the cost of current investment in offspring to future reproduction. Because investment in current offspring can limit future reproduction, parent-offspring conflict arises when current offspring try to maximize the resources they extract from the parent while the parent tries to balance their current investment with future reproduction (Vandeleest & Capitanio 2012). Female mammals provide parental investment through high energetic investment in milk and suppression of ovulation while nursing (Lee 1996); therefore, weaning, to accustom one's young to take nourishment in something other than suckling, represents an important event for female mammals. Weaning allows a female to resume sexual receptivity, and shorter weaning periods mean shorter inter-birth intervals. Assuming shorter weaning periods do not compromise infant or adult survival, shorter weaning periods can increase a female's fitness.

Among highly social mammals such as many primates, factors that may affect the weaning process may be social rank and associated stress levels. In general, dominant individuals have more access to mates and resources and on average show lower stress levels compared to subordinate individuals (Michopoulos et al. 2012). Therefore, dominant females may benefit from frequent mating opportunities and shorter weaning intervals. In contrast, subordinate individuals exhibit higher levels of stress hormone cortisol, known to negatively affect the reproductive system (Mas-Rivera & Bercovitch 2008). Furthermore, subordinate monkeys are known to be more protective of their offspring, indicating that stress and social status are influential in child rearing strategies. Altogether, I hypothesize that high ranking females will wean their offspring earlier than low ranking females.

Under the supervision of Dr. Reitsema, I will be conducting a study of social rank, stress, and weaning among rhesus macaques. Rhesus macaques are well-studied non-human primates, known to be good model systems for humans due to similarities in our immune systems. I will use measures of carbon and nitrogen stable isotopes and cortisol levels in blood samples of high and low ranking females to measure the relationship between stress and rank, and how these two factors are related to a mother's weaning strategy. Stable isotopes are means to test the relative importance of different food resources, and can be used to measure the weaning process by estimating the relative contribution of solid foods to milk in an infant's diet (Kurle 2002). Carbon is used to track the introduction of solid foods into the infant's diet, while nitrogen values monitor the length of breast-feeding (Crowley 2012). Blood samples have already been collected from 10 mother-infant pairs of captive rhesus macaque females at the Yerkes Primate Research Center. Infant ages during blood sampling were 1, 2, and 5 months. I will use 200 µl of blood and 3ml of breast milk for stable isotope analysis. Sample preparation will take place at the University of Georgia Department of Anthropology, and analysis will be conducted at the Center for Applied Isotope Studies at the University of Georgia. I expect to find that stable isotope values will reach the levels of their mothers faster in high ranking vs. low ranking females (since a shorter weaning period implies infants will consume a diet most similar to their mothers more quickly), and I expect cortisol levels will be lower in the highest ranking individuals.

In addition to informing the theory on parental investment, this research has applications to understanding the effect of stress on parental care with applications to primate conservation and human welfare. This study will ideally be the basis for a future longitudinal study of how late vs. early weaning affects developmental health and socialization, and also, how differing weaning strategies and stress

levels affect a female's fitness. By understanding the role of weaning and stress on fitness and ontogeny, we can acquire knowledge on how to improve reproductive success and developmental health for both primates and humans.

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Lester Moody: A Man, a River, and a Quest for Industry in the Twentieth Century South

2013 Summer Fellow: Anthony Sadler
Research Mentor: Dr. Brian Drake, Department of History

There are currently more than twenty dams and reservoirs proposed to be added to the more than four thousand already on Georgia's rivers. Despite large sums of tax money allocated for such projects, dams are typically the culmination of grassroots campaigns by local leaders. Some of them are well-informed, focus on the best interest of their constituents, and take riverine development seriously. Some consider the long-term economic, social, and environmental consequences of their decisions. Others do not.

The development of the Savannah River in the early- to mid-twentieth century was due to the intense lobbying of a small but powerful group of individuals headed by a seemingly inconsequential civic leader. Lester Moody, the secretary of the Augusta Chamber of Commerce, was the head lobbyist for three dams, the Savannah River Plant, and the expansion of Camp Gordon into a Fort, all of which brought industries and an era of great prosperity to the city in the 1950s. The result of his work was a legacy of both environmental disruption and economic success, but his legacy is misleading. He promised protection from flooding and long-term economic prosperity to the people of Augusta, Congress, and three presidents, which he failed to fully deliver. Yet Moody is neither a hero nor villain. When leaders from across Georgia promise answers to economic and environmental woes in the form of dams and reservoirs, it is important to review history to gain perspective on the present. That history has not been written.

My research focuses on Lester Moody to create a model to scrutinize the grassroots leaders behind modern Southern environmental change. Moody's actions were informed by a conservation ethic, a belief or theory behind his plans, but that ethic is unknown. How was he able to inspire so many to support his endeavors? How did he have such great influence on senators, congressmen, presidents, and the common man? What did he know about the ecological consequences of his plans? Did he knowingly mislead the public in order to accomplish his goals? These are questions that can only be answered through the disciplined and intense research I plan to do this summer. By using the breadth of archival evidence about Savannah River development, interdisciplinary research into the effects the development had on the river's ecosystem, and personal accounts of Lester Moody and his allies through their papers, libraries, and interviews with those who knew them, I hope to build an interwoven story—a dual biography—of a man and a river in order to highlight the delicate and often deleterious relationship between humans and their natural resources. I will uncover the nature of leaders such as city attorneys, managers, chief executive officers, and leaders of the chamber of commerce and convention and visitors bureau, who were not elected, but held power over policies which affected a great number of people in the twentieth and twenty-first centuries.

I plan to spend the summer between various archives in Savannah, Augusta, Atlanta, Morrow, and South Carolina, as well as trips to interview individuals that knew Moody and his wife, and to be able to follow any leads the research provides.

The results of my research will add to the historiography of Southern environmental history by focusing on the grassroots aspect of his campaign to provide a model to use as a burden of proof for other reservoir lobbyists. The focus of scrutiny should be shifted, when looking at the past or present, from those at the top of the political pyramid to those at the bottom with little accountability and a broad range of power. Only then can we fully understand both our past and present relationship with our rivers.

Structure-Function Investigations of the Ste24p: A Metalloprotease Associated with Progeroid Disease

2013 Summer Fellow: Will Saunders
Research Mentor: Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology

Ste24p is a metalloprotease that is involved in the processing of prelamin A in humans (significant to progeria), the a-factor mating pheromone in yeast, and is hypothesized to have as yet unknown targets in other species. Collectively, these targets have in common that they are farnesylated as the result of having a C-terminal CAAX motif. The Schmidt lab is actively collaborating with a research group at UVA that was the first to determine the X-ray crystal structure of Ste24 (Science, 2013 – in press). Despite this information, the mechanism of Ste24p is unknown and much remains to be investigated about this important enzyme.

The most relevant human disease associated with Ste24p mutation is Hutchinson-Gilford Progeria Syndrome (HGPS). Unpublished studies from the Schmidt lab also indicate that Ste24p has the ability to protect against amyloid fibrils formed in association with the PSI+ prion of yeast. This is significant because similar amyloid fibrils in humans, including those derived from the Prion protein, cause neurodegenerative disease, including Creutzfeldt-Jakob disease and bovine spongiform encephalopathy (commonly known as Mad Cow Disease).

Much of what is known about Ste24p comes from its role in the a-factor processing pathway of yeast (Fujimara-Kamada 1997). The production of yeast a-factor involves a multistep post-translational modification pathway. The a-factor precursor is farnesylated, proteolytically cleaved, and carboxymethylated before it is released as an active signaling molecule to mediate sexual reproduction in yeast. Ste24p is involved in two distinct cleavage steps in this pathway. The proposed work associated with this application takes advantage of yeast a-factor as a reporter.

Ste24 is very well conserved across species. The structure of Ste24p is interesting because it is a membrane bound protein that resembles an oil drum embedded in the membrane bilayer with no apparent point of entry to a central cavity that contains the proteolytic active site. There is one small window within the transmembrane portion of Ste24 that has been proposed as the access point.

This project investigates the mechanism of Ste24 through structure-function studies of the proposed substrate access point. Specifically, mutations will be created that either constrict these access points or lock putative hinge points that interfere with gating of the access point.

The proposed order of events is as follows:

- Identify sites of mutations using structural information as a guide. This will be accomplished in collaboration with Dr. Zachary Wood (UGA Biochemistry & Molecular Biology) and our collaborator Dr. Michael Weiner (UVA Molecular Physiology and Biological Physics).
- Mutations in Ste24p will be created by molecular methods already in my skill set (e.g.PCR, Quikchange).
- The impact of the mutations will be tested using both *in vivo* and *in vitro* assays that are standard protocols used by the Schmidt lab.
    - *In vivo* assessments will involve genetic based assays related to a-factor production (conjugation tests, halo assays) and prion suppression. I am very familiar with the a-factor techniques, having used them continuously over the past three semesters.
    - *In vitro* assessments will involve the isolation of membranes and a dequenching assay that will allow for kinetic analysis of mutant enzymes. These assays will allow me to

expand the breadth of my training in lab technique to include protein enrichment and other biochemical methods.

We expect to identify the structural region that serves as the access point to the Ste24p active site. Additionally, we will resolve whether mutations that affect a-factor also affect the clearance of yeast prions. The PSI+ prion is not a CaaX protein, so there is a possibility that we may uncover an additional mode of access to the Ste24 active site.

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Social Behavior and Vocal Repertoire of Wild Red and Green Macaws

2013 Summer Fellow: Natalie Schwob
Research Mentor: Dr. Dorothy Fragaszy, Department of Psychology

Red and Green macaws (*Ara chloropterus*) are large-bodied members of the parrot family *Psittacidae*. These macaws form long-term pair bonds, travelling and nesting together, and often flying almost wingtip to wingtip with their mate. Despite abiding interest in psattacids as highly encaphalized, socially complex birds, studies of wild psattacids are rare, and virtually no studies have been done on wild macaws, especially those that live in the Cerrado (Brazilian savannah). Basic features of their behavioral biology have not yet been described. Dr. Fragaszy (Psychology department) and I plan to study the behavior of wild Red and Green macaws in Piauí, Brazil. The macaws produce frequent and variable vocalizations, perhaps associated with different social contexts. For the past six months I have reviewed published studies of bird vocalizations and the limited literature available on macaws to establish a foundational knowledge for this study. I hope to record the vocalizations and behavior of these uniquely social birds in May – July 2013 at the field site in Piauí, Brazil where Dr. Fragaszy has worked since 2005. We know the location of several nesting sites in cliff crevices within a few kilometers of the research lodge, and the birds are easy to see and hear near the nest sites. Thus this site offers a great opportunity to study wild macaws.

My main objectives are to describe social interactions of macaws, and to define the repertoire of calls they produce, with differentiation by functional contexts (e.g., "depart", "return to the nest") and by pairs. I am especially interested in describing the interactions of mated pairs and small groups that form transiently. I will also seek evidence that the birds develop pair-specific or individual-specific calls (signature calls), as have been described very recently in other wild psattacids, and that pairs duet and/or coordinate their vocalizations temporally ("call and respond").

