SIRE Research Symposium

Emory Undergraduate Researchers in all fields in the College

April 22, 2009

4:00 – 6:00 pm

Lobbies of White Hall

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Scholarly Inquiry & Research at Emory

Emory College of Arts & Sciences
HUMANITIES / CREATIVE AND PERFORMING ARTS

Balasubramanian, Anita

The Impact of Commercialization on Carnatic Music in India
Faculty Mentor: Dr. Tong Soon Lee, Music

Abstract:
This project focuses on the performance, teaching, and reception of Carnatic vocal music and explores the ways in which different conceptions of tradition and modernization are represented through music. In particular, I examine the styles and aesthetics of classical Carnatic vocal music and the varying perspectives on its commercialization in contemporary South India. This study was conducted in Chennai, India in December 2008 during the concert season. I was presented with the opportunity to observe and learn from performers of various aptitude levels in different settings and to meet with different musicians—both performers and teachers—to enhance my knowledge of the operational procedures and methodologies underlying Chennai’s established music culture. I achieved this primarily through conducting interviews, enrolling in private voice lessons and attending concerts and lecture demonstrations.

My fieldwork raised some crucial questions in various areas of Carnatic music, including the spiritual dimension of Carnatic music, the correlation between teaching styles and transcription methods and also the influence of social and political hierarchies in South India, on the music’s reception and appeal.

Having looked at the spirituality, social hierarchy, performance aesthetics, and redefined teaching methodology governing Carnatic music, I have speculated on the extent to which they play a part in the music’s progress. Thus, I have concluded that there are parallel trends that function as dual identities for the future of Carnatic music, one that celebrates the spiritual tradition and another that embraces the modernity that is engulfing contemporary South India.

Lascar, Julie

The Evolution of the Religious Zionist Movement and its Relationship to the Temple Mount
Faculty Mentor: Dr. Shalom Goldman, Middle Eastern and South Asian Studies

Abstract:
This research examines how political factors affect actions regarding sacred space. In particular it focuses on the evolution of the religious Zionist movement, a group which inherently fuses politics and religion, and its relationship with the Temple Mount and attempts to explain why the relationship has changed. It examines three possible factors in explaining the evolution of the relationship. The first possible factor is a natural progression of a movement started by Rabbi Abraham Isaac Kook in 1921 when he established a yeshiva, Jewish institute of learning, which focused on teaching and studying the laws of the Temple. The second possible factor is a political
attempt by religious Zionist rabbis to find a new cause for the religious Zionist community to rally around due to the apparent failure of the Greater Israel movement. The third factor is an attempt to combat the growing Palestinian presence on the Temple Mount and the authority of the Islamic Waqf. The research examined secondary writing on the Temple Mount and the religious Zionist movement, writings by rabbis and settler leadership, and interviews conducted in Israel to examine the research question. The research demonstrated that the change in behavior is a result of two main factors: it is an attempt to combat the Arab presence on the Temple Mount and the result of the failure of Greater Israel. Both factors grew together because in both cases the Jewish territorial presence weakened and therefore the movement experienced a growing need to combat their loss of territory. These two reasons are not mutually exclusive, but instead have grown and evolved together.

Lyle, Ellen

Investigations of a Choreographic Voice: A Personal Approach to Dance-Making
Faculty Mentor: Dr. George Staib, Dance

Abstract:
Dance-makers often refer to a choreographer’s individual perspective and style of composition as his or her “choreographic voice.” Through the creation and presentation of three works, I sought to investigate the essence of my choreographic voice. I embraced a highly personal approach, aiming to create a set of three dynamically different and emotionally intriguing works based upon interpersonal relationships. I approached my composition through the use of personal memorabilia and anecdotes, musical analysis, improvisation and movement created in collaboration with the dancers, each approach emphasizing the dancer as a vital instrument in the composition (his or her personality, movement style, etc.). The first work, entitled "Heartstitching" was created following the death of my mother and sought to celebrate her life while expressing my sense of loss. The second piece, "Twinkies," playfully explored ideas regarding physical and emotional accessibility. The final piece, a duet entitled "You Away/Soutiens-Moi" explored a very close friendship, contrasting support with uncertainty.

The three works elicited strong emotional responses from audience members (feedback sheets were used to evaluate audience response). “Heartstitching” moved many to tears, “Twinkies” creatively engaged and humored observers, and “You Away/Soutiens-Moi” brought about a reaction as complicated as its theme, with audience members feeling a combination of contentment and unsettledness. From audience feedback, I have been able to conclude that an intensely personal approach and an emphasis on emotion, focus, and movement dynamic made these works more universally accessible and engaging.
Pullagura, Anni

The Myth of the Superwoman: Power, Fantasy, and Representations of Gender in Popular Visual Culture
Faculty Mentor: Dr. Cheryl Crowley, Russian and East Asian Languages and Cultures

Abstract:
The role of gender in popular visual culture simultaneously attempts to negotiate a space for individual agency while still supporting constricting frameworks of power, spectatorship, and hetero-normative sexuality. Complicating these challenges is the criticism that visual culture continues to cater to the masculine gaze while now introducing the critical feminine gaze as a way of further policing representations. The result is a compromise in which a female character or figure may demonstrate independence and agency, but only within a socially-constructed arena that inhibits progress despite its claims to uphold new and liberating philosophies. Finally, the appropriation of these ideals to various mediums reflects how the emergence of a new global visual culture provides an additional lens through which these compromises of female agency are made. This project attempts to analyze collisions between global and visual cultures by examining how women of power are represented within the visual context. Specific case studies include the fantasy of the superheroine in superhero comics, the exotic female body in popular global photography, and the stereotype or exception of the extraordinary woman in popular television shows such as Law & Order: Special Victims Unit, Saving Grace, and Ugly Betty. Using frameworks of spectatorship theory, visual culture and the theory of the “Other”, and art analysis, I hope to unpack how messages of female power and male fantasy in contemporary film and television, comics, and other visual mediums continue to influence the struggle to establish individual agency in the face of popular cultural oppression.

