2014

CURO

Summer Research Fellowship

Book of Proposals

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April 22, 2014

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-mentored 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 proud of the accomplishments 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 2014 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
Proposals

Proposal for Research on the Old English Poem “Elene” by Cynewulf, with a Focus on the Figure and Propaganda of Constantine the Great

2014 Summer Fellow: Kaitlyn Beck
Research Mentor: Dr. Jonathan Evans, Department of English

Introduction

This research project will look at the Old English poem entitled “Elene,” which is Old English for Helena, the mother of Constantine the Great. The primary focus of the project will be Constantine the Great, one of the most important political and religious figures in history. The real question of the research project is what effect did the propaganda of Constantine the Great have in later portrayals of the Emperor? Much research has been done on the ways in which Constantine chose to be portrayed; this project would have the important role of determining how successful those portrayals were.

Historical Perspective

Scholars have already noted some of the striking similarities between Constantine’s version of Christianity and the cult of Sol Invictus. The Church in the Age of Constantine by Johannes Roldanus outlines the connections between Constantine and the worship of Apollo, establishing Constantine’s connection to Sol Invictus. Constantine viewed himself as a direct representative of the deity, and so worshipping the “Unconquered Sun,” a monotheistic religion, gave him a divine mandate to be the sole emperor of Rome. In The Iconography of Constantine the Great, Christopher Walter explores the connection that Constantine makes in his portrayal of Jesus and the Sun deity. The similarities actually made his conversion much easier. Just as Constantine believed himself the divine representative of Apollo, he also believed himself the representative of Christ. Therefore, the iconography of Constantine began to portray himself in a similar manner to Christ. This portrayal extended to his mother, Helena, whom he wanted to associate with the figure of Mary, the mother of Jesus.

This is the historical background for the poem “Elene.” Written almost 600 years after Constantine’s life, the poem chronicles the mythical journey of Helena to Jerusalem to locate the cross of Jesus Christ. The figure of Constantine plays a very important role in the poem, as discussed by E. Gordon Whatley. Dr. Whatley’s research focuses on the militarization of Christianity that was started by Constantine and considered standard by Cynewulf’s time. What I aim to look at is slightly more political. I will examine the portrayal of Constantine as a leader (both in the religious and secular sense) and see what traces of Constantine’s own iconography survive.

Research Methods

To examine the figure of Constantine in “Elene,” most of my work will make use of primary texts. I will be closely examining the language used by Cynewulf when describing Constantine, and see how it resembles or differ from the Latin words used to describe him by Eusebius and other contemporary historians. This will require an extensive look at the work of the Peterborough chronicles, an Old English translation of a Latin history, to see the most accurate translations of Latin words to Old English.

I will also be looking more into Constantine’s iconography. While I have already studied this in relation to his sun god worship, I will need to focus more on his propaganda relating to his
mother and to the Christian cross. These two themes are the focus of the poem by Cynewulf and will determine much of whether or not Constantine’s methods were successful.

I expect to find that Constantine’s efforts were largely successful in regards to his status as the representative of the Christian God. However, it is less likely that his affiliation with the sun god, and how he believed that connected to Christianity, remains.
The narrative of the 1960s student protests revolves around the major campuses of Kent State, Berkeley, Columbia, and other Northern and West Coast universities. However, this narrative fails to paint the national picture of college upheavals. The 1960s would not have had the same effect on society if protests were confined to a few liberal campuses. Across the nation, students fought against the Vietnam War, the policy of in loco parentis, and for their right to free speech on campus. While ignored in most histories of the decade, these protests reached the Deep South as well. Chapters of Students for a Democratic Society, and their Southern equivalent, the Southern Student Organizing Committee, formed on Georgia campuses. Georgia students, too, staged sit-ins and marches and desired to have their voices heard. Yet, even within these so-called ‘radical’ groups, women struggled to be allowed the same opportunities to speak and organize as their male peers. If the Southern radical is overlooked in historical narrative, the female radical is nearly forgotten, as she had to fight for her voice to be heard within even the New Left movement itself.

In 1968 the biggest protest on the UGA campus centered on making disciplinary rules equal for both male and female students. At the time, women were subject to stricter rules of curfew, visitation, and drinking. While the Red and Black ran op-eds from parents and students who supported this inequality on the basis of preserving a unique femininity and a female wholesomeness, 112 of the 300 students who occupied the Academic Building were women, all of whom were breaking traditional gender roles, and also their curfew. Yet, despite the participation of women and the protest being over a women’s issue, the leaders of the protests and the ones who became the spokespeople were all men.

UGA erupted in protest again in 1970 as it joined the nationwide student strike to protest the shootings at Kent State. What role were women able to play in this protest? What struggles and frustrations did they face? Female radicals existed on campus. In 1972 a chapter of the feminist group W.O.M.E.N (Women’s Oppression Must End Now) formed at UGA. As chairwoman Linda Chafin said, “I started out in the peace movement. It just riled me up the way the men acted toward women, even though we had the same concerns.”

This research aims not to address the feminist movements on the UGA campus, but rather the struggle within New Left groups that required separate women’s movements. At a time when even the president of the UGA Young Democrats denounced the campus SDS chapter as “radical,” why did some of the peace movement membership feel so restrained by traditional gender roles they had to form their own groups? What was the unique brand of Southern radicalism, and how did Georgia universities fit into the college protest narrative? Utilizing back issues of the Red and Black as well as the UGA archives at the Russell Special Collections Library, particularly the Fred Davison papers, as he was President of the University during these protests, I aim to explore the dual narrative of the radical Southern woman. How did the Southern student protests differ from, yet also mirror, the high-profile Northern ones? How did being a woman affect a student’s ability to be a radical? There is a national question here as well: how could a group or movement be truly radical if it enforced the traditional gender roles of the society it claimed to oppose?
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Skin cancer is the most widespread form of cancer in the United States and is possibly initiated by ultraviolet (UV) radiation damaging DNA contained in skin cells.\textsuperscript{1} Certain constituents within our skin, like the polymer eumelanin (see Figure), function as a built-in sunscreen, naturally protecting our bodies from DNA photodamage. However, the mechanism responsible for this UV-shielding is not yet fully understood. The focus of the proposed project is to study this mechanism in both the gas and condensed phases by employing a unique simple-to-complex approach.

Beginning with building blocks of eumelanin, I will determine at a molecular level how these simpler molecules respond to UV radiation, and then extrapolate this information to larger polymeric systems to achieve a better understanding of eumelanin photodynamics.

The research objective of my proposed project is to understand the dynamics of the eumelanin precursor indole, using gas-phase and condensed-phase time-resolved spectroscopic techniques. We will photoexcite the indole molecule in the gas phase with UV radiation and monitor the evolution of the excited states, while also investigating possible fragmentation pathways. Our hypothesis is that the optically dark $\,^1\pi\sigma^*$ state (i.e., the $\,^1\pi\sigma^*$ state is not excited directly) provides efficient ultrafast deactivation back to the ground state. This process has been demonstrated in previous works on indole,\textsuperscript{\textendash}yet many discrepancies still exist (e.g., the relaxation time associated with the $\,^1\pi\sigma^*$ to ground state transition). The $\,^1\pi\sigma^*$ state was proposed as a deactivation pathway in the theoretical work of Sobolewski and Domecke,\textsuperscript{4} and our hypothesis is based on the emergence of this state as a key candidate in the photoprotection mechanism of many biomolecules. We will conduct numerous gas-phase experiments on indole, utilizing various wavelengths across its UV absorption spectrum. Femtosecond time-resolved photoelectron spectroscopy (TR-PES) will be applied to directly observe the relaxation pathways of all excited states, including the $\,^1\pi\sigma^*$ state. We will also use time-resolved total kinetic energy release (TR-TKER) to monitor the kinetic energy of emitted H-atoms, an indirect method of examining $\,^1\pi\sigma^*$ state dynamics that lead to N\textendashH bond fission, and time-resolved ion yield (TR-IY), a technique employed to observe fragmentation dynamics.

Information gleaned from each method will afford the opportunity to inspect the involvement of the $\,^1\pi\sigma^*$ state in the overall photoprotection mechanism itself.

To replicate a more biologically relevant environment, we will also study indole dynamics in different solvents with varying polarities, such as cyclohexane, ethanol, and water. Time-resolved transient absorption spectroscopy (TR-TAS) will be performed on indole to investigate the temporal evolution of the neutral, electronically excited states. Similar to the gas-phase studies, we will utilize a wide range of excitation wavelengths but will probe for the possible appearance of the indolyl radical with white light. Indolyl is the indole molecule with the H-atom located at site 1 (see Figure) removed and again an indication for $\,^1\pi\sigma^*$ deactivation dynamics.
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Through these methods we expect to obtain a comprehensive understanding of the photochemical and photophysical processes in the eumelanin precursor indole, including energetic onsets (i.e., the minimum amount of energy required to access a specific relaxation pathway) and the significance of varying deactivation pathways, specifically the \( ^1\pi\sigma^* \) state, as well as their respective timescales. The gas-phase results will be compared with theoretical models as well as the condensed-phase results to show the potentially significant role of a solvent in biomolecular photostability. This understanding will provide a foundation for the Ullrich Ultrafast Laser Group as they commence to understand the photophysics of eumelanin precursors, with the understanding of eumelanin itself being the ultimate goal.

References:


Proposals

Techno-economic Assessment of Co-producing Bioplastics with Algae Biofuels

2014 Summer Fellow: Charles Bond
Research Mentor: Dr. Sudhagar Mani, College of Engineering

Over the next century, the ever-increasing demand for energy, the volatile and decreasing supply of fossil fuels, and the environmental and health problems caused by burning them will force a shift towards renewable energy sources. At the University of Georgia and around the world, research has begun on the economical cultivation and conversion of biomass into drop-in fuels (equivalent to fossil fuels used today).\textsuperscript{1,2,3} Algae are a promising source of biomass because of their high areal productivity (50-100 dry tonne/ha/y) compared to that of terrestrial biomass (5-20 dry tonne/ha/y) and can be converted into a variety of biofuels and other products.\textsuperscript{1,4} Furthermore, considering that “algae are capable of producing in excess of 30 times more oil per acre than corn and soybean crops”\textsuperscript{4} without directly competing with food, one wonders why we still use petrol and corn in our cars. The reason is that advancements in algae cultivation and conversion are not happening fast enough for algae-based fuels to meet the lower costs of fossil fuels and federally subsidized industrial food crops,\textsuperscript{1} and potential environmental benefits such as carbon sequestration, waste treatment, and reduced pollution are difficult to factor into the value of the product.\textsuperscript{2} For this reason, I intend to research the coproduction of bioplastics as a potential offset to the costs of producing algal biofuels.

When producing fuels from algae, valuable coproducts can be produced alongside biomass for fuel simultaneously, and “this co-production is seen as an important option to break through the barrier of economic viability.”\textsuperscript{2} Potential algal coproducts are very diverse: “antiviral compounds, Immunomodulators,”\textsuperscript{5} complex silicon nanostructures,\textsuperscript{6} antibiotics, nutraceuticals, pigments and a wide variety of other bioactive molecules.\textsuperscript{5} Although the market values of such products are high,\textsuperscript{7} potentially hundreds of thousands of dollars per ton,\textsuperscript{5} their markets are small and elastic, meaning they are subject to a significant “decrease [in] price and also market value as higher production rates may possibly lead to market saturation.”\textsuperscript{8} Contrast that with fuels and plastics, commodities that are generally lower in value (biofuels worth 100-1000 $/ton, bioplastics worth 2000-5000 $/ton, roughly),\textsuperscript{5} but are inelastic and resistant to market saturation, as billions of people use them every day. Demand for energy and plastic grows with population, and since fuels and plastics are today derived from oil, their value will rise as oil becomes scarce, and the demand for alternatives will increase. Algae offer a 2-in-1 alternative, as bioplastics are derived from proteins, the biomass that is least suitable for fuel. This relationship seems very promising, and that is why I would like to research how the production costs of fossil plastics and fuels compare to those of algal plastics and fuels, how bioplastics will affect the economic feasibility of algal-fuel production, and how those relationships will change as oil prices rise.