Dr. Fragaszy and I intend to observe the macaws from distances of 10 – 80 m as they depart and arrive back at their nests in our field site, including when "visitors" arrive at nest sites while the mated pair is resident. Often the larger group (pair plus visitors) fly off together after a period of vocalizing near the nest. The pairmates reliably leave together and return to the nest at dawn and dusk, respectively, and fly in the area during the day. We will note the behavior of the birds (events in temporal sequence, with notations of context) using digital data loggers. We will record vocalizations using a parabolic receiver and a directional microphone attached to a digital recorder. Following data collection, I will process the vocalizations to define their structure using RavenPro software. Then identified calls will be associated with their behavioral records, to build a picture of the functional context of specific calls. We will collaborate with two Brazilian ethologists in this project (Dr. Patricia Monticelli and Dr. Carlos Araujo), and will share the vocal processing tasks with them.

This study will provide new information about the virtually unknown lives of wild macaws, particularly their social behavior. To our knowledge, this will be the first study of these birds in a savannah habitat.

Ecology and Genetic Characteristics of Haemogregarines in Fresh Water Turtles

2013 Summer Fellows: Scarlett Sumner
Research Mentor: Dr. Michael Yabsley, Department of Wildlife Disease Ecology

Haemogregarines are common intracellular parasites of freshwater turtles and aquatic leeches (the vector). Rarely do haemogregarines cause disease, but they can during extreme circumstances (e.g., stress, heavy infections). Previous studies, including one conducted by a former CURO student, showed that prevalence varies by species and location. These differences could be related to leech abundance or behavior, such as basking behaviors, which could result in differential exposure to leeches. Also, differences in prevalence could be due to habitat, which could alter leech abundance or communities of turtles present. Because these parasites cannot be distinguished based on morphology seen on a blood smear, it is currently unknown if the different turtle species are infected with the same parasite or different parasites. Not knowing the diversity of parasites within these hosts has limited previous studies.

I have two aims for this proposed project including 1) expand on previous work and examine differences in prevalence among common turtle species from several different habitats (e.g. river, pond, lake, etc.) in Clarke County, Georgia to relate any differences to habitat or behavior of the turtles and 2) genetically characterize parasites from a diversity of hosts and geographic regions to determine species diversity and host range of haemogregarine parasites. During this summer, a diversity of water bodies in Clarke County will be sampled. The common species of turtles present at these sites include the common musk turtle (*Sternotherus odoratus*), pond sliders (*Trachemys scripta*), painted turtles (*Chrysemys picta*), and snapping turtles (*Chelydra serpentina*). Turtles will be trapped by standard methods and a blood sample collected for making a thin blood smear and whole blood for PCR and sequence analysis of partial 18SrRNA gene sequences. Various ecological variables (water body size, water depth, aquatic vegetation presence, tree cover, urbanization, etc.) will be collected. Thin blood smears will be stained and analyzed to determine the prevalence of haemogregarine parasites in each specimen and if present, the number of parasites/7,000 red blood cells will be determined to calculate an intensity of infection. Differences in prevalence and intensity between these groups will be assessed. We hypothesize that frequent basking may decrease parasite prevalence and/or intensity by either 1) heating the animal, which helps the immune system fight off infections or 2) decreasing contact with the vectors of haemogregarines, which are aquatic leeches. In addition, we will test for differences in parasite prevalence and intensity between individual turtle species from the different habitats. The geographical surroundings of the turtles may be important regarding the prevalence of haemogregarine parasites and perhaps the burdens due to pollutants or other unnatural or natural compromising factors. For example, turtles in more pristine environments may be less prone to haemogregarine infections or exhibit lower levels of infection than turtles in more impacted habitats. It is known that turtles are less stressed in a natural environment; therefore, their parasite burdens may be lower. Conversely, pristine environments may be more suitable for the leech vectors, which would result in higher prevalence. Because haemogregarines can cause disease when present in high numbers or during periods of stress, the greatest impacted turtles would be those with higher parasite burdens.

Finally, a subset of samples will be genetically characterized. Currently, experimental infections are the only way to distinguish between species, which isn't practical or logistically possible in many cases. Haemogregarines are not necessarily host specific, so there is a possibility that multiple turtle species harbor the same parasite and that multiple parasite species are present in a single host. Recently, Dr. Yabsley developed a PCR test that can amplify the haemogregarine

parasite DNA. Using this PCR and subsequent sequence analysis of samples I will collect this summer as well as banked samples from other regions and turtle species, we will be able to determine how many species of haemogregarines are infecting turtles in the United States and if parasite species impacts prevalence and/or intensity of infections in various turtle species.

Jean-Jacques Rousseau and the Development of the Counter-Enlightenment

2013 Summer Fellow: Brian Underwood
Research Mentor: Dr. Jennifer Palmer, Department of History

Scholars often count Swiss philosopher Jean-Jacques Rousseau as a chief figure of the Enlightenment, a movement at the heart of western intellectual tradition. It is unusual, however, that they consider Rousseau a member of that movement when he himself explicitly challenged Enlightenment tenets at their most fundamental levels. I intend to demonstrate through this project that Jean-Jacques Rousseau was in fact an early figure in a burgeoning Counter-Enlightenment – a direct ideological confrontation of the strict rationalism of the Enlightenment that began in the eighteenth century and heavily influenced the dominant continental philosophies of the nineteenth century. Examining the philosophy of Rousseau in this context will offer insight into direct and immediate reactions to the Enlightenment while it was still in progress. In turn, the writings of Rousseau will exhibit that the Enlightenment itself was not a monolithic intellectual entity, but instead was a contentious movement even at its height.

Accepting Dorinda Outram's standard definition of the Enlightenment and its values – including scientific inquiry, reason, and individualism – it is clear that Rousseau explicitly rejected the philosophy of the Enlightenment[1]. Rousseau expressly introduced his antagonism to the philosophy of the Enlightenment in his *First Discourse* (1750): "Almighty God… deliver us from the enlightenment and fatal arts of our forefathers, and give back to us ignorance, innocence, and poverty, the only goods that can give us happiness and are precious in thy sight.[2]" He continued this antagonism throughout the course of his writings on multiple subjects, from metaphysics to politics.

The purpose of this project is to identify those central ideas that make Rousseau's ideology distinct from that of the Enlightenment as a whole, placing his ideology outside of that intellectual tradition, thus diminishing the notion of unquestioned Enlightenment hegemony over eighteenth century thought. I will research Rousseau's intellectual and social relationships with his contemporaries such as Voltaire and Diderot. This will provide additional evidence of Rousseau's ideological separation from and conflict with mainstream Enlightenment thinkers. Because of the intense role that Rousseau's philosophy played in the French Revolution, I will also examine the ideology of writers in pre-revolutionary and revolutionary France. This will serve the twofold purpose of expanding my understanding of the scope of Rousseau's intellectual legacy and of allowing me to determine whether or not the French Revolution itself was fundamentally Counter-Enlightenment. Was the French Revolution primarily guided by the philosophy of the Enlightenment or that of Rousseau? If by the Enlightenment, then how does Rousseau fit into that movement? If by Rousseau, then should the French Revolution even be considered a result of the Enlightenment at all? Further, what made Rousseau's writings and philosophy more appealing than those of Enlightenment writers to the French revolutionaries? Answering these questions will help develop a comprehensive picture of how Rousseau's philosophy was accepted, adapted, and transmitted from the late eighteenth century to the early nineteenth century.

Research for this project will focus principally upon primary sources by Rousseau, Enlightenment philosophers, and French revolutionaries. To reaffirm Outram's definition of the Enlightenment and to solidify Rousseau's position as a Counter-Enlightenment figure, I will study writings from other "canon" figures of the Enlightenment, including Locke's *Two Treatises of Government* (1689), Montesquieu's *The Spirit of the Laws* (1748), and Voltaire's *Letters concerning the English nation* (1733). I will also examine pamphlets from the French Revolution on record at UGA's Special Collections Library, as well as the French Documents Collection at Emory University. I will also follow scholars such as Isaiah Berlin, Darrin McMahon, and Arthur Melzer to consider the

central role of the Counter-Enlightenment to late eighteenth century thought and Rousseau's place in that movement [3, 4, 5, 6]. Using that knowledge, I will go further in arguing that the Counter-Enlightenment, not the Enlightenment itself, produced the French Revolution.

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The Role of Cytochrome P450 Monooxygenase 2E1 in Bile Acid-induced Prostate Cancer Cell Death

2013 Summer Fellow: Stephanie Wilding
Research Mentor: Dr. Brian Cummings, Department of Pharmaceutical & Biomedical Sciences

Prostate cancer is the second leading cause of cancer-related death in men in the United States[1]. Bile acids mediate the digestion and absorption of fats and fat-soluble vitamins; however, pathological increases are associated with choleostasis and cell death. Recent studies show that high concentrations of bile acids can induce apoptosis in several cells, including cancer cells, by mechanisms that are not fully understood[2]. My previous work showed that treatment of three prostate cancer cell lines (PC-3, LNCaP, and DU-145) with bile acids (chenodeoxycholic acid, deoxycholic acid, and lithocholic acid) induced time- and concentration-dependent decreases in MTT staining, a marker of cytotoxicity, with IC50 values of 100-200 μM after 72 hours. In general, lithocholic acid was more potent than chenodoexycholic acid, followed by deoxycholic acid. Further, LNCaP cells tended to be more susceptible to bile acid-induced toxicity than either DU-145 or PC-3 cells.

While the above data demonstrate the novel finding that bile acids can induce prostate cancer cell death, they do not tell us anything about the mechanisms of cell death. Recent studies show that bile acids may induce oxidative stress, but this study was not performed in prostate cancer cell lines[3]. Based on these papers, I tested the effect of pretreatment of cells with diverse antioxidants (glutathione, N-acetyl cysteine, and ascorbic acid) on the ability of bile acids to induce cancer cell death. Dosing the cells with the antioxidants prior to bile acid exposure did not alter MTT staining. Thus, antioxidants did not appear to change the effects of bile acids suggesting that bile acid-induced prostate cancer cell death is not mediated by oxidative stress pathways.

Recent studies demonstrate that bile acids are metabolized by cytochrome P450 monooxygenase 2E1 (CYP2E1)[4]. CYP2E1 can metabolize compounds not naturally found in the body, such as acetaminophen and ethanol[5]. This suggests that CYP2E1 can mediate bile acid toxicity. My current hypothesis is that treatment of prostate cancer cells with a CYP2E1 inhibitor, diallyl sulfide, will alter the effects of bile acid-induced cytotoxicity. Data showing that treatment of cells with diallyl sulfide causes a decrease in bile acid-induced cancer cell death would support the hypothesis that bile acids are acting through the CYP2E1 metabolism. To confirm this hypothesis, my summer project would be to assess CYP2E1 expression and activity in prostate cancer cells using immunoblot and quantitative PCR and then to determine the effect of bile acids on the expression of CYP2E1. I would then inhibit CYP2E1 expression using small inhibitor RNA (siRNA) and determine the effect of CYP2E1 inhibition on bile-acid induced toxicity in prostate cancer cells. If successful, this work could identify a novel therapeutic target (CYP2E1) for inhibition of prostate cancer cell growth.