Yuhas, Caitlin

Connection, Dissension: Physical Interpretations of Antagonism
Faculty Mentor: Dr. Anna Leo, Dance

Abstract:
As a long-time performer and observer of dance, I have often been drawn to movement with generous amounts of weight and energy behind it. This is especially true in pieces centered on contact improvisation and partner work. For my dance performance honors thesis, I chose to explore physical interpretations of antagonism. Here, I was able to delve into the physicality of athletic contact work while also investigating the emotional dynamics of antagonist/protagonist relationships.

My main goal as a performer was to present a diverse set of works, and to successfully meet the physical and character-driven goals within each. My chosen pieces included a Mean Girls-style cat fight duet, a trio focusing on subtle shifts in weight distribution, a human versus environment solo set inside a wooden box, and a second duet showcasing both the tension and support of a close friendship.
This honors project culminated an evening-length performance, presented on March 26 and 27, 2009. To prepare myself for this event, I immersed myself in 20-25 hours of rehearsal per week, as determined by my choreographers. I also received pre-show feedback from my dance professors, outside artists and fellow dance students. Based on their reactions, written comments left on feedback sheets at the concerts, and my internal observations, I feel I was successful in relaying the unique aspects of each piece to audience members. My investment in this project has deepened my awareness as a performer, and will no doubt influence my artistic choices in future shows.
SOzial Sciences

Heilbrun, Anna

Children's Interpretation of Arbitrary Printed Symbols: A Study of Symbol Learning at 26 Months of Age
Faculty Mentor: Dr. Laura Namy, Psychology

Abstract:
This study investigates children’s comprehension of symbols in the printed modality, specifically those that are unrelated to their referents (“arbitrary printed symbols”). Namy (2004) has demonstrated that while 26-month-olds are capable of learning this particular symbol type, there is individual variation in their comprehension of this symbolic medium. The present study investigates whether parental engagement in activities that support arbitrary printed symbol interpretation accounts for these individual differences in children’s understanding of these symbols. Using a correlational design, I tested 26-28-month-old participants’ comprehension of arbitrary pictures as symbols for objects and how it relates to parental behaviors. This study replicated an experimental symbol-learning task and elaborated on it by including a picture-book reading task with the parent and their child, and an original parental questionnaire regarding their support of their children’s arbitrary symbol learning. The present study did not replicate as robustly as anticipated the finding that children in this age range can learn arbitrary printed symbols, but found a link between parental “scaffolding” of symbolic insight and children’s symbol recognition. These findings support the notion that children’s symbolic abilities are shaped by social and cultural support, particularly from parents, and have important implications for literacy acquisition.

Hollars, Shannon

Feedback: Constructive or Destructive? The Impact of Task Evaluation on Students' Self-efficacy and Performance
Faculty Mentor: Dr. Nancy Gourash Bliwise, Psychology

Abstract:
This study examined whether positive and negative feedback impact future performance with positive feedback increasing students’ self-efficacy and performance and negative feedback decreasing these elements. Hardiness and test anxiety were studied as predictors of students’ self-efficacy reevaluations. Sixty-three undergraduates were given either positive or negative false feedback, or no feedback following visual-spatial problems. Participants finished the problems and rated their self-efficacy. Negative feedback influenced self-efficacy in the predicted direction. Self-efficacy levels for this group predicted lower performance. Subscales of test anxiety and hardiness predicted self-efficacy and performance, respectively. No differences were found between the positive and control group’s self-efficacy and performance. This research provides support for applying social cognitive theory in classroom settings and has implications for improving student-teacher interactions.
Jackson, Jonathan

The Relevance of Religion in a Secularized Germany
Faculty Mentor: Dr. Frank Lechner, Sociology

Abstract:
In this thesis, I question how relevant religion remains in Germany society. My purpose is not to test secularization theory but to refine our understanding of secularization. Specifically, I am seeking to discover to what degree religion can explain some of the social processes going on in that country. To make this large question manageable, I conceptualize it by asking: do religious Germans differ from nonreligious Germans in their opinions and attitudes towards key public policy issues in the areas of immigration, the environment, and foreign policy? I predicted that religion still weakly influences these important public issues.

To test my assumption, I conducted a secondary data analysis of the third wave (1999/2000) of the European Values Study. Using SPSS, I created organized and individual religiosity indices, comparing their effects on foreign policy, immigration, and environmental variables. Additionally, I combined the organized and individual religiosity indices into one religiosity index in order to run an OLS regression, examining the effect of religiosity on multilateralism, immigration, and environmental indices. Overall, the results show that religion influences public attitudes across a wide spectrum of issues. In the regression analysis, religion’s effect was statistically significant on all three public policy issues. After controlling for other variables, the religiosity index exhibited a stronger effect on the immigration and environmental indices but a weaker effect on the multilateralism index. My findings suggest that religion still has some bearing on matters like foreign policy, immigration, and the environment, in spite of decreased relevance.

Karamali, Mariam

Activity of Americans and the Effects on Sleep
Faculty Mentor: Dr. Carol Worthman, Anthropology

Abstract:
From 1982-2005, the sleep quota declined 14% from 8 to 6.9 hours/day, far from the ideal daily sleep quota of 8-9 hours/day. It has been suggested that entertainment, the Internet, and TV, and even stress serve as distractions that take time away from sleep. The purpose of this experiment is to examine sleep conditions, sleep behavior, stress levels, and media use to understand how sleep quality is affected. Members of the Emory staff (12 females and 7 males) were administered the following questionnaires: background questionnaire, stress index, Pittsburgh Sleep Quality Index, media use questionnaire, and sleep conditions questionnaire. Data were analyzed using paired t-tests. It is predicted that an increase in the number of stressors, higher amounts of media use, and fewer hours of sleep will result in a poorer sleep quality.
Levine, Melissa

Generation Y At Work
Faculty Mentor: Dr. Nancy Bliwise, Psychology

Abstract:
Every generation has its own unique set of values, ideals, and motivations that emerge from social values, societal norms and cultural events and are expressed in family structures and lifestyles, work habits, and overall values. Of particular interest in this study are members of Generation Y, those born after 1980. Although it should seem that this educated, technologically advanced, success-driven generation would be ideal workers, Human Resource departments are reporting the opposite. The rationale for this study stems from HR reports that Generation Y workers pose problems for older management. As members of the first generation to grow up with the monumental impact of technology, and constant access to global information, this generation brings unique values and attitudes to the workplace. Conflicts described between Generation Y workers and their managers is pertinent today, and this study asks whether the current generation of college students differs from previous generations regarding views of impulsivity, family, attitudes toward authority, and personal values. In addition, this study examines how these attitudes and values are associated with expectations about the workplace with the goal of explaining this workplace divide. An anonymous online survey was completed by 128 undergraduates at Emory University, and these values were compared to published normative data. The findings were significant; Generation Y differs significantly from previous generation on measures of impulsivity, traditional family ideology, and terminal and instrumental values. In addition, significant correlations were found between work values impulsivity, traditional family ideology, and certain terminal and instrumental values.

