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Greetings!

Spelman College is proud to present this collection of winning student abstracts from Research Day 2016. This is an important time for the College, when we pause to celebrate the wonderful ideas and work that Spelman students are generating.

In this year’s competition, over 250 students submitted oral, poster, and creative presentations, representing a new high in student participation. The 60 winning presentations profiled in these pages are those projects judged to be the most outstanding this year.

Research Day has a long and proud history at Spelman. For 25 years now, we have showcased student talent in an annual public conference. Begun as “Science Day” in 1989, we now invite students in all academic departments and programs to submit research and creative projects for Research Day.

We offer sincere thanks to our sponsors, Northwestern University, Fisher Scientific, and VWR International, for the critical financial support underpinning Research Day. With the support of our sponsors, we are able to offer all of our students the experience of participating in a professionally-styled conference. Thanks also to our panels of judges, whose careful evaluations provide critical feedback to our students, enhancing their research and professional development.

Very special thanks to our engaging Research Day speakers, Lia Haynes Smith, Ph.D., C’93, associate director for laboratory science in the Center for Disease Control and Prevention division of viral diseases; and Shawn Drew Gaillard, Ph.D., C’91, program director in the National Institutes of Health Institute of Allergy and Infectious Diseases. We appreciate your inspiring remarks and the excellent example you set for your Spelman sisters.

And finally, warmest congratulations to all of the student and faculty participants in Research Day 2016, and especially to those whom we recognize for their outstanding research and creative presentations. We are challenged by your sterling example to continue producing students who change the world through their contributions in all areas of art, science, and creative endeavor. Let’s do even better next year!

Sincerely,

Myra Burnett
Interim Provost and Vice President for Academic Affairs
ORAL PRESENTATION
WINNERS
ANTHROPOLOGY

1st Place Winner
Economic Globalization: The Winners versus the Losers in Trade Liberalization
Presenter/Author: Dana Belfleur
Advisor: Jerry Wever, Ph.D.
This paper seeks to look at globalization at the cross section of economic development and culture. It will compare the Republic of Korea and the Republic of Haiti. Why is it that two nations who share a history of colonization and have been a part of globalization long before the 1983 emergence of the term, have not seen the same economic success? Haiti has been a free nation much longer than South Korea and in fact fought for her independence yet is still stuck in cycles of poverty, underdevelopment and the inability to compete in the global economy. South Korea, who also share international relations with the United States, has been able to practice protectionism to boost their economy and compete internationally, they house several successful multinational corporations such as Samsung, LG and Hyundai, and have been able to provide the majority of their citizens with a better quality of life. From these brief comparisons, it is evident that Haiti has been the victim of globalization while South Korea has seemingly been a beneficiary. I will look at the roles culture and globalization play in economic development to understand if globalization favors certain nations over others.

2nd Place Winner
The Impact of Education on Entrepreneurs in Egypt and Vietnam
Presenter/Author: Jordan Daniels
Advisor: Jerry Wever, Ph.D.
There are scholars that believe entrepreneurs in developing nations only pursue entrepreneurial activities because they do not have the skills or education needed to secure employment. Another school of thought believes that people, no matter their skills or educational background, are motivated by an opportunity to engage in entrepreneurship. My research will focus how more education affects engagement in entrepreneurship within Egypt and Vietnam.

ART

1st Place Winner
Kisses and Bullets: The Nature of Prejudice
Presenter/Author: Madeleine Wood
Advisor: Joseph Bigley, MFA
Through her socially critical digital video installation, Madeleine Wood analyzes the nature of prejudice and empathy. As humans, we naturally tend to stray away from people we perceive to be different. Instead of taking the time to understand and appreciate their stories, we may have the tendency to judge and make assumptions from afar. Finding inspiration from a background in theater, she uses the character
development process to fuel her current body of work. This process involves seeking to understand another’s story as well as one knows their own, using a more empathetic, less judgmental approach. Her process involves challenging her participants to discover commonalities, rather than assess the obvious differences between themselves and a set group of individuals. How do people tend to respond, and most importantly, why do people respond the way that they do? Her current body of work shows the enamoring complexity of human behavior with examples of some of its deplorable beauty and inexplicable logic. She is able to observe the treatment as well as attempt to understand the struggles that erect aversions and proclivities aligned in the minds of the people with whom she interacts. Wood, through her work, encourages viewers to understand their own flaws in an easily digestible and thought-provoking manner.

2nd Place Winner
The Art of Reflective Practice
Presenter/Author: Kristyn McKinney
Advisor: Joseph Bigley, MFA

My current body of work deals with concepts of reflection. The Nature of Reflection is an art series based in the idea that we as individuals, as a community, and as a world at large, reflect that which we surround ourselves with, physically, spiritually, and mentally. These are the most pivotal aspects of humanity. As they have the power to shape who we are and thus what we internalize. Noting that some of our deepest connections to aspects of light, and even darkness (both literal and figurative) comes from that which we are most familiar. All of which is largely based on personal experiences. Through an abstract process, I utilize reflective materials such as copper plates, gold leaf, and glitter in conjunction with found images of people of color; to create small as well as large scale collages on various surfaces. The idea is to render a space that is reminiscent of both an astrological and earthly realm - one in which people of color interact with a light source that reflects the beauty of themselves within the universe.

My artwork explores a space where people of color, specifically African Americans, exist as both human and godlike beings covered in a shadow of the universe. A space that I often feel exists internally, but is rarely depicted in more visible spaces. I aim to shed light on the power and beauty that we possess as people of color, by engaging my audience in a visual experience of human interaction with spirituality as it may or may not pertain to them.

Biology I

1st Place Winner
FIS2-Dependent Down-Regulation of Invertase Inhibitors during Arabidopsis Seed Development
Presenter/Author: Mason Dana
Advisor: Dongfang Wang, Ph.D.

Endosperm is a large source of calories in human diets. Therefore, it is important to study the mechanisms responsible for its early growth and development. After fertilization, the endosperm goes through free nuclear divisions resulting in a non-cellularized syncytium, which is followed by a cellularized phase. Embryo growth increases dramatically after endosperm cellularization. Since invertase catalyzes the hydrolysis of sucrose into glucose and fructose, which are used as energy in plant cells, we investigated whether changes in embryo growth rate are associated with changes in invertase activity. Our data indicated that invertase inhibitors are highly expressed before cellularization and down-regulated after cellularization. Endosperm cellularization requires FIS2, which is a polycomb group protein that represses gene expression. To test whether FIS2 represses the expression of invertase inhibitors, quantitative RT-PCR was used to quantify the expression level of invertase inhibitors at different stages of seed development. The expression of invertase inhibitors was detected after fertilization in both the wild type and fis2 mutant plants. However, the down-regulation of invertase inhibitors was only observed in the wild type plants. In addition to qRT-PCR, we also analyzed the invertase inhibitor promoter activity in fis2 mutant using a promoter-GFP reporter. The promoter activity was detected during the syncytial phase and failed to be down-regulated in fis2 mutant. Our data suggested that FIS2 represses the expression of invertase inhibitors, thus promoting embryo growth after endosperm cellularization. Unlocking
the mechanisms of gene regulation during seed development could ultimately have a big impact on how we grow our crops.

1st Place Winner

Resistance?

Presenter/Author: Amonie Robins
Advisor: Mentewab Ayalew, Ph.D.

Atwbc19, is a plant gene which encodes an Arabidopsis thaliana ATP binding cassette (ABC) transporter and confers antibiotic resistance in transgenic plants. Due to the nature of the gene’s function, it is a more preferred marker in the practice of transferring genes of interest into plants. The experimental goal is to discover if there are other such transporters in plants. Topo 4 along with three other rice genes were found to be homologs of the Atwbc19 gene. Identification of these homologs was done via NCBI and ClustalO. The focus of this experiment is to discover if the rice gene, Topo 4, will also confer kanamycin resistance. To discover this, Topo 4 was cloned via recombination cloning by the Gateway System, then preliminary testing on the plasmids was done via digestion and Gel Electrophoresis. The plasmid which contained the gene Atwbc19 was used as the positive control and the negative controls were plasmids containing green fluorescent proteins (GFP). The plasmids were then infiltrated into tobacco plants leaves via Agrobacterium tumefaciens and tested for kanamycin resistance. The comparison of transformation efficiencies for the negative and positive controls, with the gene of interest, Topo 4, will allow us to determine if Topo 4 confers kanamycin resistance and if it is an ortholog of Atwbc19. If other ABC transporters conferring kanamycin resistance are discovered in plants, it will lead to an increase in working with transgenic plants in a more effective way.

2nd Place Winner

Determining the Factors Affecting Metric Proficiency and Scientific Literacy and Attitude.

Presenter/Author: Kierra Parker
Advisor: Hong Qin, Ph.D.

Scientific literacy (understanding of basic and fundamental science concepts) and scientific attitude (general positivity, open mindedness and willingness to consider scientific fact) has become a growing concern with the scientific community, not only for students
and members of the scientific community but the populace in general. The specific factor(s) that affect scientific literacy and attitude has yet to be understood. A specific component of scientific literacy called metric conversion, involves the use of simple math to convert a numerical value into a proper scientific unit. In this study, we report a positive correlation between country of origin and scientific literacy, as well as identify scientific attitude and highest degree received as influential factors of positive scientific attitude, metric proficiency and scientific literacy. Our study support the argument that reduced exposure to metric conversion in the U.S. compared to the rest of the world have a negative impact on attitude toward science.