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The Role of PAX6 in the Formation of Neural Rosettes in Induced Pluripotent Stem Cells

2013 Summer Fellow: Elizabeth Wilkins
Research Mentor: Dr. Steve Stice, Department of Animal & Dairy Science

Human pluripotent stem cells are key factors in solving many mysteries surrounding human development and diseases. Stem cells have the ability to develop into nearly any type of cell in the body. The differentiation of stem cells mimics the development of the human body, making them an excellent tool for research. Given the broad differentiation capabilities of stem cells, they are ideal for disease modeling (for diseases like Parkinson's disease), cell replacement therapy, and drug screening. In 2006, Yamanaka first developed induced pluripotent stem cells. He was able to reprogram somatic cells back into stem cells. These cells eliminate the ethical dilemma of using embryonic stem cells, as well as allow for patient specific models and cell replacement therapies. Cells from a sick patient could be taken, reprogrammed into stem cells, and then differentiated to either study the disease in depth, or to treat the specific patient. In the Stice lab, we use both embryonic and induced pluripotent stem cells to study neural differentiation and, in particular, the generation of various central nervous system cell types. Neural rosettes are radially organized polarized cells organized around a central lumen. They are the first step in neural differentiation and mirror the process of neurulation in humans. We focus on three specific neural rosette markers: PAX6, SOX1, and ZO-1. PAX6 and SOX1 are transcription factors involved in neural development. PAX6 is a marker of neuroectodermal commitment. SOX1 is a neural stem cell marker. ZO-1 is an intracellular protein associated with cellular junctions. Previous work in the Stice lab shows that in human embryonic stem cells PAX6 is expressed first, followed by SOX1, and then the rosette is formed completely when ZO-1 becomes completely restricted to the lumen. We will focus on PAX6 as it is expressed before the rosettes form, and continues to be expressed after they develop.

To better understand the role of PAX6, we will create knockdown cell lines from a previously established induced pluripotent cell line created in the Stice lab. This will be accomplished by lentiviral transduction of constructs expressing small hairpin RNA (shRNA) specific to PAX6. We will compare the different cell lines with both nontransduced lines and each other. We plan to utilize quantitative RT-PCR, immunofluorescence, and flow cytometry in our analysis. We will characterize the expression of PAX6 mRNA in the cell lines we created using quantitative RT-PCR. We expect to see a range of PAX6 mRNA expression amongst the cell lines. Immunofluorescence will show the PAX6 protein expression spatially. It will be important to see the spatial arrangement of the PAX6 protein expression as it relates to rosette formation. Flow cytometry will show the temporal expression of the PAX6 protein. Each cell will be double labeled for PAX6 and SOX1. We expect that the flow cytometry will show that over a time period the cells will express PAX6, then PAX6 and SOX-1, and then just SOX-1. We hypothesize that rosettes are formed in a PAX6 dependent manner, which will be shown with concurrent studies with wild type and knockdown cell lines.

This experiment will help scientists to further understand the role PAX6 has in forming neural rosettes, and allow more insight into human development. This study is important to further understand neural differentiation, so that these cells can one day be used in drug therapy, disease modeling, and cell replacement therapy. Understanding the role of PAX6 in neural rosette development in the induced stem cells is an important step in understanding both human development and neural differentiation.

Using Metabolically Engineered *E. coli* to Better Ferment Highly Industrially Processed Pectin-Rich Biomass

2013 Summer Fellow: Travis Williams
Research Mentor: Dr. Joy Doran Peterson, Department of Microbiology

With the USA's energy demands being so high, it is becoming increasingly important to explore energy alternatives that can be produced within the country. It is important that we are aware of the renewable energy opportunities that exist around us and are able to communicate these opportunities to the rest of the country. No single solution will secure the energy independence of the USA, but rather a combination of techniques developed by scientists worldwide is needed.

One prospective sustainable energy opportunity is ethanol production by microbes through the fermentation of pectin-rich biomass. Pectin-rich biomass consists of food waste products that are no longer a food source, such as sugar beet pulp from sugar extraction or rotten peaches or apples. My recent project has focused on analyzing the effects industrial processing has on the carbohydrate composition of pectin-rich biomass and the ethanol production of this pectin-rich biomass via fermentation by two different microorganisms. Working with a PhD student in the Peterson laboratory, we found certain microorganisms are better suited for the fermentation of different pectin-rich biomass sources depending on their level of industrial processing. The unprocessed peaches are better fermented by industrial yeast, *Saccharomyces cerevisiae* XR122N, and the highly processed sugar beet pulp is better fermented by the engineered bacterium, *Escherichia coli* LY40A.

Yeast used for corn ethanol fermentations works well when there is an abundance of free sugars present, as is the case with rotten peaches. Although the sugar beet pulp was best fermented by *E. coli* LY40A, the percentage of the maximum theoretical ethanol production from the sugar beet pulp was relatively low. This is a result of the *E. coli* using multiple metabolic pathways to produce unwanted products (lactic acid, formic acid, and acetic acid) instead of ethanol. The challenge that now exists is improving ethanol production from the fermentation of higher processed pectin-rich biomass types using *E. coli*. We are focusing on the engineered *E.coli* for further studies because it consistently outperformed *Saccharomyces cerevisiae* in highly industrially processed pectin-rich materials with little free sugar remaining.

Using a previously engineered strain of *E. coli*, JP07, which produces a pectin-degrading enzyme, we will continue to knock out metabolic pathways in the organism that lead to unwanted products like lactic acid and acetic acid. Lactic acid is produced by lactic acid dehydrogenase (LdhA) and acetic acid is produced by the pathway beginning with pyruvate formate lyase (Pfl). If these pathways are knocked out and the remaining metabolic pathways are up-regulated in *E. coli JP07*, there should be a significant increase in ethanol production from the fermentation of highly industrially processed pectin-rich biomass using this newly engineered strain of *E. coli* JP07.

To test this new strain, sugar beet pulp fermentations will be conducted. To analyze the sugar beet pulp fermentations, samples will be taken every 24 hours during the fermentation and then gas chromatography will be used to determine the amount of ethanol that has been produced at each sample time. High pressure liquid chromatography will also be used to determine the amount of unwanted products that are forming during the fermentation as well as the amount of various sugars that remain in the fermentation.

It is not going to be easy for the USA and the world to create a sustainable energy future. The natural resources to do so exist. But it is going to take the creativity and persistence of many individuals who are devoted to finding ways to harvest energy from materials from which energy is not necessarily easy to extract. Using an engineered *E. coli* strain capable of producing ethanol from

highly processed pectin-rich material provides a means of adding value to an existing industry for sugar processing, and could pave the way for fermentations of other pectin-rich materials such as peach and apple processing wastes.

A Geospatial Analysis of Fission-Fusion Dynamics in Bearded Capuchin Monkeys

2013 Summer Fellow: Leigh Anna Young
Research Mentor: Dr. Marguerite Madden, Department of Geography

Hans Kummer (1971) was the first primatologist to describe a primate social group, the hamadryas baboon, as a fission-fusion society. Since then many species/groups of primates have also been labeled as such, despite this social organization's rarity among most other mammals (Smuts et al.1987). Fission-fusion societies can be defined as societies in which group members merge together (fuse) and separate into smaller groups (fission) over time. Many researchers have detailed different factors that contribute to a group's fission-fusion tendencies, including predator prevalence, foliage density, and resource availability, and have aimed to identify specific factors that lead a primate society to be either (a) fission-fusion or (b) cohesive (Koenig 2002; Mangel 1990; Stanford 2002). However, Aureli et al. (2008) suggest that rather than labeling each individual primate species in a binary fashion, as either fission-fusion or cohesive, we should begin to look at fission-fusion dynamics as a continuum on which individual groups of primates may fall. I find this change in outlook to be quite interesting! Aureli goes on to suggest that in order to begin to understand grouping patterns of the many species of primates, researchers should describe the features of the species' habitat in a spatially explicit manner. I aim to follow Aureli's suggestion by measuring the cohesion of a group of capuchin monkeys for which little is known regarding fission-fusion dynamics, and relating this cohesion to the spatial features in the group's environment.

Aureli et al. (2008) define fission-fusion dynamics as a three-dimensional conceptual framework that includes variation in group composition, variation in spatial cohesion (i.e., the area covered by the primate group), and variation in group size. Under the direction of Marguerite Madden from the Department of Geography, I will investigate fission-fusion dynamics of a group of capuchin monkeys (*Cebus* (*Sapajus*) *libidinosus*) in the wild, by following them on their daily routes and recording their spatial spread, group composition, and group size at 15 minute intervals from dawn to dusk each day. I will accompany a group of senior research scientists to their research station in northeastern Brazil, Piauí State. In the field, a graduate student researcher and I will simultaneously record GPS points at the outer limits of the area encompassed by the monkey group. Using geospatial analysis techniques, these points will then be imported into Geographic Information Systems (GIS) software and related to spatial elements of the monkeys' landscape. I will correlate group cohesion over space with land cover class in the monkeys' home range to try to describe landscape features that affect group cohesion. By investigating correlations between the group's cohesiveness and their environment, I hope to add to the growing body of work related to primate movement, as well as provide clues about the evolution of group cohesion among primates.

Coles et al. (2012) state in their study of fission-fusion in Southern Muriquis that, "broadening the range of primate groups studied is vital" if we hope to "understand the different evolutionary pathways to fission-fusion." The research I propose would be beneficial to this field of study because the species of interest has never been studied in this way before. This project may lead to future comparisons between these results and other species and populations of capuchin monkeys with the ultimate goal of revealing the natural continuum of fission-fusion dynamics in primates. In addition, learning more about how these animals move and interact with their environment could ultimately contribute to the protection of these species in the event that their current environments are jeopardized.

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Appendix A
2012 CURO Summer Research Fellows

William Austin
Dr. William Kisaalita, College of Engineering
Studies of Water Availability and Use in Tanzania

Conner Blackwell
Dr. Boris Striepen, Department of Cellular Biology
Striated Fiber Assemblin Protein Function in *Tetrahymena*

Stephen Bocarro
Dr. Jacek Gaertig, Department of Cellular Biology
The Characterization of Long Flagella Protein 4 in *Tetrahymena thermophila*

Hope Foskey
Dr. James Lauderdale, Department of Cellular Biology
Identification of GABA-Responsive Neurons in the Zebrafish Brain

Terese Gagnon
Dr. Virginia Nazarea, Department of Anthropology
Landscapes of the Interior: Ethnobotany and Senses of Palace among Karen Refugees

Devon Humphreys
Dr. Kelly Dyer, Department of Genetics
A Phylogenetic Approach to Investigating the Evolutionary History of the Quinaria Species Group of Drosophila

Emily Kopp
Dr. Chris Cornwell, Department of Economics
Immigration Law Reform and the Georgia Labor Market

Brittany McGrue
Prof. Sarah Zenti, Department of Furnishings and Interiors
The Need for Universal Design: An Environmental Assessment of Residential Interior Spaces and the Built Environment

Tuan Nguyen
Dr. Natrajan Kannan, Department of Biochemistry & Molecular Biology
Ca^{2+}/Calmodulin Dependent Protein Kinase (CAMK) Group: Evolution of Dynamic Regulatory Modules

Phillip Ogea
Dr. Arthur Roberts, Department of Pharmaceutical & Biomedical Sciences
Classification of the Transport Protein MDR3 and Its Effects on Multi-Drug Resistance

Ronke Olowojesiku
Dr. Nicole Gottdenker, Department of Pathology
Effects of Anthropogenic Land Use on Reservoir Host Potential of the Common Opossum *Didelphis marsupialis* in Panama

Babajide Oluwadare
Dr. Duncan Krause, Department of Infectious Diseases
Analysis of P1 Function in *Mycoplasma pneumoniae* Adherence and Gliding

Elliot Outland
Dr. William Dennis, Department of Physics and Astronomy
Finite-Difference Time-Domain Investigations of Metamaterials

David Parker
Dr. Jennifer McDowell, Department of Psychology
Neural-mechanisms Underlying the Gap Effect: Why is 200 the Magic Number?