Locascio, Gillian

Home Grown: Ngöbe home gardens in a changing world
Faculty Mentor: Dr. Ellen Spears and Dr. Scott Lacy, Environmental Studies

Abstract:
Home gardens—highly diverse plots near the house in which plants are cultivated on a small scale, mainly for home consumption—are internationally recognized for their role in environmental conservation, culture, and food security. For the indigenous Ngöbe communities of western Panama, who are battling declining productivity of the land and suffer the highest levels of malnutrition in the entire country, home gardens provide a stable and invaluable source of nutrition. Parts of the indigenous state, however, are changing rapidly as government roads, schools, programs, and non-governmental organizations extend their influence throughout the area. These changes have not arrived everywhere at the same pace, and while organizations have been taking ecological factors such as climate, slope, and soil type, into account when they design home garden programs, many have ignored the more difficult-to-classify sociocultural and economic factors that impact garden use. As a result, many garden “betterment” programs do not fit the reality of each community or the interests of home gardeners.
Research was conducted in three communities, one on the edge of the highway, at the entrance to the indigenous state or Comarca Ngöbe-Buglé, one community one hour on foot from the first, and a third community that is also an hour away from the nearest town with a road but has a ten year history of working with agricultural organizations. Over the course of a year I spent four months in the field, during three separate trips, living in the communities, conducting interviews with families and organizations, and examining the diversity and structure of home gardens. Of the human factors that shape limits and opportunities in home gardens, access to cash or the market and access to production or farmland are the most important to survival. Organizations, though, that provide cash or material support over time can change the opportunity structure. It is possible to create a rapid assessment tool that allows home garden programs to adjust to these sociocultural and economic influences in different communities.

**Murphy, Alexandra**

**Children's Narratives and Health-related Quality of Life**
Faculty Mentor: Dr. Robyn Fivush, Psychology

**Abstract:**
To examine how children make sense of scary asthma experiences, relations between emotional regulation and coping expressed in narratives and psychological and physical well-being were examined over time. Participants included 54 boys and 35 girls, 8-12 years old, and their mothers. Over three time points, children provided narratives of a scary asthma experience, mothers and children completed questionnaire measures on psychological well-being, and researchers measured lung function. Although well-being largely improved over time, narrative expression of coping predicted more severe asthma, and narrative expression of emotional regulation predicted higher anxiety. Findings suggest that children may not yet have the skills to be able to construct emotionally regulated narratives in ways that are beneficial.

**Spees, Lisa**

**James Jackson Kilpatrick: The Changing Views of a Southern Newspaper Editor on School Desegregation During the Civil Rights Era**
Faculty Mentor: Dr. Joseph Crespino, History

**Abstract:**
During the civil rights era, James Jackson Kilpatrick, the editor of the Richmond News Leader, wrote America’s most widely syndicated column, “A Conservative View.” He was viewed as the most articulate hard-line segregationist in America. Kilpatrick became an integral part of the “massive resistance” movement in the late 1950s. Kilpatrick argued that blacks were inherently inferior but also focused on the constitutional and legal arguments. However, in the late 1960s and 1970s, Kilpatrick came to accept, at least publicly, school desegregation. He affirmed a “color blind”
ideology. His gradual conversion to a “colorblind” perspective can be traced through his arguments on tuition voucher programs, federal aid to education, and racial busing.

My most basic question is how did Kilpatrick’s views on school desegregation change over time? To answer this question, I traveled to UVA and USC to look at the archives of Kilpatrick as well as William Workman, another newspaper editor from South Carolina, and Harry Byrd, Sr., an US Senator from Virginia. By studying Kilpatrick, one does not only see the purely racial arguments against school desegregation but also persuasive lawful arguments. His clear communication of Southern views on school desegregation helps one understand how Southerners’ racial conservatism was transformed into constitutional and legal terms. Southerners believed that by protecting their schools, they were protecting their rights and preserving the Southern way of life. Kilpatrick is important in the history of school desegregation because he provided a logical argument that could be used by advocates of school segregation.

Tran, Ashlee

Measuring Representation: The Truth About Barack Obama and Hillary Clinton
Faculty Mentor: Dr. Beth Reingold, Political Science

Abstract:
In the 2008 Democratic Presidential Primary, both Senators Hillary Clinton and Barack Obama relied heavily on their symbolic representation—the first viable woman and black candidate—in order to win in key contests. Clinton channeled the support of women while Obama held the majority of the black vote. This begged the question: what effect has their symbolic representation had on their substantive representation? I.e., do they actually disproportionately represent blacks and women? This study sought to investigate Sen. Hillary Clinton and Sen. Barack Obama’s substantive representation of African-Americans and women during their tenures in the Senate from 2001-2008 for Sen. Clinton, and 2005-2008 for Sen. Obama. It will particularly focus on their concurrent years of service, from 2005-2008. No comprehensive study has been done comparing the two Senators’ records regarding race and gender, in light of the 2008 Democratic nominating contest. This project examined the co-sponsorship of women’s issues bills and African-American issues bills in the Senate using a cross-tab analysis. Former Senator Carol Moseley Braun, as an African-American female, was also used as for comparative study. This study found that while both candidates represented general women’s interests and general black interests relatively equally, they did indeed represent their demographics, with Hillary Clinton having disproportionately represented feminist interests more often and Barack Obama having disproportionately represented direct black interests.
Wise, Olivia

The Expansion of Womanism as a Theological Framework: Creating a Space for Queer African American Women Within Christianity
Faculty Mentor: Dr. Dianne Stewart, Religion

Abstract:
Abstract not available for publication.
**NATURAL SCIENCES**

**Bery, Amit**

**Identification and Frequency Characterization of Natural Pathogens in Drosophila**
Faculty Mentor: Dr. Todd Schlenke, Biology