Dr. Sudhagar Mani, who is researching the cultivation and conversion of algae into bio-crude oil and coproducts at the UGA College of Engineering, has invited me to work with his research group. I would study their work and factor it into an analysis of the costs and benefits of a variety of potential large-scale production scenarios, comparing the costs of producing algae-derived products to the current and predicted future costs of petroleum-derived products. With this information, I hope to find out the extent to which bioplastics can improve the economic viability of algal-fuels, how those improvements can be optimized, and finally, if and when the costs of oil will make algal plastics and fuels viable on a commercial scale.
References:


People in relationships often try to change their partners’ behavior. Finding a balance between behavior change and relationship quality is challenging but very important for a healthy relationship. Past research has found that focusing on changing one’s partner is not a successful approach to help the partner change (Hira & Overall, 2011). Instead, relationship quality and development depend on whether or not the partner attempts to engage in effective change on his/her own (Hira & Overall, 2011). Furthermore, encouraging and supportive partners promote self-enhancement by giving their partners help to achieve their goals (Overall, Fletcher, & Simpson, 2010). Additionally, people who reported high marital satisfaction also reported giving extra support towards their spouses’ goals compared to those who reported low marital satisfaction (Brunstein, Dangelmaye, & Schultheiss, 1996). Likewise, further studies suggest that romantic partners may rely on each other for help with self-control, which may help conserve resources for other goal pursuits down the road as well as facilitate relationship commitment (Fitzsimons & Finkel, 2011).

Additionally, social control is associated with an increase in health behavior and people in relationships tend to influence the health behaviors of their significant others (Craddock, vanDellen, Ranby, & Novak, 2014).

Although we know support, especially goal support, is important for overall relationship quality and satisfaction, we do not yet know how people go about recruiting support from their significant others for health behavior change. Nor do we know much about the extent to which people perceive their partners as obstacles to health behavior change. The major emphasis of this research will be to investigate communication about health behaviors in romantic relationships, including how people in relationships plan to change these health behaviors and how these conversations about health behaviors are related to their personalities, their partners’ personalities, and their relationship satisfaction.

The present study is an exploratory study where I will observe videos of sixty-six couples discussing health behavior change. My primary task for the summer will be to lead the coding and analyzing of these videos. I plan to develop a coding scheme for the videos with a focus on whether the dyads preferred collaborative versus independent plans for health behavior change (e.g., did the partners decide to exercise together or separately at different times) as well as features relating to the plans themselves (e.g., are they abstract vs. concrete; are they short-term vs. long-term). Additionally, we will code the extent to which couples spend an equal amount of time talking about health change versus the extent to which one partner does the majority of the talking. Once I have developed this coding scheme, I will train and lead a team of research assistants in the coding of the videos, ensuring that we maintain high inter-rater reliability.

When the data coding is complete, I will analyze the correlations and means, and prepare a manuscript for publication. Additionally, I will use data from this project as the basis for a proposal for a poster presentation at the Society for Personality and Social.
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Psychology, an international academic conference where researchers in my specialty of interest meet annually.

References:


Contemporary Artistic Approach toward Ancient Chinese Papermaking
2014 Summer Fellow: Jiacheng Chen
Research Mentor: Prof. Eileen Wallace, Lamar Dodd School of Art

In 105 AD, Cai Lun, a royal officer of craftsmanship in China, reported his method of making paper to the emperor. It is the first recorded proposal of papermaking, and Cai Lun is recognized as the inventor of papermaking. Today, after almost 2000 years, handmade paper art has established itself as an independent art form. This research will focus on creating paper sculpture using ancient Chinese paper material.

The quality of handmade paper remains true to its raw plant material. Its process of creation is transformative in physical form yet adhesive in fiber materiality, a key feature that distinguishes one piece of paper from another. In this research, I will study the old papermaking technique from ancient Chinese papermakers, to see what a piece of paper made from this earliest recipe would be like. I will also look into its texture, opacity, and malleability from a sculptural perspective, an art domain that has not been explored in ancient oriental art history. For paper sculpture, its shape formation cooperates with nature. Different from traditional sculptors, paper sculptors don’t dominate the entire creative process. Once an initial structure is made, the paper reacts with the structure and transforms into natural shapes as it dries. An artist’s position becomes secondary behind the idea of “let nature finish the job.”

I plan to divide this research into two parts. First, I will travel in China and read an original text *Tian Gong Kai Wu* (The Exploitation of the Works of Nature, by Song Yingxing, 1637). I will take field trips to local paper workshops to learn the recipe and visit the Cailun Paper Culture Museum in Shaanxi Province. When I return to the United States in early June, I will continue my studies in papermaking in the Hargrett Rare Book and Manuscript Library. To start the second part of this research, I will actually make Chinese paper in the papermaking department, using what I learnt from a papermaking course. Meanwhile, in the studio I will adopt a research method from the architecture laboratories, where researchers study shape formation by experimenting with many models with a single variable. Similarly, I will explore paper’s drying mechanism through the variation of structural setup and document groups of accumulative visual outcomes in photographs. I will conclude my research and expand the reaction mechanism to paper installations of a large scale. The final project will be a large paper installation of Chinese papermaking which will combine ancient oriental paper materiality and spontaneous visual appearance.

I am interested in exploring a traditional medium using a modern approach and creating innovative yet nostalgic aesthetics. Last year I created a CURO research course entitled “Modern Re-creation of Ancient Chinese Architecture.” Guided by two professors, I studied historical texts about ancient Chinese architecture and its specific bracket system craftsmanship. I designed new bracket styles and a minimalist wooden pavilion. This study, “Contemporary Artistic Approach toward Ancient Chinese Papermaking,” will be similar in character and re-create an ancient craft in a contemporary artistic format. Additionally, it will also serve as inspiration to future architecture design for its methodology. I look forward to studying paper’s drying-motivated shape formation and seeing how its unpredictable curling will allow nature to participate in a creative process. Ultimately, this research will not only bring together two historical periods, but will also be interdisciplinary, mixing visual art and design.
Influence of Mating Behavior on Germline Stem Cell Reproduction in Three Species of Drosophila

2014 Summer Fellow: Blair Christensen
Research Mentor: Dr. Patricia Moore, Department of Entomology

Insect pest management is arguably the most important area in modern entomology, determining the success or failure of large-scale agriculture across the globe. Essential to understanding pests is a clear picture of their life history and reproductive strategies. Tailoring pest management to specific reproductive patterns yields more efficient and often more effective control. The fruit fly species of the genus Drosophila are models for studying evolutionary biology and life history, but up to now have not been known to be pest species (Ashburner et al., 2005). However, a new invasive pest species of Drosophila, D. suzukii, has recently arrived in the USA and is causing significant losses, including in Georgia (Lee et al., 2011). Our goal is to determine whether innate reproductive mechanisms can be manipulated by external conditions; this could lead to a non-chemical pest solution to the recent influx of D. suzukii.

An essential component of fertility is the production of gametes by germline stem cells (GSCs). The regulation of GSCs is not yet entirely understood, although the effect of diet and age is being explored in D. melanogaster (Hsu & Drummond-Barbosa, 2009). However, other factors, particularly the role of mating, are not well understood. It is unknown whether or not individuals of the same species and environment will exhibit different rates of GSC division when exposed to different reproductive conditions (Tu & Tatar, 2003). Some earlier studies have shown that increased rates of mating will result in a higher turnover rate in the GSCs (Schultz lab preliminary data). We believe that this supports the idea that virgin male fruit flies will have less division activity in their GSC hub than a fruit fly that has been able to mate in a limited context, and that that male will have less than a fruit fly that has been allowed to mate an unlimited amount of times.

Three different species of Drosophila will be used: D. melanogaster, D. suzukii, and D. pseudoobscura. Drosophila melanogaster is a common model organism, with established staining techniques and a completely mapped genome. Drosophila suzukii is an important emerging pest species, but nothing is known about its reproductive physiology. Drosophila pseudoobscura is very different from the other two species, both in appearance and in some aspects of physiology, including testes shape and size (Mayr, 1946). The previous two semesters have been devoted to developing a staining procedure that will work on all three species. In my previous work I have established a protocol that utilizes a blocking step to reduce non-specific binding which is essential for labeling testes for both structure and GSC division rates.

Division rate is determined by counting GSCs in either the synthetic or mitotic phase, by ex-vivo labeling of the testes. Testes from males at the same age, but under three different reproductive conditions (unmated virgins, a single mating, and unlimited mating) will be analyzed for GSC division rate. Testes will be dissected. One testis from each male will be labeled for BrdU incorporation and actin filaments. The other testis from each male will be labeled with anti-phosphohistone H3 to label M-phase nuclei as a control for changes in cell cycle length. I will test the hypothesis that the rate of GSC division increases with increasing number of matings. The results from this summer of study will be not only applicable to the life history model of the organisms, but also to pest management utilization, possibly impacting entire agricultural industries.
References:


The Politicization of Soccer and the Effects of the 2014 World Cup on Brazilian Politics

2014 Summer Fellow: Aaron Conley
Research Mentor: Dr. Barry Hollander, Grady College of Journalism & Mass Communication

The summer of 2014 will be extremely significant in terms of political and social issues in Brazil. Those actions will focus on a range of topics including public health and education, high tax rates, corruption, multi-billion dollar projects for the World Cup and Olympics, and social injustice for the poor in the favelas in major cities such as Sao Paulo and Rio de Janeiro. The catalyst for all of this comes in the form of the 2014 World Cup, hosted by Brazil and played out in twelve major cities around the country. The political action that will take place during the month-long tournament can have an immediate effect when Brazilian president Dilma Rousseff seeks re-election in November.

My research has begun by analyzing the political revolts that occurred during the 2013 Confederations Cup, which served as a dry-run for the World Cup, allowing Brazil to practice hosting games in the new stadiums. The uprisings staged during the tournament set a precedent that is all but assured to be upheld at the 2014 World Cup. These protests and the issues inspiring them form the basis of my research.

One major issue comes in the form of extreme government spending and rampant corruption. To date, the Brazilian government has already spent more on its own World Cup than South Africa, Germany, and South Korea (the most recent three hosts) combined. Brazil is also notorious for its extremely high citizen tax rates but very poor public education and public health.

Also significant is the nature of the protests themselves. The ways in which the protests are carried out and the use of media by which they spread are both extremely telling about the current state of Brazil. Also, the way that the government responds to them holds significant political implications. Dilma Rousseff was actually part of the leftist guerrilla movement in the 1980s. This has left her in a balance between trying to quell the dangerous rebellions without reneging on the values that can win her re-election.

The immediate future of Brazil will be entirely determined by the events that will unfold from June 12th to July 13th of this year. The way that the World Cup changes the political nature of Brazil will have major ramifications on the 2014 presidential election and the 2016 Rio Olympics, and ultimately determine if Brazil, one of the fastest growing nations in terms of both population and economics, will become a global power on par with the United States and China, as some believe it is capable of doing. A scholar from the University of Espirto Santo said: “Brazilians are mixing soccer and politics in a way that is new.” This unique mixing of sport and politics will unfold on the world stage this summer and will determine the future of a nation, a continent, and ultimately the world.

Looking at this summer, the 2014 CURO Summer Fellowship will serve as a research stipend affording me the opportunity to gather information about the 2014 World Cup and the social and political actions surrounding it in real time. I will see and understand exactly what is happening in one of the fastest growing nations in the world, and what the World Cup is doing to adjust a political system which already finds itself in an unstable state, especially heading into a major election season in the Fall of 2014. Ultimately, with this fellowship, I will find myself at the beginning of the fall 2014 term with all of my information gathered, allowing me to begin writing and preparing for hopeful publication in 2015.
Exploring the Relationship between Oxytocin and the Tendency to Trust
2014 Summer Fellow: Lydia Denison
Research Mentor: Dr. Brian Haas, Department of Psychology

The neuromodulating hormone oxytocin is the focus of many studies in the field of neuroscience and social behavior. Abnormalities within the oxytocin system play a large role in psychopathology, specifically social disorders such as autism. Recently, oxytocin has been linked to the regulation of the specific social-behavioral constructs that include trust, empathy, and altruism. My goal is to better understand the relationship between oxytocin and the tendency to trust, utilizing a combined genetic analysis and neuroimaging approach.