Anakela Popp
Dr. Dorothy Fragaszy, Department of Psychology
Development of Nut Cracking Skills in Young Bearded Capuchin Monkeys

Cameron Prybol
Dr. John Pickering, Odum School of Ecology
Lepidoptera Survey of San Luis Valley, Monteverde, Costa Rica

Nicholas Richwagen
Dr. K.C. Das, College of Engineering
Comparative Study of Chemical Flocculation vs. Autoflocculation for Microalgae Harvesting, *Scenedesmus bijua*, *Chlorella minutissima* and *C. sorokiniana*

John Rodriguez
Dr. Donald Nelson, Department of Anthropology
Changing Food Security Strategies in Northeast Brazil: Fifteen Years of Development Policies on Household Ability to Buffer Drought Impacts

Cole Skinner
Dr. Michael Terns & Dr. Rebecca Terns, Department of Biochemistry & Molecular Biology
Characterization of the Tneap Complex in the CRISPR-Cas Viral Defense System of Prokaryotes

Brittany Truitt
Dr. Michael Tiemeyer, Department of Biochemistry & Molecular Biology
Pharmacologic Rescue of Mutations That Affect Tissue-Specific Glycan Expression in *Drosophila melanogaster*

Stephanie Wilding
Dr. Brian Cummings, Department of Pharmaceutical & Biomedical Sciences
The Role of Secretory Phospholipase A_2 in Bile Acid-Induced Prostate Cancer Cell Death

Anna Wilson
Dr. William Kretzschmar, Department of English
Defining the Latino Experience in Roswell, GA: A Study in Sociolinguistics

Appendix B
2011 CURO Summer Research Fellows

Lauren Anderson
Dr. Amy Ross, Department of Geography
The Legacy of Truth Analyzing the Impact of the Truth and Reconciliation Commission on South Africa's Millennial Generation

Joshua Trey Barnett
Dr. Corey W. Johnson, Department of Recreation & Leisure Studies
Drag's Not a Drag: Narrative Inquiry of Serious Drag Performers

Brooke Bauer
Dr. Robert Vandenberg, Department of Management
Organizational Commitment in the Workplace

Melissa Brown
Dr. Kecia Thomas, Department of Psychology
Black Stereotypes in Reality Television and the Reinforcement of Prejudiced Attitudes

William Costanzo
Dr. K.C. Das, Department of Biological & Agricultural Engineering
Algae Biofuel Development Growth Efficiency

Dervin Cunningham
Dr. Kelley Moremen, Department of Biochemistry & Molecular Biology
The Recombinant Expression of Proteins in the Glycosylation of Mammalian Cells

Abid Fazal
Dr. Joy Peterson, Department of Microbiology
Characterization of Enzymes Produced by Genetically Engineered *Hypocrea jecorina* and Their Use in Fermentation by Recombinant *E. coli.*

Melanie Fratto
Dr. Vanessa Ezenwa, Odum School of Ecology
Testing Bacteria-Killing Ability in Songbirds with Two Approaches Before and After Acute Stress

Nisha George
Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
The Role of Cysteine Residues in the Function of the Ras Converting Enzyme (Rcelp)

Erin Giglio
Dr. Kelly Dyer, Department of Genetics
Sensory Systems at Play in Drosophila Courtship

Osama Hashmi
Dr. Monica Gaughan, Department of Health Policy & Management
From Malpractice to Medicare: Addressing the Legal Needs of Primary Care Physicians

Anna Beth Havenar
Dr. Dawn Robinson, Department of Sociology
Religion and Impression Change Dynamics: An Affect Control Theory Analysis of Christianity and Islam

Ransom Jackson
Dr. John C. Inscoe, Department of History
A Comparative Study of Feminism in Southern Literature: Uncle Tom, Beulah and Aunt Phillis's Cabin

Elena James
Dr. Russell Karls, Department of Infectious Diseases
Detection of Mycobacterial Genes Involved in Vitamin 1B12 Uptake

Kellie Laity
Dr. Dorothy Fragazy, Department of Psychology
Development of Nut Cracking Skills in Young Bearded Capuchin Monkeys

Marianne Ligon
Dr. Michael Terns, Department of Biochemistry & Molecular Biology, and Dr. Rebecca Terns, Department of Biochemistry & Molecular Biology
Characterization of the Tneap Complex in the CRISPR-Cas Viral Defense System of Prokaryotes

Katherine Manrodt
Dr. Steven Lewis, Department of Physics & Astronomy
The Molecular Dynamics of Atomic Sticking Coefficients

Lindsey Megow
Dr. Kaori Sakamoto, Department of Pathology
Intestinal Nematode Infection's Inhibitory Effect on *M. bovis*

Tuiumkan Nishanova
Dr. Stephen Hajduk, Department of Biochemistry & Molecular Biology
Assembly of High Density Lipoproteins via Retained N-terminal Signal Peptides

Farres Obeidin
Dr. David Hall, Department of Genetics
Modeling Subtelomeric Growth and the Adaptive Telomere Failure Hypothesis

Joshua Parker
Dr. Richard Steet, Department of Biochemistry & Molecular Biology
Identification and Characterization of a Novel Beta-Galactosidase Enzyme in Brain

Lea Rackley
Dr. Katarzyna Jerzak, Department of Comparative Literature
Finding the Child in Children's Literature

Luben Raytchev
Dr. Michael Yabsley, Department of Wildlife Disease Ecology
Intracellular Blood Parasites of Common Freshwater Turtle Species in Georgia: Prevalence and Burden

Mark Rolfsen
Dr. Jessica Muilenburg, Department of Health Promotion & Behavior
The Implementation of Effective Smoking Cessation Intervention for Drug and Alcohol Addicts in Substance Abuse Treatment

Dana Schroeder
Dr. Quint Newcomer, Director, UGA Costa Rica
An Applied Research Examination of Progress Toward Sustainability Goals at UGA's Costa Rica Campus in San Luis de Monteverde, Costa Rica

Daniel Sharbel
Dr. Timothy Dore, Department of Chemistry, and Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology
Assessing Rce1-Protease Inhibition in a Cell-Based Fluorescence Ras Localization Assay

Daniel Smith
Dr. Michael Marshall, Lamar Dodd School of Art
Contemporary Interpretation of Dante Alighieri's Inferno Through Photographic Illustration

Justin Smith
Dr. Michael Terns, Department of Biochemistry & Molecular Biology, and Dr. Rebecca Terns, Department of Biochemistry & Molecular Biology
Characterization of a Putative Endonuclease-RNA Complex L Involved in CRISPR-Mediated Viral Defense

Theresa Stratmann
Dr. John Maerz, Warnell School of Forestry & Natural Resources
The Science of Monitoring Rare Species Developing Methods for Surveying and Monitoring Bog Turtles

Christopher Sudduth
Dr. Cathleen Brown, Department of Kinesiology
Establishing Clear Cut-Off Scores to Develop Classification Criteria for Subgroups of Individuals with CAI

Connor Sweetnam
Dr. Marcus Fechheimer, Department of Cellular Biology, and Dr. Ruth Furukawa, Department of Cellular Biology
The Involvement of Coenzyme Q (50) and Tau in the Formation of Hirano Bodies

Nakul Talathi
Dr. Natarajan Kannan, Department of Biochemistry & Molecular Biology
Determining the Effect of Oncogenic Mutations on EGFR Protein Kinase Activation and Phosphorylation

Korry Tauber
Dr. Michael Tiemeyer, Department of Biochemistry & Molecular Biology, and Dr. Lance Wells, Department of Biochemistry & Molecular Biology
Examining the Function of O-GlcNAc in Drosophila to Analyze Intercellular Signaling Pathways

Nathan Usselman
Dr. Jason Locklin, Department of Chemistry
Synthesis of Enzyme Functionalized Conjugated Polymers for Implantable Power Sources

Star Ye
Dr. Jason Zastre, Department of Pharmaceutical & Biomedical Sciences
Measuring Lactate Production to Understand Transketolase and Its Isoforms in Breast Cancer Cells

Appendix C
2010 CURO Summer Research Fellows

Jessica Alcorn
Dr. Audrey Haynes, Department of Political Science
The Validity of the News Marketing Hypothesis

Amarachi Anukam
Dr. Pamela Orpinas, Department of Health Promotion & Behavior
Healthy Teens: A Longitudinal Study of 'At Risk' Secondary Students

Thomas Bailey
Dr. William Kretzschmar, Department of English
Six Bodies: A Quantitative Analysis of Japanese Discourse Features

Michael Bray
Dr. Kelly Dyer, Department of Genetics
Genetic Analysis of Pigmentation in Drosophila tennebrosa

Ebony Caldwell
Dr. Monica Gaughan, Department of Health Policy & Management
Influences on the Outlook of the Post-college Educational Opportunities and Choices of Undergraduate Science Majors

Caitlin Cassidy
Dr. William Kretzschmar, Department of English
The Art of Persuasion: How Small Business Owners Use Speech to Market Products in Roswell, GA

Meagan Cauble
Dr. Mike Adams, Department of Biochemistry & Molecular Biology
Mechanism of Plant Biomass Conversion Without Pre-treatment by Anaerobic Thermophilic Bacterium *Caldicellulosiruptor bescii*

Daniel Celluci
Dr. Steven Lewis, Department of Physics & Astronomy
Applications of Molecular Dynamics Simulations to Models of Gas-Grain Interactions in the Interstellar Medium

Jessica Fazio
Dr. Richard Hubbard, Department of Chemistry
Carvone Luche Reduction Followed by Optical Activity Determination

JoyEllen Freeman
Dr. Barbara McCaskill, Department of English
Georgia Slaves in Transatlantic Culture: Blind Tom and William and Ellen Craft

Debashis Ghose
Dr. Joy Doran-Peterson, Department of Microbiology
Engineering Saccharomyces Yeast Strains to Better Ferment Pine Wood Biomass to Ethanol

Camille Gregory
Drs. Marcus Fechheimer and Ruth Furukawa, Department of Cellular Biology
Creating a Transgenic Mouse to Study the Physiological Role of Hirano Bodies in the Progression of Alzheimer's Disease

Shanterian Hester
Dr. Michael Pierce, Department of Biochemistry & Molecular Biology
Exercising Glycoprotemics Analyses to Discover New Breast Cancer

Georgianna Mann
Dr. Sonia Hernandez, Warnell School of Forestry and Natural Resources
Bufo marinus Pathogen and Parasite Analysis as a Model for Ecosystem Change

Krelin Naidu
Dr. Brian Cummings, Department of Pharmaceutical & Biomedical Sciences
Epigenetic Effects of Bromate on p21 and Histone-2AX Expression in HEK293 Cells

Rebecca Parker
Dr. Kevin McCully, Department of Kiniseology
Effects on Blood Flow Velocity and Arterial Diameter Produced by Compression Therapy in SCI Individuals

Jay Patel
Dr. Boris Striepen, Department of Cellular Biology
Characterization of Striated Fiber Assemblin Proteins in T. gondii

Rachel Perez
Dr. J. Peter Brosius, Department of Anthropology
Oil Palm Proliferation in Peru

Ryan Prior
Dr. Katarzyna Jerzak, Department of Comparative Literature
Foundations of Medical Philosophy in Ancient Civilizations

Malavika Rajeev
Dr. Sonia Altizer, Odum School of Ecology
The Effect of Parasite Infection on Monarch Butterfly Mating Behavior

Hope Rogers
Dr. Jonathan Evans, Department of English
Real-World Applications of Tolkien's Races and Cultures

Carla Rutherford
Dr. Stephen Hajduk, Department of Biochemistry & Molecular Biology
Human Resistance to Infection by African Trypanosomes