**Abstract:**
Studies on the fruit fly, Drosophila melanogaster, have been instrumental in multiple areas of genetic research. This organism is an especially effective model system in the field of immunology due to its lack of acquired immunity and the ease with which its innate immunity can be manipulated. However, most research on the Drosophila immune system has relied on lab strains of pathogens artificially administered to lab strains of flies. The purpose of this project is to identify and assess the frequencies of natural pathogens in wild populations of D. melanogaster, to gain a better understanding of natural host-pathogen interaction dynamics. We caught D. melanogaster from two locations around the Emory University campus using traps baited with fruit and mushrooms. DNA and RNA was extracted from the flies and amplified via PCR with primers specific for several known pathogen groups, including the bacteria Spiroplasma and Wolbachia, Trypanosomes, Microsporidia, and various RNA and DNA viruses. Preliminary data show the presence of every one of these pathogen types in flies caught from Atlanta population samples. Once infection frequencies have been recorded, additional analysis will help determine whether particular pathogens are positively or negatively associated inside Drosophila hosts, and assess how pathogen frequencies vary over the course of a collecting season. This study will serve as a launching point for many studies on the associations of these pathogens, not only with D. melanogaster, but also with each other.

**Faits, Tyler**

**Testing the Effects of Host Plants on the Virulence of a Protozoan Parasite**
Faculty Mentor: Dr. Jacobus C. DeRoode, Biology
Co-Authors: Carlos Lopez, Jacobus C. DeRoode

**Abstract:**
Parasites typically rely on the survival of their hosts for their survival and transmission, and yet parasites have evolved to harm their hosts, often reducing the host’s longevity as well as overall fitness. How and why virulence occurs is still largely a mystery, though countless explanatory models have been proposed. Studies have described virulence as partially a genetically inherited trait and partially an ecologically determined trait. O. elektroscirrha is a protozoan parasite specific the monarch butterfly. Monarch larvae become infected when they consume parasite spores on their host milkweed plants, and upon reaching adulthood are coated with spores, reducing monarch fitness. The species of milkweed plant that monarch butterflies are reared on as larvae significantly alters the rate of parasite reproduction and therefore adult monarch longevity. However, the
mechanism of this affect is still unknown. To determine this mechanism, it is first important to discover what stage in the monarch’s life cycle its host plant has the greatest effect. If chemicals from the milkweed affect the protozoan parasite the midgut, only the milkweed present in the midgut at the time of infection is significant. We fed monarch larvae either A. incarnata or A. curassavica at each of three sub-stages of larval development: the first two days after hatching, the third day at which point we administered the parasite, and the remainder of their larval life. This showed that only the species of milkweed consumed in the two days before and the day of infection have significant impact on adult lifespan.

Heyler, Carla

The effects of oxytocin on food sharing and cooperation in the capuchin monkey (Cebus apella)
Faculty Mentor: Dr. Sarah Brosnan, Psychology (Georgia State University)
Co-authors: Patrick Dougall, Language Research Center and Georgia State University; Timothy Flemming, Language Research Center and Georgia State University; Paul Zak, Claremont Graduate University; Sarah Brosnan, Language Research Center and Georgia State University

Abstract:
Oxytocin (OT) is a neuropeptide that mediates social behaviors in humans, including trust, cooperation, and generosity. We here investigate whether exogenous OT increases cooperative and food sharing behavior in a highly social non-human primate species, the capuchin monkey. This may improve our understanding of positive social behaviors and cooperative interactions in capuchins and help to clarify the evolutionary enigma of altruism through evidence of a mechanism by which OT facilitates cooperation. In our study, one or both subjects must pull bars linked to a tray in order to receive food (apples) on the tray. In the reciprocity condition, the tray is weighted so that both subjects must pull, though only one subject has access to the reward and must share it for his partner to receive any. In the mutualism control, both must pull and both receive a reward. In the solo control, only one subject need pull and only the same subject has access to the reward. We are testing whether OT administered intranasally will facilitate both the willingness to cooperate in obtaining rewards and the subsequent willingness to share the reward. OT administration is randomized so that in each scenario, either one subject, both subjects, or neither subject receives OT (saline is the control). We will use a repeated-measures ANOVA to determine whether levels of cooperation and food sharing vary across conditions. Although data are still being collected, we predict that increased OT levels will correlate with an increase in both cooperation and subsequent sharing of the reward.
Kamins, Alexandra

Transfer of helpful bacteria among insect communities
Faculty Mentor: Dr. Nicole Gerardo, Biology

Abstract:
Aphids cannot survive on their limited diet of plant phloem without the help of their primary symbiotic bacterium, Buchnera. In addition to this obligate relationship, a number of facultative symbionts can inhabit this sap-sucking insect. While efficient transmission from mother to daughter is readily seen in the lab for both types, secondary symbionts are thought to undergo horizontal transfer across species in the field. Genetic comparisons suggest these jumps may even occur between very distantly related species, such as whiteflies or ladybirds. Such horizontal transfer could play a critical role in both understanding the colonization of new insect lineages with novel bacteria and in the general understanding of bacterial migration. I explored the of transfer among insects the aphid community, screening field samples of sympatric ants, ladybirds and aphids for three common aphid secondary symbionts and conducting feeding experiments with live ladybirds. I found that ladybird larvae fed aphids with symbionts were half as likely to die as larvae fed aphids without symbionts, suggesting there is an advantage to consuming symbionts. There was decrease in the persistence over time of the symbiont Serratia symbiotica in adult ladybird beetles fed aphids with the bacteria, until no bacterial DNA was seen in the ladybirds after one week. No ants or ladybirds were found in the field with any of the three main aphid symbionts, suggesting that horizontal transfer is a rare event. Still, ingestion may need to be considered as a route of symbiont acquisition.