Biology II

1st Place Winner
Identification of Commissurally Projecting Neurons from the Entorhinal Cortex
Presenter/Author: Asha Cotterell
Advisor: Dongfang Wang, Ph.D.
Mesial temporal lobe epilepsy (mTLE), is a common neurological disorder characterized by spontaneous, recurrent seizures that arise from the temporal lobe, and a characteristic pathology known as hippocampal sclerosis. In a newly developed animal model of mTLE that replicates the defining features of mTLE observed in humans, spontaneous granule cell layer activity and seizures appear to be synchronous across both hippocampi after injury. The source of this synchrony is unknown. Therefore, understanding the connectivity between the structures of the hippocampal formation, such as the anatomy of the commisural projections, may provide insight into understanding the disease process. In this project, we investigated the anatomy of the commisural projections between the entorhinal cortex and the hippocampus using immunohistochemistry techniques. The concentration of anti-Fluoro-Gold antibody was optimized to allow the identification of the neurons within the entorhinal cortex that project commissurally to the dorsal hippocampus.

2nd Place Winner
How Does Probiotic Affect Immunological Function in Zebrafish?
Presenter/Author: Chezlyn Patton

Advisors: Mentewab Ayalew, Ph.D.; Andrew King (Royal Veterinary College, London, England)
The collapse of ecosystems is partially prevented through the maintenance of relationships, many of which are symbiotic. Symbiosis accounts for the thriving of many species. Interactions taking place in the microbiome of complex eukaryotic organisms are remarkable examples of successful symbiotic relationships. The microbiome, consists of various strains of bacteria, some being commensal, some pathogenic, and others beneficial. Beneficial bacteria administered to boost immunological function are called probiotics. These bacteria impact immunology by outcompeting pathogenic species, while benefiting from the habitat provided by the host. Probiotics were fed to zebrafish embryos in order to provide more insight into how they affect the immune system. A series of experiments were conducted in order to confirm probiotic presence, and then measure how the immune system was affected. Fluorescent imaging and agar medium plating were used to confirm probiotic absorption, while histology staining, PCR, and microinjection with pathogenic bacteria were utilized in an attempt to measure any immunological response. Because probiotics are beneficial bacteria, it is expected that they will positively affect immunity. Though somewhat inconclusive, our preliminary results provide information about how probiotics containing Bacillus could affect immunological function. These new insights could aid in the advancement of aquatic animal health and ecosystems.

Biology III

1st Place Winner
Monitoring the Quality of European Hake (Merluccius merluccius L.) Fillets at Different Freezing Conditions Known to Inactivate Anisakis Larvae
Presenter/Author: Kaycei Moton-Melancon
Advisors: Mercedes Careche, Ph.D.; Isabel Sanchez-Alonso, Ph.D. (Instituto de Ciencia y Tecnología de Alimentos y Nutrición); Cristina De Las Heras, Ph.D. (Instituto de Ciencia y Tecnología de Alimentos y Nutrición)
Oral Presentation Winners

Anisakis simplex is a parasitic nematode, which can accidentally infect humans that consume raw or undercooked infected fish. Freezing of fish is one of the methods that kills Anisakis larvae, but it is important to define with precision at which point the parasites are no longer infective since a too short treatment may lead to health problems, but too extensive treatments may cause quality problems and economic losses. The objective of this work was to study the quality of hake (Merluccius merluccius L.) muscle as affected by freezing conditions previously found sufficient to inactivate Anisakis. Fillets were frozen at three different freezing rates up to -20 °C in the thermal center. They were kept at this temperature and analyzed after 24 hours and 7 days. Low-Field Nuclear Magnetic Resonance and Water Holding Capacity were monitored as measurements of fish quality. Anisakis simplex viability of artificially infected fish treated under these freezing conditions was also evaluated. For that, pepsin digestion, ultraviolet light recovery, mobility of larvae, and agar penetration test were monitored. Finally, a sensory triangular test was performed to test the consumer's ability to distinguish between fresh and frozen fish. Results showed faster freezing rates maintained the quality of the fish while effectively eliminating the Anisakis. There were significant differences between fresh and frozen fish, so that at least 22% of the consumers can distinguish this difference with a 95% confidence level. These results can help in refining current fishery legislation and increase marketability of fish.

2nd Place Winner
Mating Types in Cochliopodium Pentatrifurcatum
Presenter/Author: Keira Williams
Advisor: Yonas Tekle, Ph.D.

Microbial eukaryotes like amoebae have been and still are viewed as asexual organisms. However, current research suggests that some species of amoebae may participate in sexual-like, or "parasexual" activity. Such interactions are termed parasexual because the conventional stages seen during meiosis are not observed. Nevertheless, an exchange of genetic information, one of the principal characteristics of sexual activity, has been speculated to occur in some amoebozoans such as Cochliopodium. The reason and mechanism for this activity still remains unknown due to the complex and diverse parasexual life cycles in amoebozoans. In this investigation, the amoeba species Cochliopodium pentatrifurcatum was observed for a type of parasexual activity termed fusion, in which the plasma membrane and the nuclei of the cells come together, and then the subsequent activity termed fission, in which the fused amoeba, also known as plasmodium, splits apart into smaller individual cells. The mechanism for fission as well as the behavior of the cells post fission is poorly understood; hence, the focus of this investigation. In order to investigate post fusion activity, cells resulting from fission were used to grow monoclonal cultures, and these cultures were stained and "mixed" to determine if there is a trend in fusing frequency. In addition to this, we also investigated the existence of gametes in the form of small nuclear sized mini-cells. Currently, no "mating types" have been indicated in Cochliopodium pentatrifurcatum due to staining difficulties; however, fusion and fission have been observed in C. pentatrifurcatum cells and is believed to occur through various different mechanisms. Our results show that Cochliopodium can engage in various forms of parasexual activities including formation of nuclear sized gametes.

Biology IV

1st Place Winner
Characterization of ZC3H14/Nab2 Physical and Genetic Interactions with the THO Complex in Saccharomyces cerevisiae Mammalian Cell Lines
Presenter/Author: Jasmine Moody
Advisors: Anita Corbett, Ph.D.; Kevin Morris (Emory University School of Medicine); Milo Fasken, Ph.D. (Emory University School of Medicine)

RNA-binding proteins are tasked with the major responsibility of regulating the co- and post-transcriptional events of gene expression. Impairments to this process can result in human disease including intellectual disability (formerly termed mental retardation). Previous studies of the budding yeast orthologue of ZC3H14, Nab2, have defined physical interactions between the
Spelman Research Day

N-terminal domain of Nab2 and proteins located at the inner face of the nuclear pore. This finding has led to the suggestion that Nab2/ZC3H14 coordinates RNA processing and export. Endogenous ZC3H14 was immunoprecipitated from the nuclear fraction of mouse brain. From this approach, numerous RNA processing factors were identified including the entire Tho complex. We have validated the interaction between ZC3H14 and Tho components. Our preliminary studies suggest a model where ZC3H14 could mediate interactions with components of the Tho complex and then facilitate nuclear export. Mass spectrometry data identified AMPD2 as the protein most co-enriched with ZC3H14 purified from mouse brain. Data from the Human Protein Atlas demonstrates that both AMPD2 and ZC3H14 proteins are present in the cerebral cortex, lateral ventricle and cerebellum. Our recent discovery of AMPD2 in complex with a nuclear RNA binding protein suggests an additional and uncharacterized function of AMPD2 suggests an additional function for AMPD2 that could be more linked to other forms of PCH disease, which are typically caused by mutations in RNA binding and processing factors. Characterization of these two proteins will provide important implications for understanding the mechanisms that facilitate the expression of both ZC3H14 and AMPD2 proteins.

2nd Place Winner
Preventing Bird Strike Fatalities on Spelman College’s Campus
Presenter/Author: Taylor Hunter
Advisors: Jennifer Kovacs, Ph.D.; Mark Maloney, Ph.D.

Birds striking the window have been found to be a continuous problem at Spelman College. Every year an increasing amount of dead birds are found all across the campus. This semester I will be looking into the different species of birds that die due to the collision with the window. I will be concentrating on the number of birds, the species, and the specific reason on why these particular birds are striking the window, as well as the best method of prevention to limit the amount of birds striking the window at Spelman College. There are two main reason birds will strike a window here on campus, one reason may be due to the reflection of trees on campus, and the second reason could be due to the vast amount of plants inside the buildings next to the windows. If there seems to be more dead birds near the windows with plants near them, the conclusion can be drawn that more birds collide with the window that have plants inside, instead of the reflection of the trees on campus. Moving the plants away from the window can be one method of preventing the birds from striking the windows. This project can ultimately reduce the amount of birds that die every year in urban areas, more specifically the birds that die every year right here on Spelman’s campus.