Interpersonal trust is defined as “the psychological status of being willing to accept frangibility, based on the expectation of the other party’s positive intentions or behaviors (Yan & Zhu, 2013).” Interpersonal trust is associated with positive social interactions, cooperation, and altruism. To study the effects of oxytocin on social-behavioral phenotypes, researchers have used the method of intranasal administration of oxytocin. Results of this research show that intranasal administration of oxytocin increases trust behavior during the Prisoner’s Dilemma Task. The Prisoner’s Dilemma Task involves two players, and a hypothetical situation in which cooperation is required from both players. The group that received intranasal oxytocin displayed enhanced mutual cooperation and trust, relative to the placebo control group (Declerck, Boone, & Kiyonari, 2013). One limitation of this study, however, is the uncertainty of the precise amount of oxytocin that actually reaches and affects oxytocin receptor sites through nasal administration (Churchland & Winkielman, 2012). Another limitation of intranasal administration of oxytocin is that it is difficult to determine the individual variability of the uptake because of differences in genotypes of the receptor.

An alternative method used to understand the association between oxytocin and trust is to investigate how genes within the oxytocin system may be related to individual differences in the tendency to trust. Abnormalities of the oxytocin receptor gene (OXTR) occur in many psychological conditions. This proposed study is designed to examine the association of the OXTR and the structure and function of the amygdala and furthermore, how these biological factors correlate with the tendency to trust. In order to conduct this research I will be working under Dr. Brian Haas in the Gene-Brain-Social Behavior Lab. In this multi-disciplinary lab I will be collaborating with the Georgia Genomic Facility as well as the UGA Bio-Imaging Research Center (BIRC). Participants will complete the Trust Inventory (a well-known measure of trust), a series of Trust Tasks during the collection of the fMRI data, and saliva will be collected for genetic analysis. The first session will be a collection of behavioral data. The first Trust Task is made up of different faces, and participants are asked to rank on a scale of 1 to 7 the trustworthiness of the faces. During the second session fMRI data will be acquired. The participants will be placed in the Tesla 3 Functional Magnetic Imaging Scanner (at the UGA Bio-Imaging Research Center) and the BOLD signal will be collected. While in the scanner each participant will see the same series of faces from the previous session (several weeks prior) and they will be instructed to either trust, distrust, or evaluate the age of the person. Age will serve as a control. Immediately following the fMRI scan the participants will then be asked to rate the trustworthiness of the same faces. This task will be a measure of conscious control of trust.

I have narrowed the focus in my correlational study in hopes of better understanding the association between certain alleles within the OXTR gene, structural and functional neuroanatomy, and social behavior. I believe that as a result of this research, the fields of psychology and biology will progress towards a greater understanding of human social interaction.
Proposals

References:


Proposals

Production of a Monoclonal Antibody Epitope Expressed on Pancreatic Adenocarcinoma

2014 Summer Fellow: Sarah Evans
Research Mentor: Dr. Michael Pierce, Department of Biochemistry & Molecular Biology

Improvements in early detection and monitoring of pancreatic cancer are necessary to reduce the low survival rate associated with this disease. Based on data from the Surveillance, Epidemiology, and End Results Program of the National Cancer Institute, only 6% of people diagnosed with pancreatic cancer survive five years or more. Pancreatic ductal adenocarcinoma is by far the most common form of cancer in the pancreas, and not much is currently known about signals indicating the initiation of this oncogenic process.

Aberrations in cell-surface glycans can be seen in various cancers, leading to their potential in serving as biomarkers of cancer. CEACAM6 is a GPI-anchored protein in the carcinoembryonic antigen family involved in cell adhesion and contains immunoglobulin domains and N-linked glycan sites. CEA production stops before birth, but research has shown elevated CEA levels associated with various cancers, particularly adenocarcinomas. Therefore, antibodies to CEA can be used to identify cells expressing this glycoprotein and narrow down the cancer type affecting the individual.

A monoclonal antibody epitope, expressed on CEACAM6 made in pancreatic ductal adenocarcinoma, has been identified by the Pierce lab and is an N-linked glycan expressed only on CEACAM6 on these cells and on CEACAM6 released by these cells. The C6f1 fragment of CEACAM6 has been expressed in HEK-293T cells as a fusion protein with the IgG Fc sequence. After this fragment was secreted and purified, the monoclonal antibody (MAb 3.3) glycoepitope was found on only one peptide. Research in the lab has already taken steps to confirm the chemical structure of this glycan epitope. The C6f1 fragment was also expressed in a Lec1 HEK-293R cell line that lacked GnT-I activity in order to simplify its N-linked glycans. The MAb 3.3 epitope was resistant to cleavage by endoglycosidase H, while the rest of the N-linked glycans were not. By treating the sample with endo H, the N-linked glycans could be released while the glycans expressing the epitope remained intact. Analysis by MSn has narrowed the possible structures of the epitope. Analysis by NMR spectroscopy is currently underway to verify this simplified structure.

Under the guidance of Dr. Michael Pierce, my primary goal will be to elucidate the structure of the native glycans that express the epitope in a pancreatic adenocarcinoma cell line, BxPC3, that contains the CEACAM6 native GPI-anchored glycoprotein. Revealing the features of these endogenous glycans may open up new possibilities that may not be apparent in the simplified secreted epitope produced in the Lec1 HEK cells. I will isolate these glycans expressing the epitope and determine their structures by expressing the C6f1 fragment in BxPC3 cells. Data has also shown detection of the MAb 3.3 epitope in pancreatic cancer ductal fluid after SDS-PAGE and immunoblotting. Identification of features of the glycan epitopes and the proteins that express them can thus be extended to ductal fluid. A better understanding of these endogenous glycans and their antibodies may enable us to develop antibodies with greater specificity that will aid in detecting if there are antibodies against this epitope, or fragments of CEACAM6 containing the epitope, circulating in sera within patients with pancreatic cancer. The analysis of the endogenous glycans that express the epitope will provide more information regarding their potential as biomarkers for pancreatic ductal adenocarcinoma and potential therapeutic targets, as well. This research will likely lead to innovative methods for diagnosing and monitoring the disease and could also lead to new therapies for its treatment.
References:


Alexis de Tocqueville once remarked that the French Revolution was “so inevitable yet so completely unforeseen.” The statement is remarkable for what it says, and even more so for what it does not say: for Tocqueville might have said that the Reign of Terror was inevitable, that the Reign of Terror might have been foreseen. Was he correct in his omission? Who can tell? To this day, the historiography of the Terror is unsettled. The facts are clear: that the years of the Terror constituted the most violent of the Revolution; that the heady days of 1789, when all was “Liberté, Egalité, Fraternité,” seemed from another world. Rather, it is the interpretation of the facts that is contested. On the one hand, the liberal school maintains that the Terror was a radical departure from the ideals set forth in 1789; on the other, historian François Furet, among others, argues that the events of 1793 were consistent with those ideals. I propose to study the problem through the lens of two important symbols of the Terror: the guillotine and the mountain. The centrality of the guillotine to the events of the Terror is well-known. Nearly 17,000 people were executed at its blade. The mountain is perhaps less-appreciated as a symbol of the Terror. The nickname for the radical political faction headed by Robespierre, it evoked the ideal city on a hill the revolutionaries strove to create. My goal is to study the significance of the guillotine and the mountain as revolutionary symbols, and, through them, to come to a deeper understanding of the problems confronting the historiography of the Terror.

Many revolutionaries endorsed the use of the guillotine to execute counter-revolutionaries. Robespierre himself said that revolutionary government “owes nothing to the Enemies of the people but their death.” The Jacobins unleashed the Reign of Terror to eliminate people who opposed the revolutionary cause. That the guillotine also dispensed with Louis XVI and Marie Antoinette only intensified its power as a revolutionary symbol. At the onset of the Terror, the guillotine was viewed as a humane innovation, suited to its purpose: a symbol of the progress of the Revolution. But as blood began to flow more heavily in the streets of Paris, everyday people referred to it by euphemisms, such as the “national razor.” This suggests a level of discomfort that was not present only months before. How did the meaning of the symbol change so rapidly? What does the changing popular mindset tell us about the people’s view of the Terror?

Just as political culture changed during the Terror, so did visual culture. The deep interaction between the two has been explicated by historian Lynn Hunt. For example, while Marianne initially symbolized the triumph of the Revolution, her appearance during the Terror gave way to that of the more radical Hercules. Additionally, the style of Jacques-Louis David, arguably the most prominent artist of the Revolution, changed drastically throughout the Revolution and, specifically, through the Terror. Before long, David himself began incorporating mountains into his art. Mountains signified a connection to the Montagnards, the radical faction of the Jacobins who were responsible for implementing the Terror. What other close ties existed between the artistic and political elites? What do the ties say about the professedly democratic ideals of the Revolution?

In conclusion, I wish to return to the question raised at the beginning of this paper. Were the seeds of the Terror present in 1789, or did the Terror occur unexpectedly, like a thunderbolt from the sky? I believe that by examining the Terror in a different light – that of the symbols of the guillotine and the mountain, through the study of pamphlets, newspapers, prints, festival plans, and paintings – I will contribute to answering this all-important question.
References:


Proposals

Development of Robots for Weed Control in Organic Farming
2014 Summer Fellow: Delmaries González
Research Mentor: Dr. Changying Li, College of Engineering

In agriculture, herbicides are utilized in large farms as a method for effective weed control. These chemicals have widely variable toxicity, so the dangers of acute toxicity from high exposure levels for the user are possible. According to some studies, there is also concern for birth defects in babies because of chlorophenoxy herbicides, which are widely used in the United States (Schreinemachers, 2003). Even so, it is necessary to get rid of weeds in our crops. Weeds reduce crop yield by competing for water, light, soil nutrients, and space. They reduce crop quality by contaminating the commodity, interfering with harvest, limiting the choice of crop rotation sequences and cultural practices, and producing chemical substances which are toxic to crop plants, animals, or humans (Ligenfelter, 2014).

Weed control is the number one problem facing organic farmers. In addition, conventional growers are interested in improving sustainability. This project could reduce the need for labor and/or chemical herbicides. As organic agriculture grows, weed control will continue to be a drag on expansion, especially where unskilled labor is limited or unavailable.

Robotic technology may provide a means of reducing agriculture’s current dependency on herbicides, improving its sustainability, and reducing its environmental impact (Slaughter et al., 2007). Societal benefits would include the reduction in the use of chemical herbicides that may pose a danger to the environment, farm workers, and their families. This would also reduce the amount of chemicals in our food supply. Reducing the need for low paid, unskilled labor would help reduce the need for immigrant labor and reduce the potential exploitation of such populations.

This project will use off-the-shelf robot chassis (NI LabVIEW Robotics Starter Kit for Prototyping) and the graphical programming language LabVIEW to develop a weeding robot for applications in organic and sustainable vegetable production. The idea is to develop a weeding robot that can autonomously navigate between the rows of organic vegetables and remove weeds between two rows. There are three objectives that I will pursue in this research program: 1) develop a GPS-based or vision-based navigation system so the robot will follow a certain path in the field; 2) integrate sensors onboard to avoid obstacles (such as plastic munch); 3) develop an actuator that can remove the weeds effectively. The control of this robot will utilize the onboard inertial measurement unit (IMU) to determine robot motion and direction, which will be used in conjunction with touch sensors to determine robot action and control the activation of the weeding brushes. The way this will be achieved is with a function of the onboard GPS, accelerometer, gyrometer, and magnetic compass. The mechanism of weed control, which I will be designing and building, will use rotating brushes to stir the soil to keep weed seedlings under control. The brush control will be integrated with the robot’s movement, starting and stopping as deemed appropriate. There are three different mechanisms of locomotion that will be evaluated: wheeled, tractor treads, and multiple tractor treads.

The project will be conducted in the Bio-Sensing and Instrumentation Laboratory in the College of Engineering. The lab is well equipped with the necessary sensors, hardware, testing instruments, robot platform, and software.

To test the robot, several experiments will be conducted both in the lab and in the UGA Horticultural Farm. The robot’s navigation, method of locomotion, and weeding performance will be evaluated based on the ability of the robot to operate autonomously. The robot will also be tested in different soils that can vary between sandy loams and clay in the Horticultural Farm. Both between-row and stale seedbed weed control will be evaluated. Evaluation will include assessing degree of weed control and weed populations. The statistical data analysis will be performed using SAS.
Proposals

References:


Natural Epigenetic Variation of the *SVP* Locus in *Arabidopsis thaliana* is Associated with an Early-flowering Phenotype

2014 Summer Fellow: Patrick Griffin

Research Mentor: Dr. Robert Schmitz, Department of Genetics

With the advent of high-throughput sequencing technologies, the identification of genetic variants and their association with phenotypic diversity is actively being pursued. Largely absent from these efforts is the identification of natural epigenetic alleles (epialleles). Epigenetics (epi- a Latin prefix meaning over) is the study of mitotically and/or meiotically heritable changes in phenotype that arise independently from sequence-level genetic variation. As a result, attention has recently shifted to non-DNA-sequence heritable factors such as DNA methylation to better understand the variation leading to phenotypic diversity (Schmitz & Ecker, 2012). The identification of an epiallele requires the preclusion of a solely genetic basis and evidence of multigenerational inheritance.