Laura Smart
Dr. Rheeda Walker-Obasi, Department of Psychology
Dialectical Behavior Therapy and Distraction: Using the Cold Pressor Test to Determine Efficacy

Stephen Thompson
Dr. George Majetich, Department of Chemistry
Application of Friedel-Crafts Annulations to Conjugated Dienones and Silyl Substituted Arene Rings for the Synthesis of Complex Tricycles

Jake Young
Professor George Contini, Department of Theatre & Film Studies
A Study of the Psycho-Physical Performance Technique of Michael Chekhov

Appendix D

2009 CURO Summer Research Fellows

Christine Akoh, CURO-OVPR Summer Research Fellow
Dr. Joseph Frank, Department of Foods & Nutrition
Effect of Mono and Divalent Cations on Biofilm Formation in a Prolific Biofilm Forming Strain of Listeria Monocytogenes Cultured in a Chemically Defined Medium

Sambita Basu, CURO-Jane and Bill Young Scholarship Summer Fellow
Dr. Gerardo Alvarez-Manilla, Department of Biochemistry & Molecular Biology
Protein-linked Glycoconjugates as Biomarkers for Cancer of Other Physiological Processes

Chip Blackburn, CURO-OVPI Summer Fellow
Dr. Hugh Ruppersburg, Department of English
Harry Crews and the Tradition of Southern Fiction-Writing

Corbin Busby, CURO Research Fellow
Dr. Isabelle Wallace, Lamar Dodd School of Art
Imaging Masculinity in Contemporary Fashion Photography

Kelly Cummings, CURO-OVPR Summer Fellow
Dr. Scott Schatzberg, College of Veterinary Medicine
Differentiation of Natural and Post-vaccinal Canine Distemper Virus Encephalomyelitis

Charles Ginn, CURO Research Fellow
Dr. Hugh Ruppersburg, Department of English
Charting the Oppression of Minority Groups through Southern Gothic Literature

Erin Hansen, CURO Research Fellow
Dr. Jennifer McDowell, Department of Psychology
Effects of Daily Saccade Practice on Behavioral and Neural Plasticity in Schizophrenics

Dillon Horne, CURO-OVPI Summer Fellow
Dr. Thomas Cerbu, Department of Comparative Literature
The Development and Implications of Predictive Modes of Thought from the Renaissance to Modernity

Tiffany Hu, CURO Research Fellow
Dr. Stephen Hajduk, Department of Biochemistry & Molecular Biology
Re-examine Alternative Editing and Understanding the Protein Diversity in T. brucei

Whitney Ingram, CURO-OVPI Summer Fellow
Dr. Yiping Zhao, Department of Physics & Astronomy
Optimization and Analysis of Titanium Dioxide Nanorod Photodegredation

Daniel Jordan, CURO Research Fellow
Dr. Betty Jean Craige, Department of Comparative Literature
German Sustainable Farming as a Model for Resource Stewardship

Fahad Khan, CURO-ITP Summer Fellow
Dr. Jason Zastre, Department of Pharmaceutical & Biomedical Science
Highly Active Antiretroviral Therapy

Max Klein, CURO-UGA Alumni Association Summer Fellow
Dr. Richard Steet, Department of Biochemistry & Molecular Biology
Gauging the Developmental Impact of Impaired Glycoprotein Breakdown in Zebrafish

Susan Klodnicki, CURO-OVPR Summer Fellow
Dr. Jim Lauderdale, Department of Cellular Biology, and Dr. Andrew Sornborger, Department of Mathematics and Engineering
PTZ and Other Chemoconvulsant Effects on Adult Zebrafish

Bridget Mailey, CURO Research Fellow
Dr. Amy Ross, Department of Geography
The ICC and the US: How Have the Actions of the US Affected the ICC in the Past and How Will They Affect the ICC in the Future?

Francisco Marrero, CURO Research Fellow
Dr. Leidong Mao, Department of Engineering
Development of Ferrofluid Based Platform for Particles and Cellular Manipulation

Amar Mirza, CURO Research Fellow
Dr. Natarajan Kannan, Department of Biochemistry & Molecular Biology
A Computational Study of the Crystalline Structure of Tyrosine Kinase Mutants

Cody Nichol, OVPR Research Fellow
Dr. Cynthia Suveg, Department of Psychology
Empirical Examination of Child Emotion Assessments: A Comparison of Child, Parent and Behavioral Observation Methods

Emily Pierce, CURO Summer Fellow
Dr. Wayne Parrot, Department of Crop & Soil Sciences
Genetic Alteration of the Soybean to Promote Astaxanthin Production

Akanksha Rajeurs, CURO Research Fellow
Dr. Russell Karls, Department of Infectious Diseases
Develop an Efficient Method to Create Marked and Unmarked Mutations in the Human Genome

Al Ray, III, OVPI Research Fellow
Dr. Susan Sanchez, Department of Infectious Diseases
Relationship between Epidemiology of Salmonella in Non-Domestic Avian Species and Humans in the Southeastern United States

Joe Reynolds, CURO Research Fellow
Dr. Frank Harrison, Department of Philosophy
Analysis of the Nature of the Individual and the Notion of His Happiness

Matthew Sellers, CURO Research Fellow
Dr. Hugh Ruppersburg, Department of English
Finding God in the Poetry of Robert Penn Warren

Michael Slade, CURO Research Fellow
Dr. Frank Harrison, Department of Philosophy
Implicit System of Rational Thought Analogous to Modern First-Order and Modal Logics in Plato's Late Dialogues

Alex Walker, OVPR Research Fellow
Dr. Timothy Dore, Department of Chemistry
Synthesis of BHQ-dithiol as a Photoremovable Protecting Group for Mifepristone

Shuyan Wei
Dr. Scott Schatzberg, College of Veterinary Medicine
Development of Consensus-Degererate Hybrid Oligonucleotide Primers (CODEHOPs) for Retroviral Discovery

2009 Howard Hughes Medical Institute EXORP Student

Valeriya Spektor
Dr. Sue Wessler, Department of Plant Biology
Designing Teaching Modules for Genome Analysis

Appendix E
2008 CURO Summer Research Fellows

Zachary Anderson, CURO Summer Research Fellow
Dr. Peter Brosius, Department of Anthropology
Multicultural Perspectives on Landscape Change

Matthew Belcher, CURO-BHSI Summer Research Fellow
Dr. Michael Terns, Department of Biochemistry & Molecular Biology, and Dr. Rebecca Terns, Department of Biochemistry & Molecular Biology
Determinants in the Localization of Telomerase to Telomeres

Mary Elizabeth Blume, CURO-OVPR Summer Research Fellow
Dr. Stefaan Van Liefferinge, Department of Art History
Uncovering Traditions of the Gothic Style in the Architectural Plans of Saint Germain-des-Pres and Saint Martin-des-Champ in Paris, France

Melissa Brody, CURO-OVPR Summer Research Fellow
Dr. Ron Carroll, Odum School of Ecology
Interactions of Bees and Hummingbirds with Hamelia patens

Carolyn Crist, CURO-UGA Summer Research Fellow
Dr. John Greenman, Grady College of Journalism & Mass Communications
News in the Black Belt: Teaching Journalists How to Cover Poverty in Persistently Poor Counties

M. Logan Davis, CURO-BHSI Summer Fellow
Dr. James Franklin, Department of Pharmaceutical & Biomedical Sciences
Long-Range Retrograde Transduction of Trophic and Survival Signals in Mouse Sympathetic Neurons

Marcus Hines, CURO-BHSI Summer Research Fellow
Dr. Michael Tiemeyer, Department of Biochemistry & Molecular Biology, and Dr. Lance Wells, Department of Biochemistry & Molecular Biology
Analyzing the Function of O-GlcNAc in Drosophila

Haylee Humes, CURO Summer Research Fellow
Dr. Marcus Fechheimer, Department of Cellular Biology
How AICD and Fe65 Are Recruited to Hirano Bodies

Lindsay Jones, CURO Summer Research Fellow
Drs. Michael Terns and Rebecca Terns, Department of Biochemistry & Molecular Biology
Identification and Characterization of a Nuclease That Functions in an RNA-Mediated Viral Defense Pathway (RNAi) in Prokaryotes

Tyler Kelly, CURO Summer Research Fellow
Dr. Elham Izadi, Department of Mathematics
Usage of Linear Subspaces with Varieties

Jung Woong Kim, CURO Summer Research Fellow
Dr. Andrew Sorenborger, Department of Mathematics, and Dr. James Lauderdale, Department of Cellular Biology
Imaging of Endogenous Ca2+ Waves in Developing Zebrafish

Jennifer Lee, CURO-BHSI Summer Research Fellow
Dr. Ronald Blount, Department of Psychology
Understanding Pediatric Symptoms

Sharon McCoy CURO-OVPR Summer Research Fellow
Dr. Chad Howe, Department of Romance Languages
Dialect Perceptions of Spanish Speakers in Georgia

Katherine McGlamry, CURO-Jane and Bill Young Scholarship Summer Research Fellow
Dr. Michael Tiemeyer, Department of Biochemistry & Molecular Biology
Glycan Interactions and the Development and Spread of Cancer Cells

Alice Meagher, CURO-BHSI Summer Research Fellow
Dr. Michael Adams, Department of Biochemistry & Molecular Biology
Expression and Charaterization of the Heterologously Expressed Soluble Hydrogenase I from Pyrococcus furiosis

Madison Moore, CURO-BHSI Summer Research Fellow
Dr. Jennifer McDowell, Department of Psychology
Behavioral and Neural Plasticity Following Daily Practice of Saccade Tasks in Schizophrenia

Emily Meyers, CURO-OVPR Summer Research Fellow
Dr. Patricia Sullivan, Department of International Affairs
The Advantage of Weakness: How Weak States Can Overcome Military Might of Strong States

Kelly Nielsen, CURO-OVPR Summer Research Fellow
Prof. George Contini, Department of Theatre & Film Studies
Augusto Boal's Invisible Theatre: Political Play with an Unassuming Audience

Sean O'Rourke, CURO Summer Research Fellow
Dr. Kathy Simpson, Department of Kinesiology
Neuromuscular Activation and Movement Kinematics Exhibited During the Sit-to-Stand by Multiple Sclerosis Individuals

Julie Patel, CURO Summer Research Fellow
Dr. Patricia Sullivan, Department of International Affairs
Military Interventions by Powerful States

Neil Pfister, CURO-BHSI Summer Research Fellow
Dr. Michael Terns, Department of Biochemistry & Molecular Biology, and Dr. Rebecca Terns, Department of Biochemistry & Molecular Biology
Interactions That Define the Organization of RNA-Protein Complexes Involved in Prokaryotic RNA Interference

Stefann Plishka, CURO-Franklin College of Arts and Sciences Summer Research Fellow
Dr. Asen Kirin, Department of Art History
Imagining Constantinople: Imperial Houses of Worship as Symbols of State Ideology

Katie Pyne, CURO Summer Research Fellow
Dr. Jerome Legge, Department of International Affairs
Refugees and Internally Displaced People: How Effective Are the United Nations, Nongovernmental Organizations, and Subsequent Initiatives in Pacifying This Complex Humanitarian Crisis?