Korneva, Arina

Sex-Specific Differences in Meiotic Silencing of C. elegans
Faculty Mentor: Dr. William G. Kelly, Biology

Abstract:
Sexually-reproducing organisms have developed a highly-advanced mechanism for ensuring genetic variation beneficial to the survival of their species—meiosis. In meiosis, parentally-inherited chromosomes undergo genetic exchange. A characteristic feature of meiosis called meiotic silencing was studied in the model system, Caenorhabditis elegans. Meiotic silencing is responsible for epigenetic repression of improperly paired chromosomes during meiosis. The recognition mechanism and triggering events in meiotic silencing are still largely unexplored. Usually, one observes that when chromosomes fail to pair with their genetically similar partner, they accumulate hallmarks of gene inactivation, such as histone H3 di-methylated on lysine 9 (H3K9me2). For example, this phenomenon occurs when the X-chromosome is unpaired naturally in males in C. elegans, which have only one X chromosome. In accordance with this observation, him-3 mutants with unpaired chromosomes show hallmarks of gene inactivation in males, but surprising not in hermaphrodites. Zim-1, zim-2, and zim-3 mutants also exhibit homolog pairing defects, and these genes were tested to further examine the differences of meiotic silencing between hermaphrodites and males. The zim genes were targeted for disruption using RNAi. RNA interference was
performed on wild-type and RNAi hypersensitive animals, and the meiotic silencing effects were assayed using immunohistochemistry. These experiments are designed to test the reason for the sex-specific differences observed; i.e., whether there is a reduction or an elimination of the meiotic gene inactivation signal (H3K9me2) in hermaphrodites as compared to males. The project sheds light on the regulation of the meiotic silencing mechanism, and whether its purpose to control gene expression, and/or to function in checkpoints that detect meiotic failure.

**Lynch, Jennifer**

**A cold "colloidal glass" still remembers when it was warm**
Faculty Mentor: Dr. Eric Weeks, Physics
Co-Authors: Zexin Zhang (Department of Physics, University of Pennsylvania), Peter Yunker (Department of Physics, University of Pennsylvania), Arjun G. Yodh (Department of Physics, University of Pennsylvania)

**Abstract:**
When a liquid is cooled to a low enough temperature, it becomes a solid. This transition is well understood for crystalline solids where the atoms form an ordered structure. However, if the cooling is sufficiently rapid, a glass is formed instead in which the atoms are disordered. In this case, the transition from liquid to solid is called the glass transition. Unlike a crystal, a glass is not in equilibrium: it is constantly changing. I am interested in these changes, collectively known as "aging". In particular, I study a colloidal suspension consisting of micron-sized plastic particles in a liquid – a good model system for studying the glass transition. In this model, the glass transition is approached by increasing the particle concentration, instead of decreasing the temperature.

I am interested in the memory of the system, that is what happens to the aging of the system if we interrupt the process. To observe this phenomenon, I disrupt the aging process after some time has elapsed by quenching into a deeper glass with a higher volume fraction and letting the glass age in this state for some time. I then return to the original glass and observe how it ages. I find that this disruption of the aging process does not strongly affect the aging of the original glass and that the aging process continues as if it had never been interrupted.

**Moreines, Jared**

**Defining the Relationship between Depression Treatment History, Cognitive Performance, and Resting State Functional Connectivity**
Faculty Mentor: Dr. Helen S. Mayberg (School of Medicine) and Paul E. Holtzheimer (School of Medicine)

**Abstract:**
Deficits in cognitive functioning are common in depression, and these deficits may vary according to a patient’s prior history of depression. Differences in Resting State Functional Connectivity (RS-FC) of brain regions involved in mood and cognition may help distinguish various patterns of cognitive
dysfunction as well as depressive states. RS-FC data is currently acquired in a number of ongoing Emory psychiatric studies focusing on patients at all stages of depressive illness (treatment-naïve, mildly-moderately treatment-resistant, and chronically treatment-resistant). We have obtained a SIRE grant for funds to compensate 50 participants from these ongoing studies for the completion of an additional cognitive battery. At the time of this midpoint report, 16 patients with chronic treatment resistant depression (TRD), two with mild TRD, and four healthy controls have undergone the cognitive testing. Once complete, this data will be used to characterize differences in cognitive functioning associated with different levels of previous depression treatment. Next, this cognitive data will be analyzed in conjunction with subjects’ FC data for clues as to how cognitive processes may be operating differently across the different patient populations. As the current data is too preliminary to answer either primary research question, this poster will focus on study progress.

**Nadler, Zach**

**Examining Dynamic Length Scales in a Two-Dimensional Colloidal System**
Faculty Mentor: Dr. Eric R. Weeks, Physics
Co-Authors: Cara Hageman, Vikram Prasad, Eric R. Weeks

**Abstract:**
We study polystyrene colloids placed at an oil-water interface as a quasi-two-dimensional colloidal system. As the area fraction of the colloidal particles is increased, we see liquid, hexatic, and crystalline phases. The liquid phase is structurally disordered; the hexatic phase has long range orientational order but poor translational order; and the crystalline phase has long range orientational and translational order. We classify these different phases using structural and dynamic parameters from prior work. Using a laser tweezer we trap and drag a particle along the interface and observe its effect on the surrounding colloids. Our interest is in developing a method of measuring and comparing responses with changing particle density, where the ordering of particles can qualitatively change. We characterize the response by the structural defects induced by the dragged particle, as well as the perturbed motion of the surrounding particles. These responses are localized around the dragged particle, and we study how the localization length scale changes with the area fraction of the colloids.

**Nguyen, An**

**Seasonal Influence of CSO Water Chemical and Environmental Parameters on Culex Vector Oviposition**
Faculty Mentor: Dr. Uriel Kitron, Environmental Studies

**Abstract:**
The effects of combined sewage overflows (CSOs) on Culex quinquesfasciatus activity and factors influencing its behavior are essential to the understanding of the species’ pathogen exchange capabilities, specifically in relation to West Nile Virus. The following investigation aims to correlate mosquito oviposition with fluctuating levels of water chemical nutrients in CSO pools under the influence of seasonality. The study site is Ardmore Park situated in metropolitan Atlanta, where
rampant mosquito activity during peak months is expected to influence the probability of disease transmission in an urban, crowded area. Semi-natural habitats will be created for the purpose of juxtaposing the ovipositional frequency in protein-rich CSO isolations with that in unenhanced CSO isolations. The chemical measures of water quality in these artificial isolated pools will be further compared against that of the main stream, in which sewage/storm water flows freely and sporadic rain patterns will be expected to influence the stream in such a way that differing rates of chemical changes between the isolations and the main stream will result. These rates, along with oviposition rates measured in the isolated reservoirs, will be compared and analyzed over time. The addition of nutrient to these systems is expected to have higher chemical concentrations as well as oviposition rates through time. Furthermore, water temperature and relative humidity changes in the environment are hypothesized to have a direct impact on the activities of gravid female mosquitoes.