To begin the task of identifying epialleles, the Schmitz Laboratory is sequencing DNA methylomes to reveal candidate epialleles that exist in natural populations of a model plant species, *Arabidopsis thaliana*. *Arabidopsis* is found throughout the Northern Hemisphere as it has locally adapted to numerous ecological niches, which makes it a superb model for the study of natural phenotypic variation. From previous experiments, a candidate epiallele was identified in the *SVP* (*SHORT VEGETATIVE PHASE*) gene of the strain Dja-1, which is a natural strain of *Arabidopsis thaliana* from Kyrgyzstan that displays an early-flowering phenotype. *SVP* influences the floral transition in *Arabidopsis thaliana*, and mutant alleles of this locus lead to an early-flowering phenotype (Mendez-Vigo et al., 2013). Interestingly, the *SVP* alleles are methylated in Dja-1 (hereafter referred *SVP* epiallele) compared to all other surveyed *Arabidopsis* strains, which leads to the following hypothesis: The methylated alleles of *SVP* in the Dja-1 strain are causative for the early-flowering phenotype observed in nature.

To address this hypothesis, the following experiments will be performed – many of which will occur in parallel instead of a stepwise manner. First, the expression levels of *SVP* in Dja-1 in comparison to wild-type loci will be quantified using RT-PCR (reverse transcriptase-PCR). DNA methylation is often associated with gene silencing, and therefore the *SVP* epiallele expression levels are hypothesized to be lower than the unmethylated alleles in wild-type strains (Law & Jacobsen, 2010). Second, classic genetic complementation analysis will be utilized to test if the early-flowering phenotype that is present in *svp* mutants and *SVP* epiallele is due to the same locus. If the F1 progeny of Dja-1 with an *svp* mutant display an early-flowering phenotype (measure in days to flowering) we will conclude that *SVP* epiallele is causative for the early-flowering phenotype of Dja-1. Third, for *SVP* epiallele to be a true epiallele, a genetic variant (mutation) needs to be ruled out as causative for the observed phenotypes. Therefore, to determine the genetic composition of *SVP* epiallele, Sanger sequencing will be done to uncover variants of *SVP* epiallele in Dja-1. Mutations are expected, and to test if any of these identified genetic variants are causative for the early-flowering phenotype of Dja-1, *SVP* epiallele will be transformed into wild-type *Arabidopsis thaliana* and mutant *svp* to determine if the early-flowering phenotype can be rescued to late flowering. If a late-flowering phenotype is observed after transgenic complementation, then we will conclude that none of the identified genetic variants identified within *SVP* epiallele are causal for the observed phenotypes.

Exploring potential epialleles is an enormous opportunity for biologists to have a more comprehensive knowledge of how diversity arises in populations of organisms. The development of whole-genome bisulfite sequencing (Cokus et al., 2008; Lister et al., 2008) and its application to natural populations is revealing widespread evidence for natural epigenetic variation. The current major challenge in this field is demonstrating causation for these newly identified epialleles. With these outlined experiments, I will be able to present strong evidence for or against the presence of a
natural epiallele at the promising candidate locus $SV^{'p}$ in Dja-1 and determine if it affects the
flowering time of this strain.

References:


Computers are now the best architects. Or, more correctly, the most imaginative ones. As a result of recent advancements in digital modeling and animation programs, architects are now allowing their computers to design previously inconceivable forms and structures. One such architect is Sterling Prize winner Patrik Schumacher, Senior Designer at Zaha Hadid Architects (ZHA), who in 2008 wrote, “[T]here is a global convergence in recent avant-garde architecture that justifies the enunciation of a new style: Parametricism. This style is rooted in digital animation techniques... Parametricism is the great new style after modernism.” But what exactly is Parametricism?

Parametric design relies on computer modeling programs that use algorithms in order to generate endless variations of complex non-rectilinear, organic-shaped forms. The practice of parametric architecture necessitates inherently adaptive spaces and forms that eschew conventional planar modeling, and is exemplified by buildings and master-plans by ZHA and their reconfigurations of various urbanscapes, such as the Heydar Aliyev Cultural Centre in Baku, Azerbaijan. The theory of Parametricism is most thoroughly explored through the writings and lectures of Schumacher, notably, his seminal essay “Parametricism: A New Global Style for Architecture and Urban Design,” and his book in which he details a comprehensive theory of architecture, The Autopoiesis of Architecture: A New Framework for Architecture.

I will explore the relationship between digital modeling technology and Parametricism. Studying the historical relationship between technology and architecture will illuminate how recent advancements in technology have radically changed the ways in which we envision and interact with urban systems and society writ large. The aforementioned Heydar Aliyev Cultural Centre is known for its structural fluidity and astounding continuity with the topography, as well as its cultural import. It, along with buildings by prominent architects Frank Gehry and Daniel Libeskind, will be examined as case studies because they exemplify the preeminence of parametric architecture to construct transformative urban networks. ZHA’s Heydar Aliyev Cultural Centre, Gehry’s Bilbao Guggenheim, Libeskind’s One World Trade Center, and the writings of Schumacher will illustrate the political, social, historical, environmental, and spatial elements of parametric architecture.

The research I plan to conduct through the CURO Summer Fellowship augments my current investigation with Mr. Mark Callahan on the impact of the internet and digital technology on the fine arts. The importance of my planned research is twofold: it introduces an area of scholarship mostly absent on campus (architecture) and, more importantly, allows me to investigate our shared future of increasingly networked and complex societies vis-à-vis parametric articulations of urbanism. My mentor is Professor Amitabh Verma of the College of Environment & Design. An architect who has worked in India and the U.S., Professor Verma is uniquely positioned to critically guide and provoke my interdisciplinary exploration, which will integrate design and art research methodologies with traditional inquiry of scholarly material, including essays, lectures, articles, as well as master plans and architectural reviews.

References:

The “Sublimated Essence of America” and the History of Coca-Cola in the Middle East

2014 Summer Fellow: Andrew Jarnagin
Research Mentor: Dr. Shane Hamilton, Department of History

In *A History of the World in Six Glasses*, Tom Standage claims that in the post-World War II world, Coca-Cola has come to represent globalization in a bottle – either a symbol of “freedom, democracy, and free-market capitalism” or cultural and economic imperialism, charmingly termed “Coca-Colonization.” This belief is not new: the May 15, 1950, edition of *Time* featured a cover graphic of Earth drinking from a Coca-Cola bottle with a story entitled “The Sun Never Sets on CaCoola.”

Complementing the commonly accepted notion of Coca-Cola as a stand-in for Americanization writ large is a significant amount of academic research into globalization as a macroeconomic phenomenon, as well as several case studies in the political economy of Coca-Cola at the communal and national levels. However, no work has attempted to tie these disparate veins of study together to interpret the company's actions in the Arab world. In my research, I will explore Coca-Cola's role as a political actor (whether wittingly or not) in American-led globalization in the post-war Middle East.

Though Standage's work allots a mere two pages to the history of Coca-Cola in the Middle East, there exists a wealth of political and economic intrigue. The company was embroiled in a scandal in 1966 after an Israeli businessman claimed that it was avoiding the Israeli market in order to escape the Arab League boycott of companies doing business with Israel. With no viable counter-argument and mounting boycotts by Jewish groups in the U.S., Coca-Cola opened a plant in Tel Aviv and was officially blacklisted by Arab countries, thus aligning itself, in practical terms, with American foreign policy. In the early 2000s, as anti-Western sentiment grew in the wake of the Second Intifada and the Iraq War, “native” soda companies, such as Zam Zam Cola, Mecca Cola, and Qibla Cola, gained market share through “dollar votes” against American policy abroad. And Coca-Cola once enlisted the help of the grand mufti of Egypt to issue a fatwa dispelling a rumor that the drink's label, read backward in Arabic, spells “No Muhammad, No Mecca.” There are many such stories, but without a cohesive framework to tie them together, they remain only anecdotal.

I plan to build on a growing body of research by economic historians into the rise of modern consumerism in the Middle East, led by Nancy Reynolds and Relli Schechter, among others. Schechter's monograph of the reciprocal evolutions of the tobacco industry and Egyptian culture from Ottoman times to the present, in particular, may serve as a model, though much broader in scope, for my own work. The sources for my research will be primarily drawn from the Robert Winship Woodruff papers at Emory University, which include correspondence on Coca-Cola's expansion into the Middle East and the Arab League's economic boycott, newspaper clippings related to the company, and archived advertising materials from around the world. The direction of my research will in large part be determined by the material available in this archive. I will also explore the representation of Coca-Cola in Arab fiction, including Alexandra Chreiteh's *Da'im man Coca-Cola* (the name of a 1990s marketing slogan) and Sun 'Allah Ibrahim's *The Committee*. Further, I will travel to Atlanta to attend the annual meeting of the Organization of American Historians in April, to attend a panel entitled “How Coca-Cola Conquered the World,” and to speak with academics – in particular, Dr. Bart Elmore of the University of Alabama – studying the company's global expansion.

A successful research project will provide a nuanced account that counters monolithic conceptions of globalization as simply a symbol of exceptionalism or imperialism.
References:


Factors Influencing the Development of Extractive Foraging Skills in Juvenile Bearded Capuchins

2014 Summer Fellow: Thomas Johnston
Research Mentor: Dr. Dorothy Fragaszy, Department of Psychology

Mobile animals search for their food. There is a tradeoff between the search for food and the exploitation of resources, but it’s still not known how animals discover the optimal point of tradeoff or its effects on reproductive success. Therefore, behavioral ecologists have enduring interest in the foraging and extraction of foods. Although the optimal foraging theory has modeled the energy intake rate of foraging, the behavioral mechanisms by which animals achieve this optimal energy intake rate are still unknown, especially when faced with a new environment (Zhang et al., 2014). For primates, animal prey, nuts, grains, and seeds are rich sources of nutrients, but they can be challenging to find and to process. For example, bearded capuchin monkeys extract the edible kernels of seeds and nuts from tough husks and shells. One of the more well-known extraction methods of bearded capuchins is the use of stone hammers to crack palm nuts, but young monkeys cannot do this until they are more than 3 years old. Yet, they must feed themselves from about 1.5 years of age, when they are still very small. I’m interested in how the young capuchins develop the skill of extraction, specifically in how they learn socially, whether through experience or by watching adults.

Dr. Fragaszy studies a group of 22 wild capuchins in the northeast of Brazil; the exact location of the field site is 9 degrees South and 45 degrees West. I propose to accompany her for the 2014 field season (mid-May through mid-July). The goals of the 2014 project in Dr. Fragaszy’s field lab are to document how individuals vary in their foraging actions (especially extractive actions) and diet; how the monkeys’ age, body size, and effectiveness at extractive foraging affect their diets, and in what ways extractive techniques and/or food preferences reflect social learning.

Our field project will consist of four subprojects: a) to record foraging, feeding, and social interactions of individual monkeys over time, b) to video record in detail the manual actions used in foraging, c) to document the spatial location of all monkeys in the group at frequent intervals to create a picture of the distribution of individuals in the group, and d) to collect body weights for all animals in the group. Each subproject will involve its own data collection procedures, some of which have been used before by Dr. Fragaszy’s team and some of which are new this year. The new methods include, for (b), individual monkeys’ foraging actions will be recorded at high frame rates using a special video camera. In playback, hand motions will be coded. For (c), a team of 3 people using iPad tablets loaded with a high-resolution satellite image of the site will walk through the group for 5 minutes at 15 minute intervals, recording the visual location of each monkey on the image. These data will be downloaded, examined for quality, and later processed using arcGIS analysis techniques to calculate interanimal distances, etc.