N-term
Chemistry I

1st Place Winner
Comparison of Cellulose Derived Composite Fibers and Biomass Pretreatment Techniques for Biofuel Production
Presenter/Author: K’yal Bannister
Advisor: Juana Mendenhall, Ph.D. (Morehouse College)

The conversion of biomass derived from perennial grasses (arundo donax, pennisetum purpureum, and panicum virgatum) to biofuels presents a viable energy alternative to fossil fuels. The physiochemical environment required to convert biomass to biofuel is dynamic, often involving changes in temperature, pressure, and pH, whose effects may lower the efficiency of the biofuel production process. Hence, there is a need to develop systems that optimize this dynamic environment. To address this challenge, this research study investigated the fabrication of nanofiber substrates containing poly(n-vinylcaprolactam), a thermoresponsive polymer attractive to biofuel production due to its lower critical solution temperature (LCST). By exploiting the LCST of PVCL, the physiochemical environment used to extract cellulose from perennial grasses was controlled. This research study also investigated various chemical strategies for extracting cellulose from perennial grasses. Two chemical strategies, dilute acid pretreatment and ionic liquid extraction, were employed to determine the highest yields of extracted cellulose (EC). After extraction, the cellulose yields were analyzed using Fourier Transform Infrared (FTIR) microscopy and Differential Scanning Calorimetry (DSC). Using electrospinning, PVCL and EC were combined to create nanofibers and compared to previously prepared PVCL nanofibers containing alpha-hydroxypropyl cellulose and cellulose acetate. The combination of FTIR and SEM microscopy determined the morphology and spatial and temporal location of lignocellulose in PVCL nanofibers showing unique structural integrity. Future work includes studying the enzyme degradation of PVCL-EC fibers to further understand the degradation rate and thermoresponsive capabilities of composite PVCL fibers.

2nd Place Winner
HCN: A Plausible Precursor of DNA and RNA Nucleobases on Primitive Earth
Presenter/Author: Sofia Walton
Advisor: Yassin Jeilani, Ph.D.

In the past 50 years, there has been a concerted effort for identifying a unified mechanism for the abiotic origin of the biomolecules but with little success. We recently reported the free radical pathways for the production of nucleobases from small molecules such as formamide. These pathways predict the formation of both RNA and DNA nucleobases. In the present theoretical study, we identified two prominent precursors for the building up of RNA and DNA nucleobases under prebiotic conditions: (a) 1,2-diaminomaleonitrile (DAMN), which is a tetramer of hydrogen cyanide (HCN), and (b) formamide, a hydrolysis product of HCN; it is important to emphasize that HCN is the source of both precursors. We find that free radical pathways are potentially appropriate to account for the origin of nucleobases from HCN. The pathways for the formation of the RNA and DNA nucleobases were studied by quantum chemical computations using density functional theory (DFT) at the B3LYP/6-311G(d,p) level. The results show that all the routes proceed with relatively low energy barriers. The free radical pathways are potentially appropriate for accounting the origin of nucleobases from HCN. The DFT results show energetically feasible routes that allow the incorporation of HCN as the building block for nucleobases. The results demonstrated that both DAMN and 4-aminoimidazole-5-carbonitrile (AICN) are products of HCN. This study makes significant contributions to understanding the HCN chemistry relevant to the formation of biomolecules on primitive earth as well as in extraterrestrial regions. The overall mechanisms are internally consistent with the abiotic formation of the nucleobases, namely (a) under a meteoritic impact scenario on the early Earth’s surface that generated high internal energy, and/or (b) in the (gas phase) interstellar regions without the presence of catalysts.
CHEMISTRY II

1st Place Winner
The Beta Pen: A Hand Held Device to Investigate Beta Contamination
Presenter/Author: Ebone Monk
Advisors: Bjorn Seitz, Ph.D.; Natarajan Ravi, Ph.D.
Silicon Photomultiplier (SiPM) detectors are investigated throughout the world as a suitable replacement for the traditional vacuum based PhotoMultiplier Tubes (PMT), used to detect radiation of various types. The SiPM detector offers unique applications, otherwise not possible with PMT detectors, due to its size, operational voltage, production cost, and quantum efficiency. Recent development of SiPM detectors has shown significant improvement in energy range, time resolution, and overall detection efficiency. The current study is undertaken to identify and test a novel scintillating material with small photon area detection system to provide a pilot study of its uses. The study is performed with a beta radiation detector comprised of the latest generation SiPM detectors from KETEK coupled with plastic scintillation material. A scintillation material (2mm x 2mm x 5mm) and an active plane (2mm x 2mm) of the KETEK PM 2250 silicon photomultiplier are used for the assembly of the device. This study resulted in the successful fabrication of a hand-held device, currently dubbed as Beta-Pen, to identify beta-radiation with applications ranging from food monitoring to radio-guided surgery.

2nd Place Winner
Mechanics of Heavy Rope and Chain
Presenter/Author: Micah Henson
Advisor: Steven Roper, Ph.D.
Most introductory physics courses cover how to approximate the motion of 1-pendulum using Newton’s laws. However, applying this approximation to understanding n-pendulum system is much more difficult. The goal of my research is to calculate the motion of n-pendulum so that it can be used as a model for heavy ropes and chains. In order to reach this goal, I sought to gain a better understanding of Lagrangian mechanics by applying it to the 1-pendulum and 2-pendulum (coupled). I calculated the kinetic energy, T, and the potential energy, V, to form the Lagrangian, L = T – V. Then, I calculated the Euler-Lagrange equation of motion, (d/dt) (∂L/∂θ’) – (∂L/∂θ) and simplified to use it in Matlab. Finally, I used the built-in ode45 function of Matlab and input initial conditions and the equation of motion derived to create a simulation of the movement of the n-pendulum.

COMPUTER AND INFORMATION SCIENCES

1st Place Winner
MTOTO-BEBE: Supporting Knowledge Sharing for Women Living in Rural Developing Economies
Presenter/Author: Jaya Johnson
Advisor: Jakita Thomas, Ph.D.
One of the most critical interventions for safe motherhood is to ensure skilled care is provided by skilled professionals during pregnancy and childbirth or, in the absence of skilled professionals, that women are informed about pregnancy, the signs of pregnancy complications and have safe approaches for overcoming them. Our previous research around engaging women from Laare, Kenya, a rural town in central-eastern Kenya, has revealed many insights that undergird this project. We learned that the overwhelming majority of women in Laare had access to a smartphone, suggesting that mobile phones would be an ideal platform for providing access to pre- and post-natal information. Women in this community also depended more on other women in the community for this information than they did skilled birth attendants suggesting that, in addition to expert pre- and post-natal information, a mobile app intervention should also include opportunities for women to have access as well as contribute to the social capital that exists among women in the community. This presentation focuses on the last insight. We have designed and implemented an infrastructure and user interface for MTOTO-BEBE to support Kenyan women as they share their motherhood experiences. We explore the following research questions: 1) What are the best practices for developing mobile applications for women in developing regions with no/low literacy that allow them to share their motherhood experiences? 2)
How do those best practices inform the expansion of MTOTO-BEBE through the design and implementation of an infrastructure to support knowledge sharing among Laarean women.

**2nd Place Winner**

*Enhancing a Physically Engaging Video Game through the Integration of Augmented Reality*

**Presenter/Author:** Simone Smarr  
**Advisor:** Jerry Volcy, Ph.D.

The foundation for this research is the desire to help hospitalized children, specifically those who are limited to a confined area during treatment. The children can suffer from additional problems due to isolation and limited opportunity for physical activity. In an effort to address this, a physically engaging video game for children using robotics technology was developed. The game uses a set of exercise bicycle pedals, a video game steering console and a video monitor to help participants control a remotely operated hand-size robotic car. In an attempt to enhance the user experience of the game we have integrated an augmented reality aspect to the game which will mix real and virtual content. To do this a frame grabber and augmented reality processor has been added to the existing set up of the game. Using the ARToolKit augmented reality framework, a set of markers are positioned along the travel path of the remotely controlled robotic vehicle. When the vehicle’s on-board camera detects the markers, the augmented reality components are triggered. Preliminary results include the augmenting of the captured video with a virtual “finish line”.

**2nd Place Winner**

*Bridging the Gap: Female College Students’ Perception of a Spanish Language Learning Video Game*

**Presenter/Author:** Honesty Nealy  
**Advisor:** Yolanda Rankin, Ph.D.

Prior research indicates that various gaming platforms such as mobile devices, virtual worlds, and Massively Multiplayer Online Role Playing Games serve as alternative yet effective pedagogical tools for language learning (Peraira 2010; Holden & Sykes 2011; Rankin et al 2009; Chik 2012). Though existing research has primarily focused on the impact of in-game social interactions between players and computer generated characters on students’ foreign language acquisition, less is known about how diverse groups of players perceive their gameplay experiences. After purposefully recruiting female college students for a game study, we present a case study that examines female college students’ perceptions of the Spanish language learning video game “Big Bad Spanish” (BBS). Our research poses the following questions: (1) “How do African American female college students characterize their gameplay experiences of a Spanish language learning video game and why?” (2) “How do we create a language learning video game that will appeal to a diverse audience of players?” The case-study results indicate that a majority of female college students enjoy games such as BBS, because of the player’s interaction with characters who resemble real citizens from Spanish speaking countries and the idea of using video games as a learning tool. Student suggested improvements to BBS include: (1) Multidimensional game generated characters; (2) Customizable avatars; (3) Interactive storylines; (4) Spanish cultural practices. These preliminary findings inform the design of a language learning video game prototype designed to facilitate college students’ Spanish conversational skills.