**Raiser, Sara**

The effects of vitamin D and chronic inflammation on intestinal calcium absorption  
Faculty Mentor: Dr. Mark Nanes, School of Medicine  
Co-author: Stephen F. Brandt

**Abstract:**  
Chronic inflammatory conditions are characterized by elevated levels of tumor necrosis factor-alpha (TNF); chronic inflammation is associated with decreased intestinal calcium absorption. This decrease in calcium absorption is associated with reduced bone density and increased skeletal fractures in arthritis, aging, and menopause. Vitamin D, the major regulator of calcium absorption, is inhibited by TNF in vitro. We hypothesized that decreased calcium absorption in chronic inflammatory conditions is a result of TNF-induced vitamin D resistance. A murine model of chronic inflammation and arthritis (TgTNF) was utilized to determine if TNF inhibits calcium absorption. Young (2-3 months) or aged (5-6 month) mice were fed a normal diet containing calcium (1.00%) and cholecalciferol (2.1 IU/g; 51µg/kg). Mice received no treatment, 20 ng 1,25-dihydroxycholecalciferol (vitD), or 125 ng vitD i.p. 16 hours prior to euthanasia. Ex vivo everted duodenal calcium absorption assays were performed with TgTNF and wildtype (WT) mice. Ca-45 isotope served as a marker to measure calcium absorption after a one-hour incubation at 37°C. Young mice showed no significant difference in duodenal calcium absorption or response to vitD. Older WT mice showed a trend for increased calcium absorption in response to vitD; older TgTNF mice showed minimal change, indicating vitD resistance. Baseline absorption was not different in older mice. This data suggests that TNF causes vitD resistance in older mice; it also suggests that an alternative calcium transport pathway compensates for the effect of inflammation in the young. This compensation is lost with aging.
Robin, Alex

Origins of the Heterogeneity of Tumor Cells in Cancers
Faculty Mentor: Dr. Chunhai Hao, School of Medicine

Abstract:
The origin of intratumor heterogeneity is being studied in an attempt to determine the most beneficial target of chemotherapeutic drugs. After cloning of primary cell cultures from cancerous tumors, it was determined that multiple different cell lines were present. This was shown by obtaining clones to performing western blots on, testing the clones for their production of different proteins. We intend to study if this heterogeneity is due to mutations in the cultured cells, or if there exists a variance in the tumor stem cells of the patients. This will be done by obtaining tumor stem cells and testing their response to TRAIL, a member of the TNF (tumor necrosis factor) family, which can trigger apoptosis in target cells. We intend to find whether all tumor stem cells show the same response to TRAIL via a cell death assay. The hope is that figuring out if the heterogeneity of cancers exists in tumor stem cells will in turn help determine if targeting tumor stem cells is a viable, and more effect, method in treatment of cancers.

Silverman, Ethan

The Creation of Visible mutants in Leptopilina boulardi and L. heterotoma
Faculty Mentor: Dr. Todd Schlenke, Biology

Abstract:
The closely related parasitic wasp species Leptopilina boulardi (LB) and L. heterotoma (LH) are obligate parasites of flies from the Family Drosophila. LB is a specialist only parasitizing Drosophila melanogaster and other members of the melanogaster subgroup whereas LH is a generalist parasitizing several Drosophila species groups. LB and LH also vary in their infection strategies, where LB is immuno-evasive and LH is immuno-suppressive. The Schlenke lab is interested in determining the genetic bases for the wasp infection strategies. To this end, I attempted to generate visible mutants in these two wasp species using both radiation and the chemical ethyl methanesulfonate (EMS). After mutagenesis, a crossing scheme was carried out to create pure breeding strains of the mutagenized wasps. These visible mutants will be mapped to linkage groups and will serve as a basis for genetic mapping of the wasp genes responsible for virulence.
Sok, Daniel

Effects of Stress on Pea Aphids
Faculty Mentor: Dr. Nicole Gerardo, Biology

Abstract:
The intent of my project is to test the effects of stress on disease and fecundity in different lines of Acyrthosiphon pisum (pea aphids). This will be accomplished by stressing different lines of pea aphids with EBF (a pheromone emitted by aphids when attacked by predators or stressed) and then counting the number of offspring between stressed and unstressed aphids. Disease effects can be observed by exposing stressed and unstressed aphids to bacteria and then doing a survival count. Plus I will test whether or not stress increases beneficial secondary symbiont bacteria in aphids by doing a symbiont count through real time PCR. I predict that certain lines of aphids when stressed will exhibit different disease outcomes, different levels of fecundity and differences in their association with beneficial bacteria compared to unstressed aphids. This project will build up an understanding of insect immune systems from the simplest of organisms which is key to future insect immunology and evolutionary molecular genetic research.

Spragg, Chelsea

Factors affecting resistance to fungal pathogens in pea aphids
Faculty Mentor: Dr. Nicole Gerardo, Biology

Abstract:
Fungal pathogens are the most important natural enemy to pea aphids. One bacterial endosymbiont, Regiella insecticola, has been shown to provide protection from the fungal pathogen Erynia neoaphidis. Lines of pea aphids with and without R. insecticola were exposed to spore showers of both Erynia neoaphidis and an additional fungus, Zoopthera occidentalis, in order to determine if R. insecticola provides protection from fungal pathogens other than E. neoaphidis and to explore the relative importance of the strain of R. insecticola and the genotype of the aphid in surviving exposure to fungal pathogens. Levels of antimicrobial peptides produced by different lines of pea aphids when exposed to fungal pathogens were also analyzed to better understand the immune response of pea aphids and the possible differences between genotypes. We expect to find that R. insecticola does protect against Z. occidentalis in addition to E. neoaphidis and that there will be differences in the survival of aphids of different genotypes possibly due to differing levels of antimicrobial peptides produced by immune response. There may also be differences in the amount of protection conferred by the symbiont R. insecticola due to a synergistic effect with the aphid genotype. Aphid resistance to fungal pathogens may complicate recent efforts to use fungal spores rather than pesticides to control aphid populations.
Subramanyam, Shruthi