Initially I will work in all of the data collection tasks wherever I’m needed, but eventually I will specialize in one technique and will assume more responsibility in that subproject. Following data collection, I will process the data back in Athens, where I will analyze it using statistical software R or SAS and assume responsibility for my own research project. Because I am a statistics major pursuing a position in the bachelor’s/master’s combined degree program and will be using R and SAS frequently in future grad school projects, becoming familiar in R and SAS through CURO will be highly beneficial.

References:

Determining the Role of RGS10 in Microglia, Neuroinflammation, and the Progression of Multiple Sclerosis

2014 Summer Fellow: Mugdha Joshi
Research Mentor: Dr. Shelley Hooks, Department of Pharmaceutical & Biomedical Sciences

I am seeking the support of the CURO Summer Fellowship to continue my research on the role of the regulator of G-protein signaling RGS10 in neuroinflammation and Multiple Sclerosis (MS). RGS proteins are important regulators of receptor signaling pathways, but their roles in human disease are poorly understood. G-protein coupled receptors (GPCR) play an indispensable role in cell signaling, allowing the cell to respond to extracellular signals. The GPCR relays external signals to its corresponding G-protein, which activates the appropriate cellular response. The activity of the G-protein is inhibited by RGS proteins. My protein of interest, RGS10, is highly expressed in the immune and nervous systems, and regulates multiple G-protein signaling pathways. In microglia, the macrophages of the nervous system, activation of G-protein pathways enhances chronic neuroinflammation, which is a critical feature of several neurodegenerative diseases including MS.1 MS is an autoimmune condition where the overactive immune system attacks the myelin sheaths on axons interrupting the ability of neural signals to travel. Enhanced microglial activation and increased neuroinflammation has been observed in mice lacking RGS10 expression, suggesting that RGS10 normally suppresses neuroinflammation.2 Further, our preliminary data show that RGS10 expression is suppressed when microglia are activated. The goal of this project is to define changes in RGS10 microglial expression in MS. We hypothesize that microglial activation that occurs during MS progression will correlate with suppressed RGS10 expression.

In order to test our hypothesis, I will complete two sets of experiments:

1. Define differences in RGS10 expression in neural tissue from normal mice and MS model mice. Our working hypothesis is that RGS10 expression will be suppressed in microglia in the brain and spinal cord of advanced MS.

   1a. Determine the difference in magnitude of RGS10 expression between healthy control tissues and tissues from MS models. Brain and spinal cord tissue slices from control animals and animals with the Experimental Autoimmune Encephalomyelitis (EAE) model of MS will be obtained from a collaborator. I will use immunofluorescence staining techniques to visualize RGS10 proteins and analyze the difference in magnitude of expression between the healthy and diseased tissues. The expectation is that RGS10 will be under-expressed in tissue from MS (EAE) animals.

   1b. Define which cell types in the tissue exhibit RGS10 expression. My hypothesis is that RGS10 is expressed in the microglia of the brain and spinal cord tissues. I will evaluate my hypothesis using a specific microglial marker in my staining and analyzing the overlap between expression of RGS10 and the microglial marker.

2. Define sub-cellular expression of RGS10. This part of my project will explore an anomaly in the observed expression of RGS10. In general, activity of RGS proteins has been observed at the plasma membrane, where G-proteins are localized. In contrast, immunocytochemistry has shown RGS10 activity to be predominantly in the nucleus of microglia, but these results have not been confirmed biochemically. I will use nuclear fractionation to determine the primary location of RGS10 expression in resting microglia and in microglia activated by lipopolysaccharide (LPS). In this process I will separate the nuclear and cytoplasmic proteins of the BV-2 microglial cell line and primary microglial cells.
isolated from mouse embryos. I will then use western blotting to determine the localization of RGS10 in the cell. These biochemical results will be compared with results obtained from immunocytochemistry.

The long-term goal of these studies is to define the role of RGS10 in neuroinflammation and to understand the regulation of RGS10 expression in microglia. This work will improve our understanding of the molecular regulation of neuroinflammation and could lead to novel strategies to treat MS and other neurodegenerative diseases.

References:


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

2014 Summer Fellow: Megha Kalia

Research Mentor: Dr. Robert Sabatini, Department of Biochemistry & Molecular Biology

Parasitic African trypanosomes have adapted a unique response to avoid detection by their host's immune system. By altering the proteins on their outer coat, they can escape being attacked because the host is unable to recognize the surreptitious changes. A component of the organism's ability to change its outer (VSG) coat has been found to be base J. The majority of base J is found near telomeric repeats, or repeats in DNA at the end of a chromosome. The tendency for base J to locate here has been an intense area of study. The unicellular protozoa in which base J is found infects the bloodstream of animals and humans across thirty-six countries in Africa. The biosynthesis of base J occurs in two steps. First, a thymidine (DNA base pair) is converted into another molecule by two proteins, JBP1 and JBP2. Secondly, a glucose molecule is added onto the complex. The understanding of the expression of base J is central to understanding how the parasites evade the immune system, as well as developing potential vaccines.

During the summer, I will use *Trypanosoma brucei* as my model to understand the biosynthesis of base J in a different life cycle stage. Previous research has studied why base J is preferred and how it is made in the bloodstream form; however, little is known about it when it is found in the mid-gut of mammals in an alternate stage. The general hypothesis is that base J is not produced because of decreased levels of both JBP enzymes. We can increase levels of enzymes and look at corresponding changes in the amount of J found in the trypanosome. Over this past semester, work was done in the lab on the bloodstream form of *T. brucei* to produce double and single knockouts of the gene to understand what happens to base J levels when one or both copies of the gene are removed. Removing one gene out of the two caused reduced levels of base J, but taking out the second copy prevented any production of base J. However, several other questions remain. What makes base J so important in gene repression? Are there any similarly functioning molecules? By blocking its function, we will understand exactly what role this protein can play.

By clearly understanding the role of base J in trypanosomes, future research can be dedicated towards manipulating it for a vaccine against the diseases caused by trypanosomes. These include sleeping sickness and Chagas’ disease from *Trypanosoma cruzi*. Additionally, we can understand the specificity of base J as to where it binds and when it causes transcription of genes to stop. If we can understand how these protozoa are invading mammalian host systems, we can develop new treatments for these devastating diseases.

References:


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

2014 Summer Fellow: Danny Kanso
Research Mentor: Dr. Charles Bullock, Department of Political Science

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

This summer I am proposing a course of research in which I intend to live in South Carolina for two months to conduct an evaluation of the modern Republican Party. Because of the relative recency in the political development of the state party, and the contrasting strength by which it has succeeded in competition with a Democratic Party that once held a much stronger electoral position, South Carolina serves as an extraordinary model for researching partisan growth. From June 1st through the close of the 2014 election cycle, I will complete a comprehensive survey by interviewing elected Republicans, party leaders, and operatives who have been instrumental in directing campaigns within their state. My analysis will be presented in the context of two fundamentally important questions: Why does today’s elected Republican majority exist? What has driven voters’ allegiance to the party amid a continually expanded electorate?

As references are increasingly made to a division between the Republican establishment and outside candidates, South Carolina’s party presents a particularly interesting question because it did not exist as a majority in any area of governance before 1994. I will provide historical context and statistical analysis developed with extensive archival research; however, the focus of this study is based upon personal interviews. To analyze the core of modern republicanism, national partisan trends, and the ideology driving voter support of Republican candidates in the context of changing demographics, my case study will focus in all 46 counties across South Carolina’s four regions, capturing the Republican Party and representatives in every level of government.
Use of a Breath-hold Paradigm to Remove FMRI Variability Due to Vascular Factors in Older Adults with Cardiovascular Disease

2014 Summer Fellow: Joshua Lukemire
Research Mentor: Dr. Lawrence Sweet, Department of Psychology

As a result of modern medicine and healthcare, people are living longer than ever. The population of older adults is on the rise, and with aging comes cognitive decline in domains such as working memory, leading to a decrease in quality of life. As more and more individuals reach old age, an understanding of what causes these losses in cognitive function becomes even more important and may give insight into how cognitive decline may be prevented. Functional magnetic resonance imaging (FMRI) is an important tool used by researchers to study the neural correlates of cognitive function and is often used in the investigation of working memory. One commonly used type of FMRI focuses on the blood-oxygen-level-dependent (BOLD) signal, which is influenced by cerebral blood flow (CBF) and cerebral blood volume (CBV). Local variations in CBF and CBV are associated with local changes in neural activity that are related to cognitive activity. However, factors other than neural activity, such as age-related alterations in the cerebrovasculature, can influence CBF and CBV. The effects of age-related changes in cerebrovasculature on the BOLD signal and ultimately the neural correlates of cognitive function in older adults are not well understood. This is an important topic to study, especially in those with cardiovascular disease, because altered vascular integrity represents a source of variance that is rarely controlled in FMRI research. The current literature in this area is limited, and further investigation into the contribution of alterations in cerebrovasculature to the BOLD signal is essential.

There are a few novel techniques that allow researchers to estimate and remove cerebrovascular effects in the BOLD signal; this CURO project will focus on one such method (Biswal, 2007). We will use FMRI data collected from 2 groups of older adults, a healthy group and a group with cardiovascular disease, during their performance of a breath-hold paradigm and a working memory paradigm in the magnetic resonance scanner. The breath-hold FMRI data will be used to quantify the potentially confounding effects of cerebrovascular integrity in order to more accurately calibrate the FMRI response during the working memory paradigm. The specific contribution of this CURO project will be to define a control region in the white matter of the brain as it has little cerebrovasculature. I hypothesize that using the breath-hold FMRI data to reduce cerebrovasculature contributions will have little effect in white matter compared to brain regions rich in cerebrovasculature. Confirmation of this hypothesis would provide evidence validating the use of the breath-hold technique. This is an important contribution because the breath-hold paradigm is both simple for the participant to perform and does not require much time in the scanner, making it an easy, valuable, and perhaps even necessary addition to FMRI investigations of cognitive decline in older adults and participants with compromised cerebrovasculature.

References:

Assessment of Proteomic and Glycomic Profiling of Medaka (*Oeyzias latipes*) to Further the Understanding of the Physiological Response to Low-level Ionizing Radiation

2014 Summer Fellow: Jason Moraczewski

Research Mentor: Dr. Carl Bergmann, Department of Biochemistry & Molecular Biology

Over 1000 United States locations, ranging from small laboratories to massive nuclear weapon facilities, are contaminated with radiation. Sites throughout human history associated with nuclear proliferation and disasters, such as Fukushima, Three Mile Island, or Chernobyl are becoming identified as sources of radio-nucleotide contamination. These radio-nucleotide emissions constitute ionizing radiation (IR). The effect of any doses of IR result in alterations in morphology, cellular and system level functional activity, and protein expression. However, little is known about how chronic low-range exposure to IR can affect biological responses. By performing proteomic and glycomic analyses, advancements can be made in the understanding of how certain organisms respond and adapt in the presence of a low-level IR environment. The results of these studies could have a significant impact on the explanation of past evolutionary events as well as the future evolutionary potential of organisms.

Through various scientific studies, it is well known that IR can have detrimental effects on aquatic organisms. Some of these changes include double strand breaks in DNA, oxidative damage to DNA, alterations in RNA, and transgenerational effects. It remains uncertain, however, how these changes relate to the metabolic adaptations that underlie the evolutionary change of a species. Ionizing radiation results in altering the expression of specific proteins and post-translational modification of certain proteins in cells. Depending on the amount of exposure, IR results in tissue and organic fluid (serum, urine, or plasma) modifications that can be detected as biomarkers when protein expression profiling is performed. However, it is very important to have an alternative to transcript analysis because there are several cases in which a poor correlation between changes in transcript level and protein expression can exist. Protein expression profiling can be used to identify radiation-associated proteins in biological samples.

Since the mid 1990’s, the University of Georgia’s Savannah River Ecology Laboratory (SREL) has been conducting research that focuses on the effects of low-dose ionization radiation. Research conducted at the SREL’s Low Dose Irradiation Facility has contributed to uncovering the role that IR can have on aquatic organisms. Studies from this facility have characterized that when IR exposure is a little as 2.4 mGy/day, the result is an accumulation of unrepaired DNA damage and radiation-induced activation of DNA repair. While these studies focus on the mechanism surrounding IR damage, they focus on specific organ systems and do not consider the entire organism.