**Comparative Women’s Studies, Philosophy, Religious Studies and Sociology**

**1st Place Winner**

*What Evidence Is There that Concepts of the Structure of Christianity Derived from African Religious Traditions?*

**Presenter/Author:** Alleyah Caesar  
**Advisors:** Rosetta Ross, Ph.D.; Alicia Fontnette

How much do we really know about the structure of Christianity? Over the course of two months, I conducted research on the notion that concepts of Christianity’s structure derived from African religious traditions. I reviewed seven literature sources and interviewed Professor Alicia Fontnette to gather evidence for my hypothesis. My hypothesis was that elements of Christianity indeed derived from African religious traditions. While this process was time-consuming, it did grant me the privilege to acquire
knowledge on a subject many do not know about. I found out that many concepts of Christianity were preceded by and resonate with concepts that came from all over the continent of Africa. From the idea of God to what is believed about the afterlife, Africa is often not credited with contributing to Christianity’s inception. Overall, I am grateful for the knowledge provided to me and the opportunity to explore a topic about which I have always wondered.

**ECONOMICS AND POLITICAL SCIENCE**

1st Place Winner
“Children See, Students Do: The Effects of Political Exposure on Voter Turnout in African-American College Students”
Presenter/Author: Marica Wright
Advisor: Unislawa Williams, Ph.D.

The literature surrounding college students’ voting behavior points to the fact that young African-Americans are a crucial piece of the puzzle when it comes to voter turnout and election results for several reasons. For example, though this literature explores several perspectives on what affects voter turnout among African-American college-aged voters, the effect of political exposure is under examined. This study hypothesizes that political exposure in childhood years affects one’s decision to engage in the political process when the individual becomes of age to vote. Synergizing existing research on college students and their voter turnout as well as analyzing existing data on political exposure in childhood is the best way to answer this question, and this will be accomplished through extrapolating conclusions from existing survey data. This research is relevant because younger voters are becoming a target group for candidates in local, state, and national elections. If younger voters’ behaviors, attitudes, and desires can be better understood, lawmakers can better figure out how to bring these voters to the polls and create the best possible solutions for the problems they care about through policy.

**EDUCATION AND WORLD LANGUAGES AND LITERATURE**

1st Place Winner
A Cultural Approach to Japanese Language Education
Presenter/Author: Akiyo Umesaki
Advisor: Xuexin Liu, Ph.D.
This project presents an effective approach to teaching Japanese language in relation to Japanese culture. American students are often daunted by Japanese due to its three different writing systems and a grammar that is completely different from that of English. An additional obstacle for the Japanese language learner is limited access to the language and contact with native speakers outside of the classroom. This lack of immersion makes learning more difficult and demotivates students. Nevertheless, the number of Spelman College students who take Japanese courses has consistently increased for several consecutive years. Xuexin Liu’s survey on the Atlanta University Center students’ interests and needs in learning Japanese indicates that most students are interested in Japanese pop culture such as anime (Japanese cartoons), manga (Japanese comics), and TV dramas as well as Japanese traditional culture. In consideration of students’ feedback, Liu has developed a cultural approach to teaching Japanese in the American context. Some components of this approach include learning Japanese language and culture from anime, movies, songs, dance, and calligraphy, and utilizing new technologies such as the Internet and calligraphy with water. Various Japanese cultural events and regular language exchanges also enable students to experience Japanese culture and use the language in a more natural environment. This immersive approach further motivates students’ interest in Japanese language and culture, strengthens their language skills, and increases their intercultural awareness and competence. Learning a foreign language in its cultural context is methodologically effective for students’ sustained interests and language learning success.

ENGLISH I

1st Place Winner
Giving Voice to the Silent: Social Media and the Black Woman’s Experience of Depression
Presenter/Author: Tiffany Pennamon
Advisors: Stephen Knadler, Ph.D.; Erica Edwards, Ph.D. (University of California, Riverside)
The purpose of this study is to analyze the ways Black women use the emerging sites of online media to redefine their experience of depression. For centuries, Black women have had to internalize depression for fear of being seen as weak. Stereotypes such as the “Strong Black woman” have perpetuated the idea that vulnerability is inherently bad, and that any Black woman that publicly identifies as depressed is weak. This rationale perpetuates suffering in silence when many women are in need of mental health care and supportive communities. For some women, blogging has become the outlet they use to validate and take control of their experiences. This project investigates whose depression story gets told and in what ways through the intimate public spaces of blogs. The study conducts case studies of Black women bloggers—in blogs and other forums—that have openly reconstructed their own definitions of depression. Sites such as the tumblr Depressed While Black by Imade Nibokun will serve as the foundational blog, as the parts of an image. In our image processing research, we focused on two simple optimization methods—the gradient descent method and the accelerated gradient descent method—to solve total variation based image denoising and image inpainting models. The total variation regularization is very effective in image processing since it is able to maintain the sharp edges in the image while it suppresses the noise. We were able to code both algorithms and explore the relations between the choices of parameters and the convergence rate. In our experiments, we observed that both algorithms are effective, but the accelerated gradient descent was almost three times faster in terms of reduction of energy value versus processing time/number of iterations. In the future I hope to apply the accelerated gradient descent method to parallel magnetic resonance imaging.

ENGINEERING AND MATHEMATICS

1st Place Winner
Gradient Descent and Image Processing
Presenter/Author: Veronica Fulton
Authors: Rachel Shore, Michael Mbaba
Advisor: Maryam Yashtini, Ph.D.
The purpose of image denoising is to reduce the noise and overall variation in an image or signal while image inpainting is to fill in some of the missing or degraded
author gives insight into the intersectional oppressions Black women face as they also experience depression. These limiting situations—being Black, a woman, and depressed—which hold stigmatizations of their own—interlock and create a perimeter where Black women often become silenced within the medicalized discourse and cultural myths of depression. In this intimate public sphere, the women's acts of "radical self-care" become more than therapeutic by potentially having larger cultural and political transformative possibilities in the ways they challenge gender and racial inequalities.

2nd Place Winner
The Key to a Better Future: An Analysis on How Speculative Fiction Promotes Self-Transcendence
Presenter/Author: Jade Sigler
Advisor: Tarshia Stanley, Ph.D.
The purpose of my research is to demonstrate how the study of speculative fiction stimulates the imagination and helps to awaken self-awareness which in one key to self-transcendence. My research is influenced by Octavia Butler's short story, "The Book of Martha," in which God asks Martha, the main character, to decide one thing to change in the world in order to save humanity. Martha chooses to give human beings "unavoidable, vivid, and satisfying dreams." My research examines and aligns Martha's choice with our naturally occurring ability to daydream. Daydreams are activated by imagination and happen in a conscious state and can occur suddenly when struck by inspiration. Butler refers to this happening in the "The Book of Martha" when God states that, "people will read for information and for ideas, but they'll create their own fantasies." Hence, my research explores how the understanding and utilization of the redemptive side of imagination can lead to the production of individual dreams that can help to produce self-transcendence, which benefits not only individuals but entire communities.

ENGLISH II

1st Place Winner
Homelessness in Children's Television: The Necessary Delinquent Sentenced to Social Death
Presenter/Author: Ariana Brazier
Advisors: Patricia Ventura, Ph.D.; Stephen Knadler, Ph.D.
I have analyzed presentations of homelessness in Nickelodeon's Hey Arnold!, and Cartoon Network's Amazing World of Gumball, and Regular Show, in order to discuss the implications of children's television's simplistic characterizations of class. Neoliberal ideology successfully functions in these shows as the homeless are stereotypically depicted as flat characters without depth or purpose. This one-dimensional characterization rooted in the false perception of the undeserving poor allows for the television audience to remain socially and emotionally disconnected from the homeless. I conducted my research by utilizing a cultural studies approach and systematically watching the different series in order to conduct a thorough examination and critique of the text. Arguably, television portrayals juxtapose the homeless, who appear to be lacking material wealth and social status, against ideal neoliberal citizens, who visibly contribute to their communities through education and labor. Essentially, I argue that the erroneous portrayals of homelessness in children's television serve as a site of deployment for neoliberal ideologies that exclude America's homeless on the basis of their socioeconomic and behavioral deviance. This form of neoliberalism necessitates the social death of the homeless in order to define and maintain the social norm. The homeless are at best castigated and at the worst, socially assassinated for the benefit of the controlling neoliberal community.

2nd Place Winner
The World is Not Enough: Commanders, Spies and Masculinity
Presenter/Author: Karys Belger
Advisor: Stephen Knadler, Ph.D.
The purpose of my research is to explore the ways in which the masculine performances of U.S. Presidents, past and present, affected their success in foreign policy negotiations and how that performance was interpreted in film. I'll discuss the major foreign policy negotiations that took place during three separate administrations, focusing on how each man performed his masculinity and examine how that image of masculinity led to one outcome or another. I will then explore how these masculine performances were reflected in cinema, focusing on the films within
the James Bond franchise. The project is based on the work of Susan Jeffords in Hard Bodies. Using the chapter “Reagan Heroes” as a model, I will explore the way Jimmy Carter’s “soft-bodied” politics failed him in the negotiation of the Iranian Hostage Crisis and how Roger Moore’s portrayal of Bond reflected Carter’s perceived weakness in For Your Eyes Only (1981). I will then look at the “hard-bodied” masculinity of Ronald Reagan and how License to Kill (1989) reflected relations with Cuba during the War on Drugs. Finally, I will look at Spectre (2015) and the way Barack Obama’s interaction with different nations during the 2015 Climate Change Conference mirror the crisis of relevance felt by the nation. Finally, I will explore the way in which the British spy’s successes and failures during his mission reflected the public opinion about each commander-in-chief.