Joseph Rimando, CURO-Interdiciplinary Toxicology Program Summer Research Fellow
Dr. Ralph Tripp, Department of Infectious Diseases
Understanding and Preventing the Interaction between RSV's G Protein and the CX3CR1 Cell Receptor

Aalok Sanjanwala, CURO Summer Research Fellow
Dr. Marcus Fechheimer, Department of Cellular Biology, and Dr. Ruth Furukawa, Department of Cellular Biology
The Effect of Hirano Bodies on Mutated Tau Protein

Neeraj Sriram, CURO Summer Research Fellow
Dr. Mark Eiteman, Department of Biological & Agricultural Engineering
Solving the World's Energy Crisis – Not One Sugar at a Time

Giridhar Subramanian, CURO Summer Research Fellow
Dr. Brock Tessman, Department of International Affairs
Power and Influence in Southeast Asia: A Study of the Methods Used by India, China, and the United States

Aileen Thomas, CURO Summer Research Fellow
Dr. Nicole Lazar, Department of Statistics
How Random is Pseudorandom

Kathryn Turner, CURO Summer Research Fellow
Dr. Shelley Hooks, Department of Pharmaceutical & Biomedical Sciences
Comparison of RGS Regulation of LPA Signaling in Prostate Cancer and Ovarian Cancer

Manouela Valtcheva, CURO Summer Research Fellow
Dr. Jennifer McDowell, Department of Psychology
Antisaccade Performance and Deficit Characteristics in a Normal Population

Hunter Wilson, CURO Summer Research Fellow
Dr. Timothy Dore, Department of Chemistry
8-Chloro-7-hydroxyquinoline as a Bilogically Useful Photoremovable Protecting Group

Laura Wynn, CURO-OVPR Summer Research Fellow
Dr. Martin Kagel, Department of Germanic & Slavic Languages
Issues in Current Turkish-German Literature

Appendix F
2007 CURO Summer Research Fellows

Caroline M. Anderson, CURO-OVPR Summer Research Fellow
Dr. John Turci-Escobar, Department of Music Theory, and Dr. Max Reinhart, Department of German
A Psychoanalytical Examination of Wolf and Mörike's Peregrina Songs

Joseph Burch, CURO Summer Research Fellow
Dr. Harry Dailey, Department of Microbiology and Biochemistry & Molecular Biology
Converting Ferrochelatase into a Cytochrome c-like Protein

Amy Burrell, CURO-BHSI Summer Research Fellow
Dr. Debra Mohnen, Department of Biochemistry & Molecular Biology
Analysis of the Transcriptional Expression of Arabidopsis GAUT Genes: 15 Proven and Putative Plant Cell Wall Biosynthetic Galacturonosyltransferases

Lee Ellen Carter, CURO-OVPR Summer Research Fellow
Dr. Fausto Sarmiento, Department of Geography
Ecoregional Conservation among Indigenous Communities in Cotacachi, Ecuador

Kimberly DeLisi, CURO-BHSI Summer Research Fellow
Dr. Ray Kaplan, Department of Infectious Diseases
Parameters Affecting Fecal Egg Count Data for Determining Drug Resistance in Nematode Parasites of Horses

Joshua Dunn, CURO-OVPR Summer Research Fellow
Dr. William Kretzschmar, Department of English
The Youth of Roswell Voices: A Linguistic Analysis

Katie Flake, CURO-BHSI Summer Research Fellow
Dr. Maor Bar-Peled, Complex Carbohydrate Research Center
The Arabinose Kinase Project

James Gordy, CURO Summer Research Fellow
Dr. Michael Adams, Department of Biochemistry & Molecular Biology
Developing Methodologies for the Study of Small ORFs in *P. furiosus*

Jana Hanchett, CURO Summer Research Fellow
Dr. David Schiller, Department of Musicology/Ethnomusicology
Latino and Hispanic Musical Influences on Athens-Clarke County

Laura Harrison CURO-BHSI Summer Research Fellow
Dr. Corrie Brown, Department of Pathology
Campylobacter in the Crypts

Clare Hatfield, CURO-OVPR Summer Research Fellow
Dr. Stephen Shellman, Department of International Affairs
Democracy and the Choice of Law: The Intersections of Shari'a, Domestic and International Law

Anna Hudson, CURO Summer Research Fellow
Dr. Richard Dluhy, Department of Chemistry

Using Surface Enhanced Raman Spectroscopy for the Detection of Pathogens

Andy Kragor, CURO-Jane & Bill Young Scholarship Summer Research Fellow
Dr. Lance Wells, Complex Carbohydrate Research Center, and Dr. Carl Bergmann, Complex Carbohydrate Research Center
Unbiased Isolation and Carbohydrate Mapping of Alpha-Dystroglycan

Brian Laughlin, CURO-BHSI Summer Research Fellow
Dr. Alan Darvill, Complex Carbohydrate Research Center
Functional Analysis of the Magnaporthe grisea Secretome

James MacNamara, CURO Summer Research Fellow
Dr. Timothy Dore, Department of Biochemistry & Molecular Biology
Synthesis of Quinolinol-Based Inhibitors of Rce1p

Prashant Monian, CURO-Interdisciplinary Toxicology Program Summer Research Fellow
Dr. Brian Cummings, Pharmaceutical & Biomedical Sciences
Molecular Inhibition of Independent Phospholipase A2 and its Effect on Prostate Cancer Growth

Neil Naik, CURO-OVPR Summer Research Fellow
Dr. Ruth Harris, Department of Food & Nutrition
The Effect of Antagonizing Stress Receptors in Rats During Repeated Exposure to Restraint Stress

Natalie Nesmith, CURO-BHSI Summer Research Fellow
Dr. Mary Bedell, Department of Genetics
Genetic Studies on the Roles of KITL in Regulating the Proliferation and Apoptosis of Primordial Germ Cells in Mice

Victor Orellana, CURO Summer Research Fellow
Dr. Nicolás Lucero, Department of Romance Languages
Unsung Hero: A Literary and Historical Study of Lautaro

Tulsi Patel, CURO Summer Research Fellow
Dr. Scott Gold, Department of Plant Pathology
Developing a Biocontrol Agent for Chinese Privet, *Ligustrum sinense*

Tomas Pickering, CURO-OVPR Summer Research Fellow
Dr. Dorothy Fragaszy, Department of Psychology
Manner of Hammer Stone Use in Wild Capuchin Monkeys

Cleveland Piggott, CURO-BHSI Summer Research Fellow
Dr. Marcus Fechheimer, Department of Cellular Biology
The Formation of Hirano Bodies

Purvi Sheth, CURO Summer Research Fellow
Dr. Russell Karls, Department of Infectious Disease
Characterization of *Mycobacterium shottsii*

Traci Tucker, CURO Summer Research Fellow
Dr. Dawn Robinson, Department of Sociology
Gender and Role Meanings: A Cross-Cultural Comparison

Jessica Van Parys, CURO-UGA Alumni Association Summer Research Fellow
Dr. David Mustard, Department of Economics
Does Writing Ability Signal Academic Excellence?: Evidence from the New Scholastic Aptitude Writing Section (SATW)

Delila Wilburn, CURO Summer Research Fellow
Dr. Barbara McCaskill, Departments of African American Studies and English
Beauty Imposed

Karen Wong, CURO Summer Research Fellow
Dr. Andrew Whitford, Department of Political Science
Political and Social Foundations for Environmental Sustainability, Transfer Pricing, and Social Entrepreneurship

Appendix G
2006 CURO Summer Research Fellows

Sarah Breevoort, CURO-BHSI Summer Research Fellow
Dr. Walter Schmidt, Department of Biochemistry and Molecular Biology
Construction of Three Rcelp Mutant Plasmids to Aid in the Characterization of Rcelp Enzymatic Activity

Lauren Coffey, CURO Summer Research Fellow
Dr. Stephen Shellman, Department of International Affairs

Susan Fang, CURO Summer Research Fellow
Prof. Christopher Hocking, Studio Foundations

Courtney Grant, CURO-BHSI Summer Research Fellow
Dr. Julie Coffield, Department of Physiology and Pharmacology
An Investigation of Botulinum Neurotoxin Interactions on RhoA Activity Using In Vitro Assays

Erica Hall, CURO-BHSI Summer Research Fellow
Dr. Jessie Kissinger, Department of Genetics

Adele Handy, CURO-UGA Alumni Association Summer Research Fellow
Dr. Greg Robinson, Department of Chemistry

Celan Hardman, CURO Summer Research Fellow
Prof. Joe Norman, Drawing and Painting

Sana Hashmi, CURO-Jane and Bill Young Scholarship Summer Research Fellow
Dr. Lance Wells, Complex Carbohydrate Research Center
Alteration of Alpha-Dystroglycan and Cancer Progression

Brian Levy, CURO Summer Research Fellow
Dr. Larry Nackerud, School of Social Work
Courrie – Not Email: Implications for Government Regulation of a Social Phenomenon. A Case Study of Language in France

Maggie Mills, CURO-NSF/SPIA Summer Research Fellow
Dr. Stephen Shellman, Department of International Affairs

Anna-Marieta Moise, CURO-BHSI Summer Research Fellow
Dr. Andrea Hohmann, Department of Psychology
Neurochemical Basis of Social Defeat in Syrian Hamsters: Role of Endogenous Cannabinoids

Lamar Moree, CURO-BHSI Summer Research Fellow
Dr. Alan Darvill, Complex Carbohydrate Research Center

Jesse Oakley, CURO Summer Research Fellow
Dr. Laurie Fowler, Department of Ecology
Economic Incentives for Private Land Conservation and Sustainable Development: Research into Environmental Policy in Costa Rica and Georgia

Katie Orlemanski, CURO-OVPR Summer Research Fellow
Dr. Patricia Richards, Department of Sociology
Reclaiming "Development" within the Context of Low-Income Neighborhoods

Danielle Pearl, CURO-OVPR Summer Research Fellow
Dr. Keith Langston, Germanic and Slavic Languages
Press Freedom, E.U. Accession, and Democracy in Croatia

Daniel Perry, CURO Summer Research Fellow
Dr. David Landau, Department of Physics and Astronomy

Andrew Pierce, CURO Summer Research Fellow
Dr. Thomas McNulty, Department of Sociology

Richard Piercy, CURO-OVPR Summer Research Fellow
Dr. Cory Momany, Department of Pharmaceutical and Biomedical Sciences

Kurinji Pandiyan, CURO Summer Research Fellow
Dr. Steven Holloway, Department of Geography
Understanding Public Space in a New Urbanist Development

Mandy Redden, CURO-BHSI Summer Research Fellow
Dr. Robert Arnold, Department of Pharmaceutical and Biomedical Sciences
Towards a More Effective Delivery System for Anti-Cancer Drugs

Eva Bonney Reed, CURO-BHSI Summer Research Fellow
Dr. Ronald Blount, Department of Psychology

Lisa Rivard, CURO-Toxicology Summer Research Fellow
Dr. Jeff Fisher, Toxicology

Sonia Talathi, CURO-OVPR Summer Research Fellow
Dr. Brian Cummings, Department of Pharmaceutical and Biomedical Sciences
Effectiveness of Ca2+-Independent Phospholipase A2 Inhibitors in the Induction of Cheomtherapeutic-Induced Cancer Cell Death

Erika Vinson, CURO Summer Research Fellow
Dr. Richard Siegesmund, Art Education

Joshua Watkins, CURO Summer Research Fellow
Dr. Patricia Sullivan, Department of International Affairs
The Price of Victory: When Leaders Underestimate the Cost of War

Daniel Weitz, CURO-OVPR Summer Research Fellow
Dr. Gary Bertsch, Department of International Affairs
The Impact of a European Union Nuclear Weapons Free Zone on the International Non-Proliferation Regime

Shannon Yu, CURO-BHSI Summer Research Fellow
Dr. Nancy Manley, Department of Genetics