To analyze the effect of low-level ionizing radiation on aquatic organisms, medaka (*Oeyzias latipes*) will be used as the fish model species. Whole organism protein extractions will be performed on homogenized specimens. Medaka are an ideal vertebrate model species to use because of their readily available genome sequence database of approximately 800 Mb. In order to detect the physiological changes in the IR treated species, the proteome of an untreated (control) group will be first analyzed. Comparative proteomic and glycomic studies will be performed using protein extractions of the entire organism. These studies will be paired with mass spectrometry and ProteolQ protein software. These methods will enable the quantification of physiological responses to differing levels of chronic low doses of IR. Performing the studies at the proteomic and glycomic level on medaka will augment the insight of the proteomic pathways operating across the multiple organ systems of the organism. Thus, this research will advance the understanding of the role that chronic exposure to low doses of IR can have on the metabolic pathways of the entire organism.
References:


“What It Is to Be Free:” Freedom and Black Community Development in Reconstruction Athens
2014 Summer Fellow: Laura Nelson
Research Mentor: Dr. Christopher Lawton, Department of History

Within five years of her emancipation, Aggy Mills of Athens, Georgia, wrote a distressed message to her former mistress: “please mam [sic] send me that money if you have it to spare…and I shall work just as long as you wants [sic] me. [P]lease excuse me as I am in need.” She was, remarkably, a literate freedwoman, illicitly taught by her master’s family. During her bondage, she served the family of Howell Cobb as a nursemaid and Mary Ann Cobb’s most trusted servant. She did not write to Mary Ann in need of money because of capricious and frivolous spending. This was a myth perpetuated by Southerners unwilling to relinquish their paternalistic control of African-American lives. Instead, Aggy needed money because her former mistress was unwilling to pay her former chattel for services she got through compulsion only years before. Aggy’s story of freedom, social conflict, and difficulties getting by was not unique. Across Athens– and indeed the postbellum South– African-Americans struggled to delimit the terms of their freedom in a landscape shared with and controlled by their former masters.

By 1860, 5,660 slaves lived in Clarke County. In 1865, these thousands of freedmen immediately sought what they thought defined freedom: education, a family life, free labor, and a voting voice in their community. To achieve these goals, African-Americans had to remove themselves from the constant presence and influence of their former masters. Although threads of a black sense of community certainly existed in antebellum times, particularly through slave churches and networks of friends and family, a more defined sense of community developed in freedom. Black neighborhoods quickly emerged, and freedmen separated their churches from the white supervision of slavery. Education and voting rights became prevalent issues, and black churches were oftentimes venues of public outcry and action.

Yet, development of the postbellum black community was not one of racial unity leading to unfettered success. White Southerners resisted the growing power of a race that they had for so long controlled. Federal law might have made African-Americans free, but local measures ensured it was never more than a subordinate freedom. This was reflected not only in society but also exemplified through the labor market and political realm. Freedmen’s Bureau policies sometimes undermined individual black efforts at agency in labor negotiations. Some black Athenians feared that their race’s political leadership, namely Madison Davis of the Georgia Assembly, put white interests above their own. Yet, despite these setbacks, the Reconstruction years in Athens saw the emergence of black political and social societies, the exercising of free labor rights, and an enduring system of education managed by black educators.

Tracing the life of Aggy Mills and her life in slavery and freedom has been the focus of my work in previous semesters, but she did not exist in a vacuum. This research will focus on examining the entire black community: the Mills family’s neighbors, friends, colleagues, and fellow church-goers. This community was an intricate network of multiple institutions including political affiliations, churches, schools, societies, private homes, and the Freedmen’s Bureau. Its history is still accessible through the records of those organizations and resources like WPA Ex-Slave Narratives, letters from Athenians in the Hargrett Library and the Athens-Clarke County Heritage Room, property deeds at the courthouse, census records, and various other local sources. Weaving these sources together will help to tell a cohesive narrative of how the first generation of Athenians freed from slavery resisted white resistance to redefine what it meant to be members of their own community.
References:

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Proposals

Pregnant and Parenting Adolescents’ Use of Space for Stress Relief
2014 Summer Fellow: Ijeoma Okoye
Research Mentor: Dr. Neale Chumbler, Department of Health Policy & Management

Statement of Purpose:
Adolescent mothers receive social support mainly from their mothers, partners, and community agencies (Devereux, 2009). The benefits of the formal and informal social support that adolescent mothers receive (e.g., how to manage stress) have been thoroughly studied (Devereux, 2009; Letourneau et al., 2004); however, there are unanswered questions concerning the means by which pregnant and parenting adolescents reduce their stress levels when social support is unavailable. There are ways they can cope with stress on their own. It is important to examine these methods because some of these teens live under circumstances with limited access to support (Coppola & Spector, 2009). These adolescents will need to find other avenues when coping with stress. Of particular importance to me is the use of their space. Space is defined as the physical living space as well as financial independence from the mother and father. It is acquired with autonomy and operates differently as a function of the various contexts in which adolescents live, as marked by race/ethnicity and risk (Niolon, 2006). This study aims to focus on the ways in which pregnant and parenting adolescent mothers utilize their space in order to reduce their stress levels.

Background:
In 2008, the US rate of pregnancy among girls ages 15-19 was 39.5 per 1000; the rate for girls ages 18-19 was 114.2 per 1000 (Ventura et al., 2012). The collection of adversities adolescent mothers have to endure in the transition to parenthood creates a great amount of stress on the mother (Birkeland et al., 2005). Although many teen mothers live with their own mother or other close family member, for some teens, part of the transition to parenthood is moving out or being cast out of their parents’ house and into their own space (Beers & Hollo, 2009). For these mothers, methods for stress relief that are more centered around the individual exist. Exercise, reading, and multiple forms of meditation are just a few ways a young mother can utilize her space to relive stress (Coppola & Spector, 2009). Other methods of coping will be explored and discovered throughout the duration of the study.

Research Methods:
Twenty hand-written journals of day-to-day accounts from pregnant and parenting adolescents will be selected and analyzed using NViVo software. The journals were obtained from a previous study that Dr. Chumbler, Department Head of the Department of Health Policy and Management in the College of Public Health, participated in at the University of Indiana. There were 52 total adolescent participants who utilized journals and wrote about their experiences – 40% Hispanic, 33% non-Hispanic black, and 25% non-Hispanic white. To begin, the journals will be assessed, looking for words such as stress and worry. Then, those relevant journals will be transcribed in Microsoft Word. A coding system will be developed with the methods outlined in Ryan and Bernard’s “Techniques to Identify Themes” (2003). By coding with key words and phrases, the journals will be categorized based on information pertaining specifically to the adolescents’ stress levels and coping mechanisms. Each individual journal containing each adolescent’s experiences will then be reconsidered in order to find a connection between their use of space and their relief of stress.

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Significance:

The results from this study will provide an increased understanding of the experiences of pregnant and parenting adolescents. It will also answer important questions concerning how they alleviate stress when there is limited access to support. This study is unique in that the data comes from hand-written journals that give pregnant and parenting adolescents a voice through a medium that few other studies have employed.

References:


Proposals

The Effects of Lutein and Zeaxanthin on Cognitive Function and Neural Efficiency in Older Adults with and without Cognitive Impairment
2014 Summer Fellow: Meredith Osborne
Research Mentor: Dr. Lisa Renzi, Department of Psychology

Lutein (L) is a carotenoid found in green leafy vegetables and brightly pigmented fruits. Lutein cannot be synthesized de novo and must be obtained from the diet. L and its isomer, zeaxanthin (Z), densely accumulate in the central nervous system (CNS), specifically in the center of the retina (macula), where those pigments are known as macular pigment (MP). L is also densely concentrated in the major cortices of the brain. In nervous system tissue, L and Z have antioxidant properties and can absorb highly energetic short-wave light. In retina, these properties lead to beneficial functional changes, such as improved optical quality and visual function, as well as a reduced risk for diseases that arise from oxidative stress, such as age-related macular degeneration, the leading cause of blindness in developed countries. In cortex, which is not exposed to light, antioxidant properties likely lead to reduced risk of neurodegenerative diseases such as dementia, a hypothesis currently being tested in this project. An additional hypothesis, the neural efficiency hypothesis, suggests that L influences cellular morphology by promoting lateral communication between neighboring cells, and, as a result, reduces neural noise and improves processing speed.

The properties and resulting functions of L and Z listed above are well established in neural retina and largely hypothetical in cortex. Preliminary evidence is supportive, but randomized controlled trials are needed to determine whether or not increasing L levels can lead to measurable neurological and functional changes. The purpose of this investigation is to determine whether or not lutein supplementation improves cognitive function and neural efficiency in older, healthy adults and in older adults with mild cognitive impairment. A second arm of the trial is investigating the same hypotheses in young, healthy adults. This is a randomized, double-masked experiment conducted over the course of a year, with visits every four months, as well as bi-weekly compliance calls to monitor the participants’ health.

To assess visual function, macular pigment optical density (MPOD) and temporal contrast sensitivity (tCS) are being measured by novel equipment. MPOD measures retinal L and Z levels, which correlate with cortical L and Z levels with a coefficient of $r = 0.90$, and, consequently, can serve as a biomarker of cortical L and Z. While MPOD is a measure of supplementation status, tCS function is a measure of an individual’s ability to process changes in a high frequency stimulus. One of the major hallmarks of age is a general “slowing” of the CNS, which manifests as reduced ability to, in this case, perceive a rapidly moving stimulus. tCS testing will serve as a marker of neural efficiency.

CNS Vital Signs program includes eight tasks that measure memory (verbal, working, visual), motor control, and information processing speed to assess cognitive function. Neuroimaging techniques, functional magnetic resonance imaging, and electroencephalography also measure cognitive function. These high-resolution scans show increased blood-oxygen levels, which indicate high metabolic demand and suggest increased neural processing.

To gauge compliance and track L and Z status, blood samples are collected every four months. Serum is analyzed via high-performance liquid chromatography (HPLC) to measure L and Z concentrations. Plasma erythrocytes are analyzed for fatty acid concentration.

Our goal is to determine whether or not L and Z supplementation improves cognitive function and reduces risk for age-related cognitive decline, as it does for age-related macular degeneration. There are no cures and no long-term efficacious treatments for acquired dementias, such as Alzheimer’s disease, and the economic and emotional burden on families is extremely high. L
Proposals

and Z supplementation may serve as a long-term prophylaxis that can be safely taken for years, especially when started at a young age.
Vocal Repertoire and Call Structure of Red-and-Green Macaws

(Ara chloropterus)

2014 Summer Fellow: Joel Owen

Research Mentor: Dr. Dorothy Fragaszy, Department of Psychology

Background: The Red-and-green Macaw (Ara chloropterus, Psittacidae) ranges from Panama to northern Argentina, including much of the Amazon Basin. These macaws are usually observed in pairs or small flocks. Red-and-green Macaws often nest in large trees with cavities or crevices on rock faces. Little is known about the behavioral biology of wild macaws, especially those found in the Brazilian savannah (the Cerrado), and their vocalizations are virtually unstudied. In the summer of 2013, Dr. Fragaszy and Natalie Schwob (UGA Psychology Department) began studying the behavior and vocalizations of Red-and-green Macaws at two nest sites on cliff faces in their field site in Piauí, Brazil, where Dr. Fragaszy has conducted research on the local monkeys since 2005. Because the nests are close to the research lodge, the field site offers excellent opportunities to observe wild macaws. There are additional nests located within a few kilometers of the field site. The previous work confirmed that it is possible to record the vocalizations of the macaws at this site and so began the task of documenting the vocal repertoire of birds in one region of the site.

Specific Objectives: Our objectives are to document the repertoire of macaw vocalizations, including variation in calls between the resident pairs in two locations 6 km apart, and to identify and analyze call structure and sequence. As possible, we plan to match vocalizations with behavioral patterns to gain insight into the functions of different calls. Our final objective is to compare the calls of this species with those of the Yellow-faced Parrot (Alipiopsitta xanthops), which is in the same subfamily (Arinae) (Faria et al., 2009).

Methods: We plan to observe and audio record the macaws as they depart and return to their nests and in places where they gather. Based on data from last summer, the macaws often leave and return in pairs, occasionally venturing alone. We will record vocalizations with a directional Sennheiser ME67 microphone attached to a TASCAM digital recorder. We will process these vocalizations using Avisoft and/or RavenPro software. New calls will be added to the existing repertoire of calls to enhance the vocalization “alphabet.” All vocalizations from 2013 and 2014 will be analyzed for structure and sequence patterns using SongSeq software (Daou, 2012). We will collaborate with Dr. Carlos Araújo (Bioacoustician, Universidade Federal da Paraíba) to compare calls between our species and the Yellow-faced parrot (Araújo et al., 2011).