ENVIRONMENTAL SCIENCE AND STUDIES

1st Place Winner

Innate Lymphoid Cells Mediate Type 2 Immunity in the Lungs of Mice Repeatedly Exposed to Ozone

Presenter/Author: Kaylin White
Advisor: Lisa Hibbard, Ph.D.

High levels of ambient ozone, a common air pollutant, are associated with increased incidences of eosinophilic rhinitis and asthma in children. Repeated ozone exposures also cause eosinophilic rhinitis and nasal epithelial remodeling in mice. We have found that these nasal lesions are dependent on innate lymphoid cells (ILCs). The role of ILCs in ozone-induced pulmonary toxicity has not been previously investigated. In the present study, we determined the ILC-dependency of lung pathology caused by acute (1-day) and subacute (9-day) ozone exposure.

Lymphoid cell-sufficient C57BL/6 mice, Rag2-/- mice devoid of T and B lymphoid cells (but ILC sufficient), and Rag2-/-Il2rg-/- mice, devoid of all lymphoid cells (including ILCs) were exposed to 0 or 0.8 ppm ozone for 1 or 9 day(s) (4 h/day). Bronchoalveolar lavage fluid (BALF) was collected for inflammatory cell content and lung tissues were processed for histopathology. After acute ozone exposure, all mouse strains (ILC-sufficient and -deficient) had similar acute airway injury characterized by increased BALF neutrophils and bronchiolar epithelial cell proliferation in response to toxicant-induced cell death. After subacute exposure only ILC-sufficient mice had lung pathology that included increases of BALF eosinophils and lymphocytes, and mucous cell metaplasia of bronchiolar epithelium (type 2 immune responses). These results indicate that lung lesions in mice caused by acute ozone exposure are ILC independent, but the type 2 immune lung lesions induced by subacute exposure are ILC dependent. This study provides a plausible biological mechanism for underlying epidemiological associations of high ambient ozone and childhood asthma.

HISTORY

1st Place Winner

Soft Weapon: Cold War-Era American Propaganda in the Middle East (1947-1979)

Presenter/Author: Ayana Lindsey
Advisors: Charissa Threat, Ph.D.; Yan Xu, Ph.D.

In 1952, Jean Anouilh wrote “Propaganda is a soft weapon; hold it in your hands too long, and it will move about like a snake, and strike the other way.” When the Cold War began in the years following World War II, the United States and the Soviet Union took up arms, but these arms were often “soft weapons” used to freeze out their political adversaries and spread their own values globally. This thesis examines efforts made by the U.S. State Department and their representatives in the Middle East to influence Middle Eastern views of the U.S. between 1947, the beginning of the Cold War, and 1979, the beginning of the Iran Hostage Crisis. It focuses on how the United States produced and altered its propaganda, both in content and medium, to adjust Middle Eastern perceptions of the United States. Saudi Arabia, Iraq and Iran serve as the central focus of this study; these three nations provide the best lens for examining U.S. efforts in the Middle East because of U.S. economic interests, mainly in oil production, in the post-war period. This thesis argues that United States’ propagandist efforts to shape Middle Eastern perceptions of the United States and relations between the United States and the Middle East were tailored by American understandings of the region. Often underestimated in historic conversations on U.S.-Middle East affairs, understanding propaganda’s role in the formation of relations between the two regions allows for a better understanding of present-day interactions.
2nd Place Winner

Multifaceted Blackness: An Analysis on the Development of Caribbean Culture in the Southern United States
Presenter/Author: Whitney McCarroll
Advisor: Kathleen Phillips Lewis, Ph.D.

I have chosen to conduct my research on the cultural significance of Afro-Caribbean Americans in the Southern United States. Growing up in Texas, I had very little interaction with Caribbean people and their culture, and I have come to realize that much of this can be attributed to the false idea that Caribbean culture does not have a place in Southern American society where different branches of black culture are not always highlighted. My research seeks to answer the question: How has Caribbean culture developed in the Southern United States, a region primarily dominated by African American culture and history? Although blackness as a whole should be celebrated, it is also important to interrogate the cultural differences that exist among people of African descent. My research argues that Caribbean culture is not as prominent in the southern region of America as a result of the popular perception that homogenizes all people of African descent in the Southern USA, regardless of origin, and thus perceives their various cultures as a monolith. This notion, however, is beginning to change.

Psychology II

2nd Place Winner

Social Media: The Association between Sexual Risky Behaviors and Social Relationships among African American Women Ages 18-22
Presenter/Author: Jasmine Lucas
Advisor: Afekwo Ukuku, Ph.D.

Background: According to the CDC, blacks tend to bear the most significant burden of HIV, making up 44% of new HIV infections, while only accounting for 12% of the population. The present study will address the gap in literature on black women, their usage of social media and how this may influence their attitudes toward sexual risky behaviors and social relationships.

Methods: Approximately 150-200 black undergraduate college women will be recruited, after informed consent has been obtained, participant’s complete 4 surveys that address media usage, relationship status, attitudes towards risky sexual behavior, and knowledge about sexual health. Researchers hypothesize that women that use higher levels of social media will have more negative sexual attitudes as well as negative social relationships. Data collection is still underway.

Results and conclusions: Researchers plan to use information gathered to determine ways to decrease the negative sexual risky behaviors and social relationships that are impacting HIV/STI rates among black women.
PUBLIC HEALTH

1st Place Winner
A Qualitative Examination of African American College Students’ Experience with Unintended Pregnancy
Presenter/Author: Simone Sawyer
Advisors: Teaniese Davis, Ph.D.; Natalie Hernandez, Ph.D. (Morehouse School of Medicine)

In 2006, 49% of pregnancies in the United States were unintended; unwanted or mistimed. Unintended pregnancies can lead to various health risk, such as delayed initiation of prenatal care, premature births and negative physical/mental health effects. College students are a population that engages in risky behaviors leading to higher risk for HIV/STD’s and unintended pregnancy. As unintended pregnancy continues to remain a public health issue for college students in the U.S., it is important to examine men and women’s narratives and experiences with unintended pregnancy to better understand how they deal with this public health issue. Gaining insight on unintended pregnancy from minority students and men is important because they are often underrepresented in these research studies. The purpose of this research is to examine the narratives of unintended pregnancy among African American college men and women, ages 18-24 years old, to better understand their experiences. A total of 10 African American college students will participate in semi-structured one-on-one interviews discussing their experiences with unintended pregnancy, barriers to using contraception, relationship factors, social network influence and support. Interviews will be audio-recorded and transcribed verbatim. After transcription, interviews will be thematically coded for reoccurring themes. Data will be collected in March 2016. This research will be useful in informing intervention developments and medical professionals regarding the reproductive health needs of African American college students, in order to decrease the prevalence of unintended pregnancy.

WORLD LANGUAGES AND LITERATURE

1st Place Winner
“El Pueblo se Levanta”: Racial Solidarities and Identity Politics in the Young Lords Party
Presenter/Author: Dominique Coleman
Advisor: Fernando Esquivel-Suarez, Ph.D.

Due to the in-depth history of Puerto Rico, a Caribbean Island, Puerto Ricans established a Black Panther like style party in the 60s, a revolutionary group called the Young Lords, as a way to bring a group of oppressed people together to fight back against their colonizers and gain Puerto Rico’s independence. The Young Lords Party established a diasporic connection between two minorities in the United States, giving insight into the Puerto Rican history and the Puerto Rican Movement that involves slavery, objectifying and dehumanizing Puerto Ricans, a similar history of the Blacks/African Americans. I will be analyzing the published work of collective essays by the Young Lords called Palante as well as “Ideology of the Young Lords Party”, analyzing the documentary series “Palante, Siempre Palante! The Young Lords”, and last but not least another documentary “El Pueblo Se Levanta” as they discuss these claims.

1st Place Winner
Salsa, Samba, and the Objectification of Women
Presenter/Author: Jordan Tucker
Advisor: Ligia Bezerra, Ph.D.

This presentation will concentrate on the objectification of women in Latin music. The music forms that I will address are Puerto Rican salsa music and Brazilian Samba. In my paper I will demonstrate how these two genres reinforce gender roles that substantiate patriarchal paradigms. I will cross-examine song lyrics from each genre, working with one Puerto Rican salsa artist and one Brazilian Samba artist from the late twentieth century. My preliminary conclusion is that these songs portray women as sexual objects, which reflects a male dominated music industry with respect to these two genres.
Questioning the Order of Colonial Society:
Úrsula de Jesús, Sor Juana, and their Perspective on Race and Gender

Presenter/Author: Remesh Adams
Advisor: Jacqueline Alvarez-Ogbesor, Ph.D.