Interaction between fungus-growing ants' cultivar and parasitic fungus Escovopsis
Faculty Mentor: Dr. Nicole Gerardo, Biology

Abstract:
Fungus-growing ants are a specific species that produce and cultivate a fungus as a primary food source. Acromyrmex octospinosus (Acro) and Apterostigma dentigerum (Aptero) are two ant species highly abundant in the tropics of Central and South America. Escovopsis is the genus of a parasitic fungus natural to the ants' environment. It surrounds and consumes the ants' garden, eventually destroying the fungus garden and killing the ants. Despite the evolutionary differences of Acromyrmex and A. dent, structurally similar strains of Escovopsis attack the cultivars. Research has shown they are attracted to, and thus attack, their natural hosts. Chemical signals between the two cause this relationship. Escovopsis attacks a specific cultivar, because they can only break down and consume a limited range of potential hosts. Similarly, cultivars may only be able to suppress a narrow range of parasite types. Bioassays conducted between samples each of cultivar from both ant species and Escovopsis have shown that this relationship holds to be true. The Gerardo Lab has also recently collected ant colonies of these species from Costa Rica and Panama and we are working to see whether this relationship plays to be true in the natural environment of the ant gardens.

Wu, David

Solar energy-driven robust multi-electron-transfer catalysts for O2 evolution
Faculty Mentor: Dr. Tianquan Lian, Chemistry
Co-Authors: Dr. Craig Hill, Dr. Jamal Musaev

Abstract:
Providing renewable pollution-free fuels is one of the most important scientific challenges of the 21st century, and with this in mind, solar splitting of water into H2 and O2 remains one of the most desired, yet scientifically challenging prospects.

Our goal is to design, prepare and characterize stable nanoassembles for the efficient conversion of solar energy to fuel (H2) by splitting water. The prototype nanoassembly comprises of three units: an electron acceptor (TiO2), a visible light-harvesting photosensitizer (a ruthenium bipyridyl complex, Ru470), and a robust tetra-Ru centered polyoxometalate, “Ru4POM” oxygen evolution catalyst (a triad).

Photo induced femtosecond electron injection from Ru470 to TiO2 nanoparticles and a millisecond reverse electron transfer process results in long-lived RuIII470, which subsequently oxidizes water with Ru4POM catalyst. Additionally, if appropriate designed, another catalyst for H+ reduction can be incorporated into this system for complete water splitting and fuel production.
Water oxidation occurring under moderate condition requires a 4-electron relay process. In our artificial photosynthesis system, Ru4POM accumulates the required 4 electrons and then has enough potential energy to oxidize 2H2O, generating 2O2 molecules. We have successfully observed the generation of oxygen from a similar photon-to-O2 system with a conversion yield of only 9% because photo-induced electron injection yield from photosensitizer to electron acceptor is only 67%. For our proposed system, the yield is similar; however, electrons will accumulate on the TiO2, and further studies must be done to find an efficient sacrificial electron acceptor, which is needed to continue the forward water oxidation process.
LINGUISTICS

Braun, Benjamin

Teaching Ideology by Way of Language: The Ideological Basis of Israel's Ulpan
Faculty Mentor: Dr. Benjamin Hary, Middle Eastern and South Asian Studies

Abstract:
Ulpan, plural ulpanim, is Israel's official language program for teaching Hebrew to immigrants to Israel. According to the Israeli government, the ulpan is more than just a method of teaching Hebrew, but a mode of imparting ideology as well. Despite this, neither the Israeli government nor previous scholarship about the ulpan consider the nature of this ideology; they assume that the purpose of the ulpan is pragmatic and they fail to consider ideological reasons for its development. The present study analyzes the nature of the ulpan's ideology showing that ideological factors affected its development and that the ulpan also conveyed a specific ideology.

Through a close reading of previous scholarship on the ulpan, the works of Zionist thinkers, internal ulpan documents, and the first textbook used in the ulpan, two conclusions are drawn. First, teaching Hebrew to immigrants is in itself an expression of Zionist ideology. Second, the ulpan actively conveyed not only a general Zionist ideology, but a particular Labor Zionist ideology. As a program that has trained millions of immigrants to Israel since its inception in 1949, the findings of this study could have ramifications not just on Hebrew education, but Israeli social, cultural, and political institutions.

Finkel, Alyse

Does Varying SES Affect /aj/-Monophthongization?
Faculty Mentor: Dr. Marjorie Pak, Linguistics
Co-Authors: Abigail Kahn

Abstract:
The goal of this study was to look at the rate of /aj/-monophthongization before voiced obstruents (stops, fricatives, affricates) in Atlanta in terms of socio-economic status (SES). The way it was decided to distinguish between the social classes largely correlates to William Labov’s famous New York Department Store study. While Labov separated the New York social classes into three social classes, this study had four social classes: upper class (Phipps Mall), upper-middle class (Lenox Mall), lower-middle class (Northlake Mall) and lower class (North DeKalb Mall). These distinctions were based on the anchor stores of each mall and its perception within the community. Thirty tokens were collected randomly from each mall and the rates of monophthongization were interpreted based on gender, age, ethnicity, and role (merchant or shopper). The hypothesis for this study was that the dependent variable, /aj/-monophthongization, would increase in the lower classes (Northlake Mall and especially North DeKalb Mall). The results show that the rate of monophthongization increased for the two lower class malls, Northlake and North DeKalb. However, there are many other factors that affect monophthongization that would need to be controlled for in order to make any clear conclusions about the effect of SES on monophthongization.
rates, most importantly ethnicity, due to the fact that /aj/-monophthongization is also a feature of African American Vernacular English. Therefore it is possible that the increased rates of monophthongization could be due to increased rates of tokens from African Americans and not solely due to decrease in SES.