Appendix H
2005 CURO Summer Research Fellows

Grace Anglin, CURO-OVPR Summer Research Fellow
Dr. Kimberly Shipman, Department of Psychology
Family Focused Emotion Communication Training

Ashley Beebe, CURO Summer Research Fellow
Dr. James R. Holmes, Center for International Trade and Security
The Influence of Media on Economic Policy in Brazil and Argentina

Ingrid Bloom, CURO-BHSI Summer Research Fellow
Dr. Steven Stice, Department of Animal and Dairy Science
Differentiation of Human Embryonic Stem Cells into Endothelial Progenitors

Ian Lewis Campbell, CURO Summer Research Fellow
Dr. Glenn Wallis, Department of Religion
Theories of Mythology and the Way That Myths Have Affected Social and Political Formation

Kimberly Coveney, CURO-CIT Summer Research Fellow
Dr. Brian Cummings, Department of Pharmaceutical and Biomedical Sciences
Role of iPLA2 in Phospholipid Metabolism in Chemotherapeutic-Induced Cancer Cell Death

William Collier, CURO-OVPR Summer Research Fellow
Dr. Amy D. Rosemond, Institute of Ecology
Analysis of an Exotic Species' Interactions with Native Aquatic Trophic Dynamics: Quantifying the Effects of the North American Beaver (Castor canadensis) on Sub-antarctic Stream Food Webs in the Cape Horn Archipelago, Chile

John Crowe, CURO Summer Research Fellow
Prof. Mark Callahan, Ideas for Creative Exploration
AUX Launch: Art, Representation, and Commerce on the Web

Katie Griffith, CURO Summer Research Fellow
Dr. Diana Ranson, Department of Romance Languages, and Dr. Judith Preissle, College of Education
Assessing Cultural Values and Political Beliefs in a Nicaraguan Classroom: A Participant Observation

Matthew Haney, CURO-CTEGD Summer Research Fellow
Dr. Rick Tarleton, Department of Cellular Biology
Antibody Depletion of Highly Abundant Proteins in *Trypanosoma cruzi* for the Fine-tuning of Proteomic Analysis

Ned Hembree, CURO Summer Research Fellow
Dr. Timothy Dore, Department of Chemistry
Rce1and Ste24 Inhibition by Dipeptidyl Acyloxymethyl Ketones: A Potential Target for Cancer Therapeutics

Alicia Higginbotham, CURO Summer Research Fellow
Dr. Thomas Cerbu, Department of Comparative Literature
Christopher Logue's *Iliad*: A Work in Translation

Scott Jacques, CURO Summer Research Fellow
Dr. Mark Cooney, Department of Sociology
The Social Reality of Young, Middle Class Drug Dealers

Lisa Jordan, CURO Summer Research Fellow
Dr. Ruth Harris, Department of Food and Nutrition
The Effect of Leptin on Sympathetic Nerve Activity in White Adipose Tissue

Carey Kirk, CURO-OVPR Summer Research Fellow
Dr. David Z. Saltz, Department of Theatre and Film Studies
The Effectiveness of Drama Techniques in Treating People Suffering from Trauma

Andrew Leidner, CURO-CTEGD Summer Research Fellow
Dr. Pejman Rohani, Institute of Ecology
Coevolutionary Behavior and Interference between Fatal Diseases

Jon McGough, CURO-BHSI Summer Research Fellow
Dr. Wyatt Anderson, Department of Genetics
The Role of Female Choice in Sexual Selection of Drosophila *pseudoobscura*

Tatyana Nienow, CURO-BHSI Summer Research Fellow
Dr. Walter K. Schmidt, Department of Genetics
Adapting Yeast for the Study of Pitrilysin and Other M16A Enzymes

Erika Porter, CURO-BHSI Summer Research Fellow
Dr. Charles H. Keith, Department of Cellular Biology
Intrinsic Fluorimetric Imaging of Neural Activation in Cultured Cells and Zebrafish

Kurinji Pandiyan, CURO-CAES Summer Research Fellow
Dr. Raj Rao, Department of Animal and Dairy Science, and Dr. Steven Stice, Department of Animal and Dairy Science
Genomic Instability of Human Embryonic Stem Cells

Kelly Proctor, CURO-OVPR Summer Research Fellow
Dr. Lee B. Becker, College of Journalism and Mass Communication
Differences in Environmental Reporting: China and the United States

Rebecca Trupe, CURO Summer Research Fellow
Dr. Kimberly Shipman, Department of Psychology
Family Focused Emotion Communication Training

Russ Richardson, CURO Summer Research Fellow
Dr. Ron Carroll, Institute of Ecology
Sugarcane Processing Waste as a Soil Amendment on Organic, Shade-Grown Coffee under Simulated Drought Conditions for Control of Plant-Parasitic Nematodes

Dustin Williams, CURO-BHSI Summer Research Fellow
Dr. Scott T. Dougan, Department of Cellular Biology
Development of Transgenic Zebrafish to Understand How Activation of Hyal-2 Leads to Tumor Formation

Fei Yang, CURO Summer Research Fellow
Dr. Janet Westpheling, Department of Genetics
Regulation of Branched-Chain Amino Acid Catabolism in Streptomyces coelicor: Applications for Metabolic Engineering of Polyketide Antibiotic Biosynthesis

Stephanie Yarnell, CURO Summer Research Fellow
Dr. Carl Bergmann, Complex Carbohydrate Research Center

Appendix I
2004 CURO Summer Research Fellows

Cara Altimus, CURO Summer Research Fellow
Dr. Jonathan Arnold, Department of Genetics
Isolation of a Light Receptor in the Biological Clock of N. crassa

Westin Amberge, CURO-BHSI Summer Research Fellow
Dr. Steven Stice, Department of Animal and Dairy Science
Guided Differentiation of Human Embryonic Stem Cells into Endothelial Cells: Focusing on the Ulex Europaeus Agglutin I Lectin

Namrata Asuri, CURO Summer Research Fellow
Dr. Sidney Kushner, Department of Genetics
Analysis of the Role of Ribosomal S1 in the Polyadenylation Pathway of Eschericia coli

Erin Bohan, CURO-OVPR Summer Research Fellow
Dr. Katarzyna Jerzak, Department of Comparative Literature
The Reconciliation of Selves: The Emigrant Experience in America

Rebecca Brantley, CURO-OVPR Summer Research Fellow
Ms. Ashley Callahan, Georgia Museum of Art
The Early Fashion Design of Mariska Karasz and the Influence of Her Native Hungary

Josef Broder, CURO Summer Research Fellow
Dr. Andrew Sornborger, Department of Mathematics
Techniques in High Noise Image Analysis

Beau Bryan, CURO-BHSI Summer Research Fellow
Dr. Michael Pierce, Department of Biochemistry and Molecular Biology
N-Cadherin Gl

Susannah Chapman, CURO Summer Research Fellow
Dr. Virginia Nazarea, Department of Anthropology
Designing Sui Generis Systems for Traditional Plants and Associated Local Knowledge

Clayton Griffith, CURO-OVPR Summer Research Fellow
Dr. Amy Rosemond, Institute of Ecology
The Effect of the North American Beaver (Castor Canadensis), an Exotic Herbivore, on the Composition, Structure, and Regeneration of the Riparian Vegetation of Sub-Antarctic Forested Streams in Chile

Christopher Hale, CURO-BHSI Summer Research Fellow
Dr. Thomas F. Murray, Department of Physiology and Pharmacology
Adolescence as a Distinct Period of Vulnerability to Nicotine Addiction

Catherine Hudson, CURO-BHSI Summer Research Fellow
Dr. Harry Dailey, Department of Microbiology and Biochemistry and Microbiology
Negatively Affecting the Heme Biosynthetic Pathway in "Escherichia coli"

Douglas Jackson, CURO Summer Research Fellow
Dr. Nigel Adams, Department of Chemistry
Reactions of Protonated Carboxylic Acid Ions with Amines in the Interstellar Medium

Andrew Leidner, CURO-BHSI Summer Research Fellow
Dr. Pejman Rohani, Institute of Ecology
Parasitoid Behavior and Evolutionary Dynamics

Janel Long, CURO-OVPR Summer Research Fellow
Dr. Jean Martin-Williams, School of Music
The Partitas of Franz Krommer and Natural Horn Technique

John McWhorter, CURO-BHSI Summer Research Fellow
Dr. Daniel Colley, Department of Microbiology
Induction of the Regulatory Ligand PD-L2 and the Co-regulatory Receptor PD-1 on CD4 Lymphoctes During Early Experimental Schistosomiasis Mansoni

William Parker, CURO Summer Research Fellow
Dr. Marly Eidsness, Department of Chemistry
Trigger Factor

Gehres Paschal, CURO-OVPR Summer Research Fellow
Dr. J. David Puett, Department of Biochemistry and Molecular Biology
Activating Mutations of the Lutropin/Choriogonadotropin Receptor Associated with Familial Precocious Puberty, Male Psudohermaphorditism, Hypogonadism, Amernorrhea, Leydig cell Hyperplasia, and Metastatic Thyroid Carcinoma

Kevin Patrick, CURO Summer Research Fellow
Dr. James Anderson, Department of Classics
Cicero and the Foundations of a Legal Education at Rome

Katherine Price, CURO Summer Research Fellow
Dr. Janet Westpheling, Department of Genetics
Site Specific Chromosomal Integration Mediated by Bacteriophage Integrase

Matthew Rudy, CURO Summer Research Fellow
Dr. Marly Eidsness, Department of Chemistry
Analysis of Cotranslational Protein Folding in E-coli and Determination of the Role of the Trigger Factor Gene in the Folding Process

Desiree Smith, CURO Summer Research Fellow
Dr. Roberta Fernandez, Department of Romance Languages
Projecting a Positive Educational Experience for Latina/os in the South

Christopher Stokes, CURO-OVPR Summer Research Fellow
Dr. Randy Kamphaus, School of Professional Studies
Family Health and Classroom Behavior: A Pilot Study

Shana Strickland, CURO-BHSI Summer Research Fellow
Dr. Kimberly Shipman, Department of Psychology
Emotional Regulation and Coping Skills in Maltreated Children

Adam Stroupe, CURO Summer Research Fellow
Dr. Boris Striepen, Department of Cellular Biology
Drug and Nutrient Trafficking in the Human Pathogen *Cryptosporidium parvum*

Teerawit Supakorndej, CURO-BHSI Summer Research Fellow
Dr. Michael Terns, Department of Biochemistry and Molecular Biology
Identification of the Determinates for the Differential Subcellular Localization of Human Telomerase RNA in Normal vs. Cancer Cells

Tendoh Timoh, CURO Summer Research Fellow
Dr. Marly Eidsness, Department of Chemistry
Fluorophore-modified Nascent Polypeptides

Jora Vaso, CURO-OVPR Summer Research Fellow
Dr. Katarzyna Jerzak, Department of Comparative Literature
The Effect of Communism on the Works of Andric, Kadare, and Szymborska

Leslie Wolcott, CURO-OVPR Summer Research Fellow
Dr. Betty Jean Craige, Center for Humanities and Arts
The Environment in Georgia's Literature, Past and Present

Appendix J
2003 CURO Summer Research Fellows

Anthony Anfuso, CURO Summer Research Fellow
Dr. Maor Bar-Peled, Department of Biochemistry and Molecular Biology
Developing a Fast Plant Expression System to Identify Biosynthetic Genes Involved in Pectin Synthesis