In the 17th century, colonial Latin America was structured by a social hierarchy that valued men’s opinions and the silence of women. This hierarchy was reflected not only in the public sphere but also in the privacy of convent life where women were seen as humble servants of God and submissive to the patriarchal Catholic Church. Convents were seen as spaces that mirrored the colonial society with an internal social order imitating the outside world. Within this micro-world, women were able to express themselves a little more openly than in the public sphere; however, they were rarely heard with a voice that differed from the colonial and the patriarchal discourse. They were expected to be silent and fulfill their duties to the church. Nevertheless, two exceptional women, Sor Juana Inés de la Cruz and Sor Úrsula de Jesús, broke their silence to make their voices heard and question the colonial discourse from their own social location. In this presentation, I will develop and answer analytical questions pertaining to the works of Sor Juana Inés de la Cruz’s letter, Respuesta de la Poetista la muy ilustre Sor Filotea de la Cruz (Response by the Poet to the very illustrious Sor Lover of God de la Cruz) and Sor Úrsula de Jesús’ diary within the biography, “The Souls of Purgatory” by Nancy E. Van Deusen. For the purpose of revealing each woman’s personal perspective and intersectionality from which they are encouraged to speak on racism and sexism.
First Place Poster Presentation Winners
Global Warming and Climate Change: Livestock Production and Environmental Degradation
Presenter/Author: Katrina Walls
Advisor: Jerry Wever, Ph.D.
This research explores the problems, causes, and effects that greenhouse gas emissions that have formed from the production and consumption of livestock from multinational industries, and its resultant effect on global warming and climate change. Some issues of livestock production that contribute to global warming and climate change are concentrated animal feeding operations, animal abuse and sanitation issues, and land deforestation in Brazil and other regions. One important contributor to both epidemics is the release of greenhouse gas emissions such as methane, nitrogen, carbon dioxide, and fossil fuels from global livestock production. United Nations Food and Agriculture Organization estimated that 18 percent of annual worldwide greenhouse gas (GHG) emissions are attributable to cattle, buffalo, sheep, goats, camels, pigs, and poultry. Overall, the massive industry of meat production and processing of livestock is indeed a large global impact that needs to be addressed and discussed in the environmental and industrial sectors of the world. If a global movement is not vastly incorporated fast enough, we will continue to see detrimental changes from global warming, and climate change that will not only affect human health but ecological environments as well. I explore the ecological damages that result from greenhouse gas emissions from the production of multiple livestock industries and what political and economic purposes drive this industry. Why does the industry continue to exist knowing the harmful effects it causes on the environment and finally, what solutions could be implemented to counteract these greenhouse gas emissions?

Lost in Music: The Impact of Afro Colombians’ Cumbia on Caribbean Music
Presenter/Author: Akilah Favors
Advisor: Jerry Wever, Ph.D.
With lesser recognition than other Afro populations that are acknowledged in Caribbean music discourse, Afro Colombians have maintained an African art form of music and dance called the Cumbia as a means to preserve their culture and to overcome the disenfranchisement of their community. Like many other Caribbean music and dances, Cumbia began as a courtship dance practiced among the African population, which was later mixed with Amerindian steps and European and African instruments and musical characteristics. Although Colombia is considered to have the fourth largest Black/African-descent population in the western hemisphere, following Haiti, Brazil and the USA, many scholars have not gravitated towards studying the importance of Afro Colombian music for the afro community and the country of Colombia at large. Since Cumbia is rarely discussed in contrast to other Afro Caribbean popular music such as salsa, reggaeton, reggae, my project seeks to detect and evaluate the influence Cumbia has had on Caribbean music and how it serves as a political tool for Afro Colombians in underprivileged communities. After having the opportunity to become close to an Afro Colombian community during my study abroad experience in Buenos Aires, Argentina, my methodological approach will include a content analysis of books about Cumbia and semi-structured interviews with Afro-Colombians whose families have practiced Cumbia on La Costa for generations. It is my research hypothesis that Cumbia has contributed to the beats and dances of other Caribbean traditions and that it is instrumental in resisting marginalization of the Afro Colombian population.

Characterizing the Variation in the Zinc Finger Domain of PRDM9 among Hispanic Mothers of Children with Trisomy 21
Presenter/Author: Parris Washington
Advisor: Tiffany Oliver, Ph.D.
Variation in the zinc finger-binding domain (ZFBD) of the protein PR Domain Containing 9 (PRDM9) is associated with altered placement of recombination in the human genome. As both the absence and altered placement of recombination are observed among chromosomes 21 that nondisjoin, we genotyped the PRDM9 ZFBD among Hispanic mothers of children with Trisomy 21 in efforts to determine if variation within this region is associated with the recombination-related risk for chromosome 21 nondisjunction (NDJ). In our approach, PCR was used
The Effect of Urbanization on Squirrel Boldness
Presenter/Author: Nneze Akwiwu
Authors: Christina Fennell, Mason Dana, Courtney Eat, Najla Ismail
Advisor: Jennifer Kovacs, Ph.D.

Urban development alters behavioral patterns of wildlife species as various animals are forced to adapt to the presence of humans. In urban areas, animals often lower their sensitivity to predator risk in order to survive. In this experiment we will investigate the levels of boldness in urban and non-urban squirrels.

We predict that squirrels that live in more urban areas will be less sensitive to predator risk and thus bolder than their non-urban counterparts. To test this, we will place two feeding stations, consisting of a variety of nuts, in both urban and non-urban settings around Atlanta, Georgia. A total of six locations will be tested. Three locations will be in urban areas such as college campuses and the other three will be in non-urban areas such as forests. Half of the feeding stations at each location, will have human stand-ins to measure the squirrel’s comfort with approaching humans, and the other food stations will not. The non-human feeding stations will serve as our standard. For four hours a camera will monitor how many squirrels feed at each location. The number of squirrels will be counted along with time spent within a two-meter circumference around the station. After the data is collected, averages and p-values will be calculated to determine a significant difference in boldness between urban and non-urban squirrels. This study explores how urban environments impact squirrel behavior and wildlife behavior in general. This experiment may lead to future studies on the impact of urban environments on wildlife fitness.

Evaluation of Spiking Patterns during Bi-Stability Neuronal Activity within Single Neurons
Presenter/Author: KayCei Moton-Melancon
Advisor: Gennady Cymbalyuk, Ph.D. (Georgia State University)

The function of a motor neuron is to carry electrical signals to muscles, triggering them to either contract or relax. In vertebrate animals, including humans, coordinating the contractions of the many muscles attached to it enables movement of the articulated internal skeletal structure. Studies have shown that action potential sourcing from the dendrites of motor neurons can have a profound effect on spiking patterns illustrated through techniques such as patch clamping. The main causes of these unique spiking patterns have been attributed to Persistent Inward Currents (PICs) facilitating bi-stability. Bi-stability, the co-existence of two firing states, has the most impact on spiking patterns. These spiking patterns have a profound effect...
First Place Poster Presentations

on the contractions experienced by the muscles. This study evaluates various spiking patterns produced by bi-stability as well as understanding how these spiking patterns physiologically affects the body. This is accomplished through utilization of Dynamical Systems Theory allowing for the production of a single compartment neuronal model within MATLAB.

Time Course of Insulin Containing Nanoparticle Drug Delivery to Prevent or Reverse Functional and Structural Changes of Proprioception in Short-Term Hypoglycemic Rats
Presenter/Author: Michael Priest
Advisors: Valerie K. Haftel, Ph.D., Morehouse College
Short term hyperglycemia leads to dysfunction of peripheral neurons leading to numbness, tingling, decline in H-reflexes, and difficulty walking. This study was done to determine the appropriate time course of drug application via biodegradable nanoparticles (NP) to prevent/reverse changes seen in proprioceptor structure and function in a model of Type I diabetes (Streptozoticin-injected rats). Rat blood glucose was monitored to allow two or three weeks of hyperglycemia (> 250 mg/dL; dpn). NPs encapsulating human recombinant insulin were injected into left triceps surae muscles. One-two weeks later, intraneuronal electrophysiological measurements were made in anesthetized rats, and immunohistochemistry was done to determine sciatic axon:myelin diameter ratio or DRG soma area. Our previous data show NP injection improves proprioceptor muscle stretch responses in a time-dependent manner: 3wk dpn proprioceptors show high no. action potentials (N) and maximum firing rate (Mx) upon muscle stretch, 6 wk dpn proprioceptors show very low N and Mx, yet NP treated proprioceptors 3wk dpn/1wk NP, 3wk dpn/2wk NP, 2wk dpn/2wk NP rats returned toward untreated values. Structural changes were found in dpn nerves: 3wk dpn/1wk NP, and 3wk dpn/2wk NP DRG soma areas returned to untreated. Axon:myelin diameter ratios of 3 wk and 6 wk dpn nerves were larger than control, and 3wk dpn/1wk NP treated side were greater than those; while 3wk dpn/1wk NP untreated side, and 3wk dpn/2wk NP untreated side measurements were closer to control. This presentation gives additional analysis of NP treatment at various time points in comparison to previously gathered data.