Significance: This study will add new information to the scant literature about the behavior and communication of Red-and-green Macaws. In fact, to our knowledge, the only other study performed on this species in the Cerrado of Brazil was the aforementioned project in the summer of 2013. I am a wildlife major, and avian biology and population dynamics are my intended focus for graduate school, so this study is directly relevant to my academic interests. It will be valuable to use my previous lab experiences in a research setting and to use my background knowledge of biology to understand new species. This project will give me the opportunity to improve my field skills and to learn vocal analysis techniques, which will prepare me for my graduate project with Canada warblers in the Appalachian Mountains of North Georgia. Also, I will learn about avifauna of a completely different biome (the Cerrado), an exceptional opportunity for an ornithologist from the northern hemisphere. Moreover, I will have the opportunity to collaborate with an international research team and learn the logistics of working in the field in a remote area.
References:


Using the Chemical Reporter Strategy to Analyze Glycoproteins in Pompe Disease

2014 Summer Fellow: Sora Park
Research Mentor: Dr. Richard Steet, Department of Biochemistry & Molecular Biology

Lysosomes are organelles within cells that help degrade macromolecules so that precursors such as amino acids and sugars can be recycled and reused by the cell. Mutations in genes that encode lysosomal enzymes cause rare inherited diseases in humans known as lysosomal storage disorders or LSDs (Wenger, 2013). Collectively, LSDs occur in approximately 1 in 8,000 live births. When the missing enzymes fail to degrade or transport molecules, abnormal storage of molecules occurs within cells, causing debilitating symptoms in patients affected by LSDs. Although symptoms vary with each specific mutation, they generally include neurodegeneration and skeletomuscular defects, and the most severe forms result in death within the first year after birth (Schultz, 2011). How exactly lysosomal storage causes these symptoms remains a mystery. Currently, there are only a few viable treatments for LSDs. Almost all are based on replacing the missing enzyme with enzyme replacement therapy (ERT). Unfortunately, ERT is not feasible for many LSDs (Platt, 2012). In order to develop new treatments, it is crucial to learn more about the mechanisms whereby storage affects the cell and eventually causes disease.

Niemann-Pick type C (NPC) disease is a lysosomal disease characterized by the accumulation of cholesterol in lysosomes. Patients with NPC are missing one of two proteins that normally act to shuttle cholesterol out of the lysosome. When cholesterol accumulates inside lysosomes, it disrupts the movement of other molecules through the cell. The Steet lab recently investigated the storage and trafficking of glycoproteins in NPC cells using a chemical reporter strategy for labeling these glycoproteins. In this strategy, a unique chemical group (reporter) is incorporated into glycoproteins by feeding cells an azide modified sugar precursor. The azide “handle” can then be reacted with a complementary functional group, which is linked to a fluorescent probe (Boons, 2010). Using this strategy, the lab was able to discover that glycoproteins, normally present on the surface of the cell, accumulate instead within intracellular vesicles in NPC cells. Glycoproteins are known to be essential to many cell activities, including cell-to-cell communication and survival. The Steet lab has proposed that the altered recycling and intracellular accumulation of cell surface glycoproteins in NPC disease may be responsible for some of the symptoms associated with this disease (Mbua, 2013).

Since all LSDs have some type of lysosomal storage, it is likely that this storage causes altered storage or recycling of glycoproteins in diseases other than NPC. Using the same chemical reporter strategy employed for NPC, we will test this possibility by studying Pompe disease (PD), an LSD characterized by the storage of glycogen within lysosomes (Fukuda, 2007). Our initial experiments will focus on the visualization of glycoprotein storage using microscopy- and biochemistry-based methods. We will then develop technology that will allow us to isolate and identify the glycoproteins that accumulate inside the cell. This technology will rely on the same chemical reporter strategy as above but be adapted so that the tagged glycoproteins can be captured and enriched prior to detection using mass spectrometric-based methods. Discovering the identity of the stored glycoproteins would be greatly insightful to their pathological roles in LSDs. These glycoproteins might be key protein receptors or ion channels that must be present at the surface of the cell in order for the cell to survive. This work could potentially lead to a clarification of the pathophysiology of not only Pompe disease and Niemann-Pick disease, but of LSDs in general. A better understanding of how storage leads to impaired movement of other molecules in the cell will hopefully lead to the development of more effective therapies.
References:


Understanding Floral Trait Evolution in Wild Sunflowers
2014 Summer Fellow: Hiral Patel
Research Mentor: Dr. Lisa Donovan, Department of Plant Biology

Agricultural productivity and ecological function are under assault from the twin forces of ongoing climate change and an epidemic of pollinator decline. In order to predict both crop and wild species’ reproductive success and persistence under looming environmental changes, we must understand how floral traits are currently adapted to specific climates and pollinator regimes. Sunflowers are an excellent system in which to study plant evolution. The genus Helianthus is extremely diverse, consisting of 51 species of annuals and perennials occupying a wide range of habitats such as forests, deserts, wetlands, prairies, and rock outcrops (Heiser et al., 1969).

Significant variation exists in floral morphology across the genus. Some species of Helianthus appear to invest more biomass in pollinator attraction, as evident by the production of larger and more numerous showy (but sterile) petal-bearing ray florets at the expense of fertile disc florets. This contrasts with other species that appear to invest more in seed production, as evident by fewer, smaller petals and more numerous and massive fertile disc florets. This project seeks to investigate the underlying ecological and evolutionary causes of variation in floral traits across the genus Helianthus. Because members of the genus are self-incompatible (genetically incapable of self-pollination), reproduction is entirely dependent on pollinator visitation. This results in a situation where investment in seed production is literally fruitless unless pollination occurs, which is in turn dependent on the level of investment in pollinator attraction. However, if pollinators are abundant, high investment in attraction is wasteful, and higher investment in seed production will be favored. It is therefore hypothesized that dependence on pollinators results in an evolutionary trade-off between investment in pollinator attraction and seed production. The evolutionary strategy adopted by specific species under this trade-off is hypothesized to be affected by differences in life history and pollinator density in native habitats. First, I predict that annuals will invest more heavily in attraction as they only get one chance to reproduce, compared to perennials which will be expected to invest relatively less in attraction because they have many opportunities to reproduce over their multi-year lifespan. Second, I predict that species found in habitats known to have higher densities of pollinators (e.g., forests and prairies) will invest relatively less in attraction and more in seed production than species from habitats known to have lower densities of pollinators (e.g., deserts and rock outcrops), based on previous research (Zulian et al., 2013).

I have been working in the University of Georgia Plant Biology greenhouses for almost a year now to collect data on floral traits in thirty species across the genus, including floral morphological measurements and biomass allocation among floral parts. I will have all data collected by the midpoint of the summer of 2014, after which I will perform evolutionary statistical analyses in order to test my hypotheses, using the most recently published phylogeny of the genus (Timme et al., 2007). These will include ancestral state reconstruction, phylogenetically independent contrasts, and tests of phylogenetic signal to determine which traits are evolutionarily conserved and which are labile and potentially adaptive.

Understanding trade-offs in floral biomass allocation has broad ecological consequences. Species adapted to specific pollinator densities may be unable to adapt to changing conditions under the short time scales of current climate change and pollinator declines, resulting in an inability to attract pollinators and failures in seed set that reduce population size and threaten species persistence. In a crop setting, understanding the trade-off in floral investment is key to understanding the balance between achieving sunflower pollination in the field for self-incompatible varieties and obtaining maximum seed yield.
References:


A Study of the Lamu-South Sudan-Ethiopia Transport (LAPSSET) Corridor on the Northern Rangelands Communities in Laikipia, Kenya

2014 Summer Fellow: Paola Rivera
Research Mentor: Dr. Laura German, Department of Anthropology

The 2008-2009 food price spike brought what has been termed a 'land rush' phenomenon to a head, inspiring increased media and academic coverage alike of the large-scale land acquisitions in developing countries by foreign investors [1, 2, 3]. The land rush is changing relations between humans and the environment (e.g. scale of carbon in ecosystems), between the Global South and the Global North, and between the state and rural communities [2, 4, 6]. Because of the economic incentives associated with low land cost, resource wealth, and generous fiscal incentives, investors have targeted Africa more than any other region, with 754 land deals announced in 2009 alone covering 56.2 million ha [1]. Furthermore, the region targeted most within Africa is East Africa, including Mozambique, Sudan, Ethiopia, and Kenya [1, 2, 3].

A 'new regionalism' trend in Africa has caused land acquisition in some areas to take the form of spatial development initiatives (SDI), which are designed to target areas with high potential for growth through 'development' and investment [1, 10]. In Kenya, an SDI entitled the Lamu-South Sudan-Ethiopian Transport (LAPSSET) Corridor is planned as a major component of the Government of Kenya's Vision 2030 development plan [9]. While project proponents justify the LAPSSET Corridor for its anticipated benefits to the domestic economy, social pillars (education/training, health, housing, etc.), and political pillars (new constitution, electoral processes, transparency) [9], it also raises questions related to land appropriation [4, 5] and its socio-ecological implications in light of the 'land rush' trend. What's concerning is the discourse of the LAPSSET Corridor not speaking in terms of the 7.5 million project-affected persons [9] but focusing on larger macro-economic benefits, as promulgated by the World Bank and similar interest groups [1, 2]. With production underway, some LAPSSET projects have already ignored key environmental impact assessment requirements such as consultation of affected communities, even with provisions for consent and community participation in the Government of Kenya's policy documents [9, 11]. Some scholarship in Africa has been done on early SDIs in South Africa and Mozambique in the late 1990s and early 2000s. This work showed the SDIs having negative effects in the areas of job creation and food security because of a lack of linkage between the incoming investment and the local economy [10]. Other problems SDIs face are lack of public consultation, capacity deficiencies at various levels of government, unresolved land claims, and poor respect and understanding of local practices [10].

Since the LAPSSET Corridor and Vision 2030 are still in their early stages, a similar analysis needs to be made early on in order to highlight issues not consistent with the project goals before they are too late to amend or mitigate.

The groups most likely to be affected are those in the new 'special economic zones' and areas deemed 'high potential' like the arid and semi-arid lands (ASL). For example, pastoralists have a particularly fragile land use system in ASLs [7]. Pastoralists rely on extensive movement over large areas in order to access productive rangeland and water in an uncertain environment, a system supported by extensive social networks and nested governance systems. Climate change and land tenure changes (e.g. from group ranch establishment, SDIs) further fragment their grazing areas and livelihood security [7, 8].

My research will focus on the northern rangelands in Laikipia District, a site of a UGA NSF project on the Vulnerability of Pastoralist Systems in Transition led by Dr. Elizabeth King (Ecology) and Dr. Laura German (Anthropology). The LAPSSET and Vision 2030 projects announced in the district include the Crocodile Jaws dam on the Ewaso Nyiro river for the planned resort city, large-scale infrastructure for transportation, livestock commercialization initiatives (e.g. disease-free zones),
and private agricultural investment initiatives for commercialization [9]. I am interested in the levels of awareness, community consultation, and the perception of these projects, likely adaptive responses for pastoral communities and households, and in exploring wider implications for adaptive governance of rangeland socio-ecological systems, a field lacking research in the context of the land rush. “Adaptive governance” is the ability of groups and individuals to tolerate and respond to changes through adaptive management strategies, which pastoralists historically have adopted [7, 8].

In order to analyze these different themes, I will be conducting a case study of the Koija Group Ranch in Laikipia through semi-structured interviews with pastoralists likely to be directly affected by these projects. I will also undergo a discourse analysis of the projects from government officials, other project proponents, and key project critics.

References:


Investigation of Intermediate Species with Different Geometry Settings between ANME Archaea and Sulfate Reducing Bacteria by Process-based Modeling

2014 Summer Fellow: Yimeng Shi
Research Mentor: Dr. Christof Meile, Department of Marine Sciences

Many aspects of the global methane (CH\(_4\)) cycle are controlled by biological activities, including the oxidation of methane in marine sediments. The conversion of methane to CO\(_2\) under anaerobic conditions is thought to be mediated by microbial consortia consisting of archaea and bacteria (e.g. Boetius et al., 2000). The exact nature of their interaction is still unknown or has been only cursory identified.