Heaton, Hayley

Charm or Harm: The Effect of an American Southern Accent on Attitude and Comprehension
Faculty Mentor: Dr. Lynne Nygaard, Psychology

Abstract:
The main purpose of this project is to examine how context influences attitudes towards and comprehension of standard-accented and Southern-accented speakers. I am interested in the range of attitudes and judgments we form about how people speak and how these perceptions interact with what the person is saying. Participants listened to passages with either neutral or stereotypically Southern content spoken either in an American Southern English accent or a Standard American English accent. Following the passage, measures of passage comprehension and attitude towards the speaker were administered. Results indicated that attitudes clustered into categories of status and solidarity, in line with prior research. Passages with neutral content were rated higher in status compared to Southern-stereotyped passages. Southern-accented speakers were rated higher in solidarity and standard-accented speakers rated higher in status. Interactions between content and accent indicated standard speakers were more sociable, likeable, and cheerful when talking about Southern content. Comprehension was not affected, despite Southern-accented speakers being rated significantly less comprehensible in pilot tests.

Mathur, Nihar

Sound Symbolism: The Relation of Sound to Meaning in Spoken Language
Faculty Mentor: Dr. Lynne Nygaard, Psychology
Co-Authors: Lauren E. Clepper, Lynne C. Nygaard

Abstract:
The sound structure of spoken language is widely assumed to bear an exclusively arbitrary relationship to meaning. However, recent research in sound symbolism has shown that listeners are sensitive to sound-to-meaning correspondences that appear to occur cross-linguistically. The current study aims to evaluate potential correspondences between inventories of certain types of phonemes and particular semantic domains. Antonyms from different semantic domains, such as motion (fast/slow) or shape (round/pointy), were recorded from native speakers of ten different languages. Participants with no prior knowledge of the languages were presented with the sets of antonyms and asked to guess their meanings. Phonemic transcriptions of words that were identified as sound symbolic were analyzed to determine if the phonemic profiles would differ as a function of meaning. In general, the relative distribution of consonants distinguished words meaning fast or
slow, while vowel roundedness distinguished words meaning round or pointy. These findings illustrate a reliable sensitivity to the mapping of certain speech sounds to certain semantic domains.

Pizzo, Presley

**Typology of Sonority Sequences in Word-final Consonant Clusters**
Faculty Mentor: Dr. Rina Kreitman, Middle Eastern And South Asian Studies

**Abstract:**
Syllable structure across languages appears to be governed by a Sonority Sequencing Principle that states that sonority must fall in syllable codas. However, this principle does not hold for all syllables in all languages. In this study, I examine the word-final biconsonantal clusters of 178 languages in order to find the distribution of syllable codas that violate this principle. I use the typology of languages studied to demonstrate that violations of this principle do not occur randomly, but rather, according to an implicational relationship where the presence of violations implies the presence of compliant codas. Using the framework of Optimality Theory, I show how universal, violable constraints can model this implicational relationship. However, the typology also shows that the Sonority Sequencing Principle does not explain all of the data, as there is a unidirectional implicational relationship between clusters that violate this principle equally. I conclude that this relationship is due to a universally fixed ranking between constraints on the sonority of single positions in the syllable.

Prichard, Hilary

**Linguistic Variation and Change in Atlanta, Georgia**
Faculty Mentor: Dr. Susan Tamasi, Linguistics

**Abstract:**
In spite of its unique position as a fast-growing urban metropolis in the heart of the South, little research has been conducted to uncover the effects of Atlanta’s rapid growth on the speech of its native population. In this thesis, I present evidence for the current state of linguistic variation and change in Atlanta, Georgia. I draw on regional data found in past linguistic atlas projects and utilize a variety of sociolinguistic methods to assemble a data set in which both apparent-time changes and variation can be observed. I decided to focus on vowel features, looking for evidence of the Southern Shift.

To study Atlantan speech, I conducted two different types of interview. The first was a rapid and anonymous interview, in which I collected data from 59 speakers focusing on the pronunciation of /aj/ before voiced consonants, as well as collecting data from 11 speakers focusing on the pin/pen merger. I found that black speakers had a significantly higher rate of /aj/ monophthongization than white speakers, and that overall rates of /aj/ monophthongization varied between different neighborhoods. The second type consisted of a longer conversation-style interview followed by a reading passage, which was conducted with five white native Atlantans. From acoustic analysis of these interviews, I found that the older speakers used more features associated with the Southern Shift.
Shift than the younger speakers, but that none of the speakers exhibited a fully-shifted vowel system. So while this shift has affected Atlantans, the extent has varied by social group.

**Sumiuchi, Sho**

**Ethnographic analysis of online political discussions: forging political identity through insults**
Faculty Mentor: Dr. Debra Spitulnik, Linguistics

**Abstract:**
In this study, I set out to investigate how participants of online political discussions expressed and manipulated their political identities through insults attacking the opposing candidate. I observed the activities in political discussion sites during key events of the 2009 Presidential Election, including Presidential Debates and Obama’s victory speech on the election day. Close observation revealed a pattern of “recycling” of popular phrases to attack the opposing candidate, in which participants pick up the motif and reproduce multiple comments in short bursts. I argue that such group activity creates a common experience for the participants and reinforces their group political identity, much like what recycling of group-identified phrases do in real world. Furthermore, I argue that this phenomenon is part of a larger "sociodrama” that is the quadrennial Presidential election, as discussed by McLeod (1999).

**Waller, Alessia**

**Il Toscano Non E’ Un Dialetto: Variation in Italian Language Attitudes**
Faculty Mentor: Dr. Susan Tamasi, Linguistics

**Abstract:**
Italy is home to one standard and many regional dialects. The standard variety, Italian, has enjoyed a relatively recent and widespread proliferation, yet until about 1950, most Italians grew up speaking regional dialects (many of which are mutually unintelligible). Here, I present an examination of how Italians evaluate their country’s dialects in terms of beauty, prestige and similarity to codified Italian. Specifically I examine how respondents’ age and region of origin shape their perception of dialects. To answer this question, 530 respondents from three regions of Italy (Veneto, Tuscany and Campania) performed a map-coloring task based on methodology pioneered by Preston (1989) in language attitude research in the United States.

The results of my research showed that 1) respondents did not always rate their local region positively for judgments of beauty and/or prestige, 2) linguistic judgments reflected North-South cultural stereotypes, and 3) younger respondents associated more strongly with Italian than with their local dialect.

I did not expect the dialect of Tuscany to be rated so overwhelmingly positively by the majority of respondents, even at the expense of their own local dialect. These results led me to conclude that the
linguistic situation of Italy warrants a different paradigm than the “correct” vs. “pleasant” one used by Preston in the United States, and that these data can be best understood within the context of the changing relationship between Italian and regional dialects.