Optimizing Tomography of Triple Negative Breast Cancer using CRISPR/Cas9
Presenter/Author: Kelsey Gallant
Advisor: Carlos Moreno, Ph.D.
Triple negative breast cancer accounts for 15-20% of all breast cancer cases and is the leading breast cancer subtype in African American women. Given it’s lack of ER/PR and HER2 receptors it is often the most difficult to treat and diagnose via mammography. TNBC lacks the typical mammographic markers of breast cancer- irregular mass shape and associated suspicious
calcifications. Tomography/Computed Tomography (PET/CT) is a non-invasive imaging modality that provides both anatomic and metabolic information. It is known that use of 18F-fluorodeoxyglucose (18F-FDG) radiotracers can help improve imaging, however we are interested in how specific genes affect radiotracer signaling. Given this fact it is important for us to understand specific targets in triple negative breast cancer, which will optimize imaging. Namely, sodium-dependent amino acid transporter protein-coding genes SLC38A1, SLC38A2, and SLC38A4 interact with each other during cell metabolism. In this investigation we used CRISPR/Cas9, a highly specific gene-editing technology that uses double-stranded breaks in order to target transporter genes of interest. In order to view these cancer cells the patient must go through PET/CT scanning utilizes the metabolic pathways for information from the cancer by targeting genes using CRISPR/Cas9 in the metabolic pathway we can provide better imaging of TNBC.

Chemical Separation and Analysis of Bioactive Licorice Root Forms as Therapy for Prostate Cancer
Presenter/Author: Alexandria Sutton
Advisors: Kimberly Jackson, Ph.D.; Marisela Mancia, Ph.D.
Prostate cancer is a disease that affects millions of people around the world. Although usually treatable, prostate cancer may become aggressive and as a result leads to many male deaths. Dibenzoylmethane is a minor constituent of licorice root and has been verified to slow the growth of LNCaP (Lymph Node Carcinoma of the Prostate) cells, a metastatic or advanced stage prostate cancer cell model. In this study, chemical fractions are being isolated from licorice root forms in the search of novel bioactive components showing the greatest anti-proliferative activity against human prostate cancer cells. Licorice chips were extracted in ethyl acetate, dried and purified through rotary evaporation. Preliminary data pointed to the presence of bioactive compounds in certain fractions. Flash chromatography was then performed and fractions collected. The bioactivity of the collected fractions was assessed by MTT proliferation assays in LNCaP prostate cancer cells.

Understanding Alpha Decay
Presenter/Author: Micah Henson
Advisor: Natarajan Ravi, Ph.D.
Alpha decay is the process when a radioactive nucleus emits a Helium particle that consists of two protons and two neutrons. This process requires a very large amount of energy due to strong forces present at the nucleus. These forces are strong in comparison to gravitational and electrostatic. Strong forces only act over a short range and are the reason that a nucleus consisting of neutrons and protons is able to stay intact. With all of these strong interactions present at the nucleus, it is a puzzle that alpha decay is even possible. In fact, it is classically forbidden; however, with the advent of quantum mechanics, it is theorized that there is a small probability that some alpha particles can overcome the strong interaction (potential barrier), a phenomenon known as “tunneling”. We sought to understand the theory of alpha decay using quantum mechanical axioms. Numerical analysis using Newton-Raphson method was applied in Excel and Matlab to solve the complex equations that arise in infinite and finite well problems. Mathematical details of these problems leading to tunneling (alpha decay) will be presented.

Bridging the Gap between Ethnic Groups through Language Using Diverse NPCs
Presenter/Author: Mariah Cowling
Advisor: Yolanda Rankin, Ph.D.
Spanish language acquisition is becoming more of a hot commodity as the United States exponentially expands with immigrants who are native Spanish speakers. Being bilingual gives one a competitive edge in the job market and demonstrates one’s ability to work in a global economy. On the other hand, learning a foreign language can be a long, drawn out and frustrating process for some students, creating language anxiety that can hamper students’ conversational proficiency in the targeted language. Language anxiety is the feeling of worry, nervousness and apprehension experienced when learning or using a second or foreign language. A recent case study that examined African American female college students’ gameplay experiences in a Spanish language learning video game reveals that students
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desire animated, diverse (beyond race) computer generated game characters or Non-Playing Characters (NPCs) that exhibit gestures, facial expressions and other aspects of personality to create a meaningful gameplay experience that helps students increase their conversational proficiency skills in a targeted language. In addition, students need conversational scaffolds such as NPCs that model correct pronunciation of vocabulary words and phrases and demonstrate communicative competency––knowing what to say and when to say it. As proof of concept, we have designed a Spanish speaking NPC that engages players in conversation about Spanish cultural practices as a means for scaffolding students’ Spanish conversational skills. Continued research efforts will result in a Spanish language learning video game that features intelligent, conversational NPCs.

The Grammys and Oscars According to #BlackTwitter
Presenter/Author: Tayloir Thompson
Author: Takeria Blunt
Advisor: Brandeis Marshall, Ph.D.
Black Twitter, a subculture of the online social networking site Twitter, has served as a vital tool to promote social change particularly in the Black community. The subculture is often criticized for not being a legitimate platform to document and voice various opinions regarding these social movements, however Black Twitter is often referred to as the modern day civil rights movement. Historically, people of color have been underrepresented throughout the arts with this year being no exception. Several black actors, actresses and music artists have been snubbed of Grammy and Oscar nominations. Therefore, blacktags or hashtags with black racial and controversial context such as #OscarsSoWhite and #WhitePeoplesChoiceAwards are currently trending on Black Twitter. We gather and begin to analyze these blacktags and others during award ceremonies.

To obtain the real-time data needed for this study, we use a series of data streaming functionalities as mandated by Tweepy, a Twitter Application Programming Interface (API) implemented in Python. By classifying certain tweets and blacktags with their prospective topic or issue, we will be able to inform a broader range of tweeters about important discussions that are critical to the black community. We can further demonstrate how and potentially why Black Twitter is used as an open forum for minorities to voice their opinions on racial issues. We show preliminary analysis results of our Grammys and Oscars tweet collections.

Une Nouvelle Beauté
Presenter/Author: Mikaela Funn
Advisor: Jean Norgaisse, Ph.D.
In the age of cultural homogenization, the standards which define beauty continue to evolve. French poetic literature can be both romantic and revolutionary. This paper seeks to analyze a poetic selection from the novella “La Saveur des Mots” written by Jean Norgaisse. The poem being analyzed is titled “Beauté.” This piece in particular dissects the concept of beauty in contrast to the external aesthetics. The word “beauty” is seemingly simplistic, but the poem tells a narrative of internal growth and creation. This paper unravels the metaphors, symbolism, and literary structure the poet uses. Jean Norgaisse uses “Beauté” to redefine what is means to be beautiful, precious, and valuable. This research will identify how the French poetic language has not become obsolete, and can still be used to present innovative schools of thought.

The Literature of Octavia E. Butler as an Outline for Modern Day Social Activism
Presenter/Author: Tyra Wimpye
Advisor: Tarshia Stanley, Ph.D.
My research will prove how author Octavia E. Butler’s literary act of world building can be a useful tool for modern day social activists including the Black Lives Matter and All Lives Matter social justice movements. I compare Butler’s descriptions of activism and justice in her literary work to traditional and current social justice movements. My research uses Butler’s literature and as an outline for the present and future work of corrective action on the behalf of marginalized peoples. I demonstrate how Butler’s use of creating a common language to transcend nations, races, economies, and other classifications that separate the world. The poster will show the links and helpful ways that we can currently use Octavia E. Butler’s literary worlds and her characters’ strategies for problem solving to positively effect change in our present world.
The Impact of Parental Involvement and School Readiness- How Does Parent Affect School Readiness in Pre-k and Kindergarten Age Children?
Presenter/Author: Jihann Grundy
Advisor: Chateé Richardson, Ph.D.
Parent involvement has been one of the many concerns for pre-k children and kindergarten age children. The involvement of the parents is vital in the household especially in the early stages of childhood. This literature review seeks to examine how the lack of parent involvement affects school readiness in kindergarten age children. It also examines the factors that affect how parent involvement is viewed in the school setting. The paper compares and contrasts how different peer reviewed articles share the same ideas of parent involvement and ways we can conquer the increase of the lack of parent involvement. This review will also look at the parent teacher relationships and how the relationships affect the involvement of the parent in the classroom. This literature review points out the limitations of little evidence that shows how parent involvement hinders school readiness in kindergarten age children.

GIS Analysis of Water Quality in Southwest Atlanta
Presenter/Author: Tamara Spikes
Authors: Sydney Hubber, Kayla Hunter
Advisor: Nirajan Dhakal, Ph.D.
Water is a key component to habitation and the sustainment of life. Many individuals are unaware of the importance of water quality as it pertains to maintaining clean water sources. In order to gain a better understanding of water quality, we will analyze the cross sectional effects of inefficient storm water management on the water quality and water quantity within the West End area, specifically Proctor Creek. The following parameters will be analyzed: fecal coliform, turbidity, and alkalinity. By comparing these parameters to the Environmental Protection Agency Standards, we are able to observe the water quality of
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Proctor Creek. From our observations, we would like to convey potential solutions, which will effect change within the storm water management of the Historic West End community.

The Voices of the Movement: The Impact of Youth Activism on the Uprisings of Current International and Domestic Social Movements
Presenter/Author: Takasha Nutall
Advisor: Unislawa Williams, Ph.D.
In 2015, the world is experiencing social and political movements are over the world led by youth activist. The findings of prior research on the issue of youth and social movements have focused on including the involvement and importance of youth in movements, but have not given emphasis on the vital influence the youth voice has on current movements. This research will focus on the voice of the youth, which is the activism, passion, and hard work of the younger generation, as the most powerful tool required for social and political transformation within social movements. I will examine and compare the cases of two current movements led by young people, the Black Lives Matters Movement in the U.S and the Rhodes Must Fall Movement in South Africa, to two social movements led by majority older activist, the Chicago Teachers Union and the senior citizens demonstrations in Ireland. I will argue the importance of the youth voice needed for the success of these movements.