The goal of this research is to compare empirical datasets, which are currently being acquired by our collaborators, with predictive models of microbial activity. The consortia are thought to face thermodynamic challenges, which may impact the process rates as well as the spatial organization of the syntrophic anaerobic oxidation of methane (AOM) consortia. We will use reactive transport models including thermodynamic constraints to study the magnitude of methane oxidation. We will use the software COMSOL and MATLAB to numerically solve the governing differential equations. We will build on an idealized mechanistic, process-based model analysis (Orcutt & Meile, 2008), where through comparison of model results to rates measured in laboratory incubations, it was shown that reaction kinetics, transport intensities, and energetic considerations all decisively impact the overall rate of methane consumption. We will apply the model to different environmental settings and spatial distribution patterns of archaea and bacteria in consortia. For example, in some cases archaea and bacteria separately form their own groups, while in some other cases they are well mixed with each other. Also, we will investigate newly proposed potential reaction pathways (Miluka et al., 2012) and study the effectiveness of various potential chemical species being exchanged between the archaea and bacteria.

During the summer, we will first work on attaining a basic understanding of AOM consortia from a literature review. Then, we will use existing models as a starting point to implement descriptions that expand beyond the simplified geometrical approximations made in Orcutt and Meile (2008), which continues the work that we have done since Fall 2013. Then, I plan to travel to Caltech to discuss the environmental settings of the model, the comparison of predicted results in the model, and the laboratory data to obtain and improve our model, which may provide new perspectives of understanding the interaction between archaea and bacteria in anaerobic oxidation of methane consortia. Leading up to, as well as during my visit in Prof. Orphan’s group at Caltech, I will also work with Dr. C. Kempes, a postdoctoral associate in Control and Dynamics Systems at Caltech, who is currently developing complementary models of ANME-SRB consortia that explore the effect of different types of interactions (synergistic, antagonistic etc.), complementing our mechanistic process-driven approach.

References:


Investigating Genotype-phenotype Correlations in \textit{POMGnT1} Gene

2014 Summer Fellow: Danish Singh
Research Mentor: Dr. Lance Wells, Department of Biochemistry & Molecular Biology

Congenital muscular dystrophy (CMD) is a genetic disorder that affects millions of people every year. Research has shown this disease has been linked to malfunctions in enzymes in the dystrophin-glycoprotein complex. Appropriately, many CMD’s are termed dystroglycanopathies. This complex is responsible for linking the actin cytoskeleton to the extracellular matrix. Thus its function is vital for cell movement and contraction, especially in muscle cells — something lacking in patients with CMD. Research in recent years has thus far focused on relating how mutations in the genes affect the function and structure of proteins in this complex with the aim of explaining how mutations in different proteins in this complex relate to different cases of CMD. A protein involved in this complex of particular interest is dystroglycan, since it interacts with dystrophin (a cytoplasmic protein) and a multitude of extracellular matrix proteins. In particular, mutations in α dystroglycan (subunit of dystroglycan) relate to many forms of CMD because this subunit of dystroglycan is responsible for binding to numerous extracellular matrix proteins, an important functional aspect of the dystrophin-glycoprotein complex. When these extracellular proteins bind to α dystroglycan, they bind to unique glycan structures on α dystroglycan, thus the correct glycosylation of α dystroglycan is necessary. While α dystroglycan is n-linked (nitrogen atom in an amino acid residue is bonded to a sugar molecule) and o-linked (oxygen in an amino acid residue is bonded to a sugar molecule) it has been shown by recent research that it is the o-linked structures of α dystroglycan that are responsible for binding to these extracellular proteins. Multiple studies also show that it is O-mannosylated structures (a mannose-sugar-residue is transferred from mannose-p-dolichol to a serine/threonine residue in o-mannosylation) that are the specific sites to which these extracellular matrix proteins bind. In particular, on α dystroglycan a phosphodiester extention on the 6-position of the mannose is a site responsible for binding to these proteins. Thus, for these proteins to bind correctly to α dystroglycan, this structure must be correctly attached to α dystroglycan which relies open the functionality of other proteins that are responsible for attaching glycan structures using o-mannosylation.

This research project will investigate a specific gene, \textit{POMGnT1}, which is responsible for extending the O-mannose initiated structure of α dystroglycan with a GlcNAc (N-Acetylglucosamine) by producing UDP-GlcNAc:O-Linked Mannose β1,2-N-Acetylglucosaminyltransferase. This gene is being studied because mutations in this gene have been observed in patients with multiple forms of dystroglycanopathies. The action of this enzyme is essential for not only 2-extension but also 6-branching of the O-mannose structure containing GlcNAc. 6-Branching of the O-mannose is catalyzed by UDP-GlcNAc:mannose β1,6-N-acetylglucosaminyltransferase, GnT-Vb (GnT-IX), and studies with mice have shown that a lack of GnT-Vb alone or in combination with GnT-Va did not produce any brain abnormalities or muscular dystrophies. This implies that GnT-Vb and GnT-Va cannot account for all O-mannose branching. Recent findings showing the 6-phosphomannose structure that was extended by a LARGE dependent glycan was extended with β4-GlcNAc instead of β2-GlcNAc, and thus this begs the question which GlcNAc is used for extending the O-mannose structure. There will then be three major aims of this research project: i) to determine whether the β4-GlcNAc structure that was observed in the study is a result of overexpression of the gene responsible for the production of α dystroglycan, ii) which GlcNa transferase is responsible for the addition of β4-GlcNAc onto O-mannose and iii) identify other genotype-phenotype correlations for the \textit{POMGnT1} gene.
References:

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Appendix A
2013 CURO Summer Research Fellows

Meg Adams
Dr. William Miller, Department of Marine Sciences
Photochemical Production of Reactive Oxygen Species in the North Pacific

Tiffany Brown
Dr. Nicolás Lucero, Department of Romance Languages
The Importance of Local Grassroots Organizations in the Reshaping of Afro-Argentine Consciousness

Stanislav Bushik
Dr. Debra Mohnen, Department of Biochemistry & Molecular Biology
Exploring the Content and Structure of Proteoglycans in Rice Suspension Culture Cells

Anne Chen
Dr. Christopher Cornwell, Department of Economics
Sex Ratio and Risky Behavior on College Campuses in the United States

Megan Chesne
Drs. Michael and Rebecca Terns, Department of Biochemistry & Molecular Biology
Investigation of CRISPR/Cas Viral Defense System in *Streptococcus thermopiles*

Mary Douthit
Dr. Allen Moore, Department of Genetics
Influence of Octopamine in Parental Behaviors of *Nicrophorus vespilloides*

Allison Doyle
Dr. Julie Moore, Department of Infectious Disease
Exploring the Clinical Association between Placental Malaria and Preeclampsia: Assessing the Possibility of a Parasite-induced Imbalance in Tissue Factor and Angioregulatory Protein Production

Jane Egbosiuba
Dr. Zheng-Hua Ye, Department of Plant Biology
The Preliminary Investigation of Whether Switchgrass SND1 Orthologs Can Activate the Secondary Wall Biosynthesis

Barry Ervin
Dr. Jennifer Smith, Department of Telecommunications
The Use of Motion Picture Narrative to Capture the Relationship between Gender Identity and Expression

Seth Euster
Christopher Lawton, Department of History
The Heritage of Slavery on the Shields-Ethridge Farm

Emily Fawcett
Dr. Kelly Dyer, Department of Genetics
Investigating Female Re-mating Rates in Wild *Drosophila neotestacea* and Their Association with Sex-ratio Drive
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Austin Garner  
Dr. Andrea Sweigart, Department of Genetics  
Investigating the Genetic Factors Responsible for Postzygotic Isolation between Two Mimulus Species

Elizabeth Guarisco  
Dr. Carl Bergmann, Department of Biochemistry & Molecular Biology  
The Connection between Glycosaminoglycans and Pectins

Joseph Hopkins  
Dr. Alexander Sager, Department of Germanic and Slavic Studies  
Norse Mythology in Modern Popular Culture

Courtland Hyatt  
Dr. Amos Zeichner, Department of Psychology  
effects of Music on Male Aggression: Do Lyrics Really Matter?

Mathew Joseph  
Dr. Julie Moore, Department of Infectious Diseases  
The Effects of Autophagy and Necroptosis in the Murine Model of Placental Malaria

Lara Mengak  
Dr. Nathan Nibbelink, Warnell School of Forestry and Natural Resources  
Assessing Potential Range Shifts of the American Alligator with Sea Level Rise

Kelly Murray  
Dr. Catherine Pringle, Odum School of Ecology  
Investigating the Indirect Effects of Guppy Introduction on Populations of a Shredding Caddisfly, Phylloicus hansoni (Trichoptera: Calamoceratidae) in Trinidadian Streams

Anish Narayanan  
Dr. Natarajan Kannan, Department of Biochemistry & Molecular Biology  
Analysis of Cancer Mutations in Protein Kinases using Semantic Web Technologies

Jennifer Pallansch  
Dr. David Hall, Department of Genetics  
Characterization of the Light Signaling System in Fireflies

Katie Partrick  
Dr. Laurie Reitsema, Department of Anthropology  
Exploring Effects of Stress and Dominance on the Weaning Strategies of Female Rhesus Macaques

Anthony Sadler  
Dr. Brian Drake, Department of History  
Lester Moody: A Man, a River, and a Quest for Industry in the Twentieth Century South

Will Saunders  
Dr. Walter Schmidt, Department of Biochemistry & Molecular Biology  
Structure-Function Investigations of the Ste24p: A Metalloprotease Associated with Progeroid Disease

Natalie Schwob  
Dr. Dorothy Fragaszy, Department of Psychology  
Social Behavior and Vocal Repertoire of Wild Red and Green Macaws
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Scarlett Sumner
Dr. Michael Yabsley, Department of Wildlife Disease Ecology
Ecology and Genetic Characteristics of Haemogregarines in Fresh Water Turtles

Brian Underwood
Dr. Jennifer Palmer, Department of History
Jean-Jacques Rousseau and the Development of the Counter-Enlightenment

Stephanie Wilding
Dr. Brian Cummings, Department of Pharmaceutical & Biomedical Sciences
The Role of Cytochrome P450 Monooxygenase 2E1 in Bile Acid-induced Prostate Cancer Cell Death

Elizabeth Wilkins
Dr. Steve Stice, Department of Animal & Dairy Science
The Role of PAX6 in the Formation of Neural Rosettes in Induced Pluripotent Stem Cells

Travis Williams
Dr. Joy Doran Peterson, Department of Microbiology
Using Metabolically Engineered E. coli to Better Ferment Highly Industrially Processed Pectin-Rich Biomass

Leigh Anna Young
Dr. Marguerite Madden, Department of Geography
A Geospatial Analysis of Fission-Fusion Dynamics in Bearded Capuchin Monkeys
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. Natraj Kan, 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
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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 bijuga*, *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 A2 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
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Appendix C
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
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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 Tnep 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
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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 Reel-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 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
Appendices A-M

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

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
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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 Glycoproteomics 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
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Appendix E
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 Photodegradation

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
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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-Degenerate Hybrid Oligonucleotide Primers (CODEHOPs) for Retroviral Discovery

2009 Howard Hughes Medical Institute EXROP Student

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

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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 Characterization of the Heterologously Expressed Soluble Hydrogenase I from Pyrococcus furiosus

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?
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Joseph Rimando, CURO-Interdisciplinary 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 Biologically 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
Appendices A-M

Appendix G
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
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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
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**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
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Appendix H
2006 CURO Summer Research Fellows

Sarah Breevoort, CURO-BHSI Summer Research Fellow
Dr. Walter Schmidt, Department of Biochemistry and Molecular Biology
Construction of Three Reelp Mutant Plasmids to Aid in the Characterization of Reelp 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
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**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 Chemotherapeutic-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
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Appendix I
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 Acyloxy methyl 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
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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
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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
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Appendix J
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 G1

**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 Lymphocytes 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 Pseudohermaphroditism, Hypogonadism, Amenorrhea, 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
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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  

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
Appendices A-M

Appendix K
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 Gosnall, 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
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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 Steptomyces 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
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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  
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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
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Appendix L
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 In Vivo

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
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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 Ciliary 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

Nwakasos 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 M
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
Appendices A-M

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