Tiffany Beal, CURO-BHSI Summer Research Fellow
Dr. Debra Mohnen, Department of Biochemistry and Molecular Biology
Determining How Pectins Inhibit Cancer Growth and Metastasis

Robert Brady, CURO Summer Research Fellow
Dr. Nader Amir, Department of Psychology
Malleability of Interpretation Bias in Social Anxiety and General Anxiety

Josef Broder, CURO Summer Research Fellow
Dr. Chi N. Thai, Department of Biological and Agricultural Engineering
Operational Characteristics of a Mobile Spectral Imaging System for Plant Health Detection

Martha Rose Calamaras, CURO Summer Research Fellow
Dr. Kim Shipman, Department of Psychology
Emotional Understanding in Abused and Neglectful African-American Families

Daniel del Portal, CURO-BHSI Summer Research Fellow
Dr. Marcus Fechheimer, Department of Cellular Biology
The Physiological Role of Hirano Bodies

Dustin Dyer, CURO Summer Research Fellow
Dr. Guigen Zang, Department of Biological and Agricultural Engineering
Dr. Michael Geller, Department of Physics and Astronomy
Energy Dissipation in Nanomechanical Resonators

Sarah Fritts, CURO Summer Research Fellow
Dr. John P. Carroll, School of Forest Resources
An Inventory and Assessment of Medicinal Plants and Animals Used by Makuleke Traditional Healers on the Northern Boundary of the Kruger National Park, South Africa

Betsy Goodwin, CURO-BHSI Summer Research Fellow
Dr. Ronald Blount, Department of Psychology
A Study of the Psychology of Pediatric Pain and Chronic Illness

Patrick Gosnell, CURO Summer Research Fellow
Prof. Ben Reynolds, Department of Photography
The Beautiful and the Absurd

Paulette Andrea Greene, CURO-BHSI Summer Research Fellow
Dr. Wyatt Anderson, Department of Genetics
Conspecific Sperm Precedence and Speciation in *Drosophila pseudoobscura*

Andrea Haltiner, CURO-BHSI Summer Research Fellow
Dr. Ruth Harris, Department of Foods and Nutrition
The Effects of Leptin on Leptin Receptor Expression in High-Fat Fed Mice

Luke Hoagland, CURO-BHSI Summer Research Fellow
Dr. Marcus Fechheimer, Department of Medical Cellular Biology
The Role of Myosin II in Hirano Body Development and the Impact of Hirano Bodies on Cell Viability

Christopher "Kit" Hughes, CURO Summer Research Fellow
Prof. Mark Callahan, School of Art
Tagging

Steven Jocoy, CURO Summer Research Fellow
Dr. Michael Bender, Department of Genetics

Leena Kukkarni, CURO Summer Research Fellow
Dr. Maor Bar-Peled, Department of Biochemistry and Molecular Biology
Identification Characterization of Enzymes and Gene Products Involved in the Synthesis of Pectic Polymers Using Mucilage as Acceptors

Valerie Marshall
Dr. Ben Blount, Department of Anthropology

Ashley Neary
Dr. Susan Sanchez, Department of Medical Microbiology and Parasitology
Sensitive and Specific Detection of Fungal Keratitis in Horses

Ngozi Ogbuehi, CURO Summer Research Fellow
Dr. Mary Alice Smith, Department of Environmental Health Science
Comparing Apoptosis During Different Stages of Limb Development in Chick Embryos

Melissa Payton, CURO Summer Research Fellow
Dr. Lillian Eby, Department of Psychology
Antecedents and Consequences of Networking Behavior for Individuals Seeking Reemployment

John Drew Prosser, CURO Summer Research Fellow
Dr. Wyatt Anderson, Department of Genetics
Kin Recognition in *Drosophila paulistorum*

Ryan Rhome, CURO Summer Research Fellow
Dr. Jan Westpheling, Department of Genetics
Analysis of bkdR Protein Function in *Stephtomyces coelicolor* and *S. avermitilis*

Susan Ritger, CURO-BHSI Summer Research Fellow
Dr. Duncan C. Ferguson, Department of Physiology and Pharmacology
Immunoreactivity and Bioactivity of Recombinant Thyrotropins (TSH)

Ben Solomon, CURO Summer Research Fellow
Dr. Kevin McCully, Department of Exercise Science
Measuring Age Related Changes in Muscle Compliance Using Ultrasound

Mary Tolcher, CURO Summer Research Fellow
Dr. Tim Hoover, Department of Microbiology
Identification of Developmentally Regulated Proteins in the Budding Bacterium *Hyphomonas neptunium*

Meghan Wilson, CURO-BHSI Summer Research Fellow
Dr. James Lauderdale, Department of Cellular Biology
Pax 6b

Ryan Wilson, CURO Summer Research Fellow
Roger Moore, Department of Landscape Architecture

Thomas Wood, CURO Summer Research Fellow
Dr. Walter Schmidt, Department of Biochemistry and Molecular Biology
Analysis and Characterization of CAAX Proteases

Appendix K
2002 CURO Summer Research Fellows

Nadia Behizadeh
Dr. Tricia Lootens, Department of English

Ashley D. Chadha
Dr. Michael McEachern, Department of Genetics
Characterization of stn-1 M1 mutant in K. lactis

Emily DeCrescenzo
Dr. Susan Sanchez, Department of Biochemistry and Molecular Biology
Development of a Detection Method for TSST-1 exotoxin from *Staphylococcus aureus* Associated with Toxic Shock Syndrome in Horses Directly from Clinical Samples

Ivy Forkner
Dr. Debra Mohnen, Department of Biochemistry and Molecular Biology
Functional Expression of Putative Biosynthetic Genes for Pectin: A Plant Polysaccharide with Anti-Cancer Activity

Cory S. Gresham
Dr. James B. Stanton, Department of Pathology, and Dr. Corrie C. Brown, Department of Pathology
Development of a Reverse Transcriptase-Polymerase Chain Reaction Based Assay for the Detection and Differentiation of Dolphin Morbillivirus and Porpoise Morbillivirus

Nowell Hesse
Dr. Maor Bar-Peled, Department of Plant Biology
Identification of Nucleotide-Sugar Biosynthetic Genes Involved in Glycoconjugate Synthesis

Matt Hoffman
Dr. Will York, Department of Biochemistry and Molecular Biology
Comparative Structural Analysis of Xyloglucans from Plants in the Subclass Asteridea

Parker Hudson III
Dr. Mary Bedell, Department of Genetics

Britt Johnson
Dr. Janet Westpheling, Department of Genetics
The Use of Generalized Transduction for Combinatorial Biosynthesis of Novel Antibiotics

LeeAnn Jones
Dr. Massimo Palmarini, Department of Medical Microbiology
Mechanisms of JSRV-Induced Cell Transformation InVivo

Jenna Lee
Dr. Andrew Herod, Department of Geography
A Study of Sustainable Economic Development in Croatia

Judson A. Lewis
Dr. John F. McDonald, Department of Genetics
Evolutionary Contributions of Retrotransposon Elements in the Genome of *D. melanogaster*

Cheryl L. Maier
Dr. Scott Pratt, Department of Animal and Dairy Science
Comparative Analysis of Nuclear Proteins Present in Donor Cells Used for the Nuclear Transfer Process and Cloning

Julie Orlemanski
Dr. Jed Rasula, Department of English
Sounding and Silencing: Suspended States in the Works of Thomas Pynchon

Gautham Pandiyan
Dr. Jacek Gaertig, Department of Cellular Biology
Study of Cilial Growth Suppression Mechanism in *Tetrahymena Thermophila*

Joanne Shinpoch
Dr. Daniel Dervartanian, Department of Biological Sciences
Purification and Characterization of Nickel Protein(s) from Bovine Heart and Their Relationship to Heart Disease

John Stark
Dr. Scott Atkinson, Department of Economics, and Dr. Michael Rauscher, Department of International Economics, Rostock University
An Economic Labor Supply Analysis of Poland's Planned Entry into the European Union with Regard to the German Economy

Joshua Striker
Dr. Thomas Cerbu, Department of Comparative Literature
The Human Experience of Time: Literary and Philosophical Accounts/Representations

Nwakaso Umejiego
Dr. Boris Striepen, Department of Cellular Biology
IMPDH as a Potential Target of Drugs to Treat Cryptosporidiosis

Ben Walters
Dr. Elizabeth Brient, Department of Philosophy
The Aestheticization of Text

Lauren Watson
Dr. Jeffery Berejikian, Department of Political Science

Katherine Williams
Dr. Kojo Mensa-Wilmot, Department of Cellular Biology, and Dr. Anne Clark, Oxford University

Brad Wright
Dr. Larry Nackerud, School of Social Work
A Comparative Healthcare Policy Analysis of the United States and Sweden

Appendix L
2001 CURO Summer Research Fellows

Siobahn Beaton
Dr. Debra Mohnen, Complex Carbohydrate Research Center
Progress toward the Partial Purification of a Pectin Biosynthetic Gene

David Cureton
Dr. Janet Westpheling, Department of Genetics
Development of an In Vitro Packaging System for a Streptomyces Bacteriophage

Jon E. Davis
Dr. Gary Bertsch, Department of Political Science
Identifying the Risks of China's Nuclear Weapons Command-and-Control System in the Event of Political Crisis

Sayan De
Dr. Max Reinhart, Department of Germanic and Slavic Languages
The Progress and Modernization of Former East German Healthcare after Communism

Lawrence Dougherty
Dr. Daniel Promislow, Department of Genetics
Exploring Olfactory Response in Drosophila melanogaster and Evolutionary Theory of Aging

Matt Edwards
Dr. Gary Bertsch, Department of Political Science
Evaluating the Moscow Center for Export Control's Role as a Non-Proliferation Epistemic Community Member

Ben Emanuel
Dr. Frances Teague, Department of English
Shakespeare on Screen: Henry in Hollywood

Jeff Halley
Dr. Sheng Cheng Wu, Department of Biochemistry and Molecular Biology
Cell Wall-degrading Enzymes from the Fungus That Causes the Devastating Rice Blast Disease

Peter Harri
Dr. Kojo Mensa-Wilcot, Department of Cellular Biology
Gene Expression in Leishmania: Control of Protein Synthesis in Leishmania 5 ' Untranslated Regions

Amanda Hudson
Dr. Michael Terns, Department of Biochemistry and Molecular Biology
Screening Mutant Yeast Strains for Abnormalities in the Localization of snoRNA

Kenneth Miller
Dr. Timothy Dore, Department of Chemistry
Synthesis and Use of Caged Compounds to Explore Cellular Processes

Lorina Naci
Professor William Paul, Jr., School of Art
Each morning I get up with one word in mind: plastik…

Lynn Nguyen
Dr. Mark Wheeler, Department of Dance
Chinese Classical Dance

Cori Pelletier
Dr. Roy Grant, Department of Music Therapy
Music Therapy with Premature Infants

Kate Smith
Dr. Kenneth S. Latimer, Department of Pathology
Immunohistochemical (IHC) Detection of Natural Killer Cells in Fish

Buudoan V. Tran
Dr. Karl N. Kirschner, Complex Carbohydrate Research Center, and Dr. Robert J. Woods, Complex Carbohydrate Research Center
Parameter Development and Application of the Glycam Force Field for Sialic Acid Derivatives

John Woodruff
Dr. Harry Dailey, Department of Microbiology
The Generation of Mutations in the n-Terminal Region of the Protoporphyrinogen Oxidase of *Bacillus subtilis* to Create a Protein Capable of Mitochondrial Targeting in Mammalian Cells