Specific Facilitation of the Identification of Foot Objects Following Stimulation of the Dorsal Premotor Cortex
Presenter/Author: Symone Fowler-Canty
Advisors: Andrea Stocco, Ph.D.; Justin Abernethy (University of Washington); Darby Losey (University of Washington, Seattle)
A debated topic is whether sensorimotor components are a necessary part of an object’s representation (as suggested by embodied cognition), or a spurious side effect. To test these hypothesis, we conducted a TMS experiment where single pulses were applied to the dorsal part of premotor cortex (PMd) while participants identified which of two words identified an object. Our results show that the application of supra-threshold TMS pulses specifically improved the capacity to identify objects that are associated with foot actions, but did not affect hand tools nor names belonging to a different category (i.e., animals). Furthermore, the effects of stimulation were restricted to the premotor cortex, while application in a control region (central superior parietal) did not result in any significant effect on any category of names.

Stereotype-Confirming Behavior and Race Based Rejection Sensitivity: Psychological Effects in Black Men and Black Women
Presenter/Author: Ayana Hart
Advisor: Valerie Jones Taylor, Ph.D.
Previous research finds that racial group members who witness negative stereotype-confirming behavior by group members experience negative emotions during interracial interactions (Taylor, Shelton, & Garcia, 2016). In addition, rejection sensitivity—a cognitive-emotional process where people anticipate, perceive and respond to rejection within interracial contexts—may exacerbate the effects of witnessing stereotype-confirming behavior by a group member (Mendoza-Denton, Downey, Purdie, Davis & Pietrzak, 2002). The current study bridges these lines of research by examining how African Americans’ sensitivity to race-based rejection might impact their emotional responses, interpersonal coping strategies, and desire to engage in future interracial interactions after witnessing a racial group member behave stereotypically. In the study, participants completed a race-based rejection sensitivity scale. Next they imagined themselves as a character in a scenario with a White coworker, who both witness a Black person behave in a stereotypically negative or non-stereotypical manner. Then participants completed an emotion scale and questionnaires that assessed their interpersonal coping strategy and desire to engage in future interracial interactions. It was hypothesized that participants with higher race-based rejection sensitivity who imagine witnessing a stereotypically negative racial group member, would experience more negative outcomes, than persons with low race-based rejection sensitivity and those who imagine witnessing a non-stereotypical racial group member. Data is currently being collected. Results of the study will provide insight into the impact of stereotype-confirming behavior and rejection-sensitivity on the experiences of African Americans in interracial interactions.

As with many mental health disorders it is imperative to look at the individual’s environment, and regard it as a possible factor affecting them and their decision to attempt suicide. With regards to this study, life stress and depression are regarded as environmental factors. As suicide is also a heritable trait, genetic factors have also been examined for their role in suicide behavior.

Variants in the serotonin transporter (5-HTT) have been implicated in risk for depression. Many of these variants, including the long/short promoter polymorphism result in differential expression of 5-HTT.

Given that the serotonin transporter is responsible for the uptake of serotonin, a neurotransmitter that is involved in the regulation of mood, this finding can be regarded as biologically relevant. In addition, Selective Serotonin Reuptake Inhibitors (SSRIs) are effectively used to treat depression, which often if left untreated can result in attempts of suicide.

The Grady Trauma Project study cohort was utilized to further explore our interest. This study cohort is recruited from several cohort was specifically recruited to study the genetic susceptibility to psychiatric disorders.

Particularly our interest is in examining the long/short polymorphism (5-HTTLPR) to determine if the short allele increases the likelihood of attempting suicide among African American individuals who have an indicated life stress.

**Rural Morocco: A Critical Analysis of the Implicating Factors on Youth Perceptions of Higher Education**

**Presenter/Author: Eilidh Branson**

Advisors: Jerry Wever, Ph.D.; Bruce Wade, Ph.D.

This research analyzes Moroccan youth attitudes towards higher education and the implicating factors that impact youth attitudes towards upward mobility in education. This study carried out a brief analysis of existing Moroccan education reform policy as a basis for understanding its effect on youth attitudes towards attempting higher education. I examined legislature and policy regarding the public school system in rural settings and compared this conceptualization to the lived reality within a rural migrant town. This research identifies boundaries that rural Moroccan youth face
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between themselves and higher education. The work also examines governmental marginalization of rural youth education as an influential factor on youth decisions to seek post-secondary schooling. Finally, this research investigates the relationship between out-migration and rural youth attitudes towards higher education. By studying youth attitudes towards higher education in a rural area of Morocco I was able to uncover indicators for potential issues in Morocco’s education system as well as areas of interest for future research on rurality and education in the kingdom of Morocco.

An Aptitude for Attitude: Neural Bases of Multisensory Perception Correlate to Variations in Human Personality Type
Presenter/Author: Jasmin Eatman
Advisors: Rosalind Gregory-Bass, MD, MS; Mary-Jane Spiller, Ph.D. (University of East London)
A synesthetic experience is characterized by the automatic stimulation of several divisions of cognitive processing by an inducer, followed by unique cognizance of an imagined object that incorporates multiple qualities. This study included participants who self-identified as synesthetes as well as those who did not report any subtype of synesthetic experience. Survey research included the Bergen questionnaire, and further identified personality traits using the Big Five Personality Inventory, Creative Experience evaluation, and Conscientiousness subscale. In order to conduct a comparative examination of self-reported personality qualities and synesthestisia type, Pearson’s correlation and hierarchical regression analyses were utilized in multilevel liner analysis. Statistical comparisons revealed that Openness, and Industriousness are the strongest predictors of time-space synesthesia. Consistently frequent reporting of openness and industriousness by number-space synesthetes point to several advantages of multisensory perception. In view of the correlations between synesthesia and personality, there are implications for synesthesia research in monitoring neuropsychological health throughout human development.
Island Life is Not All It’s Hyped Up to Be: The Impact of Urbanization on Georgia’s Coastal Regions
Presenter/Author: Gabriela Atsepoyi
Authors: Wangui Hymes, Ishara Emerson
Advisor: Jennifer Kovacs, Ph.D.

Urbanization is a human-driven process that causes irreversible and dramatic change to the natural environment. In coastal regions, these changes vary in regards to intensity and timing. Increased development can heavily disrupt the natural ecosystem. Conversely, undeveloped coastal regions and areas that are protected natural habitat may have more stable ecosystems. Even in areas that are ecologically similar, there may be variations in biodiversity due to human impact. We plan to analyze trends in amphibian diversity across coastal regions throughout the Southeast US. In addition, light pollution is a useful determinant in identifying the impact of urbanization on an area. Based on the information we obtain from amphibian surveys performed by the USGS and an iOS app that measures light pollution, we can assess the effects that urbanization has on the biodiversity of the two coastal regions. Recent studies found that species diversity decreases as urbanization increases. Few studies have found no changes in richness with increasing urbanization, while others actually indicated an increase in species richness. These varying results further indicate the need for an increase in the number of studies examining the impact of urbanization, and in turn the impact that humans have on their surrounding environment.

Proteomic Profile of Extracellular Vesicles Following an Acute Myocardial Infarction in Humans
Presenter/Author: Kayla Jackson
Advisors: Gale Newman, Ph.D. (MSM); Derek Akpalu (MSM)

Myocardial infarction (MI), is a cardiovascular condition with complex pathophysiology causing chronic heart failure. Extracellular vesicles (EVs) are membrane-bound vesicles released from various cells during activation, stress, and apoptosis. They are found in varying concentrations in healthy and diseased states, including MI. Recent studies have shown that EVs, in addition, to their putative roles in intercellular communication and pathogenesis of various diseases may also serve as a source of biomarkers. The objective of this study was to determine the proteomic content of EVs obtained from acute MI patients and healthy controls. Plasma samples were obtained at one time point for 10 healthy controls without cardiovascular disease and at 24hrs; 48hrs; and 72hrs post-infarction for 14 acute MI patients. Flow cytometry was used to isolate the EVs and mass spectrometry used to determine the protein-content of the EVs. The peptide sequences were mapped to human protein sequences using the NCBI Protein BLASTp tool. The identified proteins were analyzed using Pathway Studio® version 10.0 for associations with apoptosis, inflammation, MI, and heart failure. Preliminary results indicate that the proteins contained in EVs of the healthy controls predominantly inhibit inflammation and cell death, while those from the infarcted patients contained apoptotic and inflammatory mediators. These results indicate that the proteomic profile of EVs may be a useful diagnostic and/or prognostic tool in elucidating inflammatory and apoptotic pathways activated during the acute phase of a MI.

Juxtaposing and Understanding Cytoskeletal Characters among Diverse Amoeba
Presenter/Author: Kierra Parker
Advisor: Yonas Tekle, Ph.D.

Light and electron microscopes are the most common methods in observation of amoeba however, this method has not developed a complete connection of the phylogenetic relationships among amoeba. The most observed and assistive features to analyze in its locomotive from are the pseudopodia. However, despite extensive research on these specific properties complete analysis has been limited due to the methods of analysis. In this study morphology, both aesthetic characteristics as well as proteomic analysis has been used to generate imaging of cytoskeletal cultures of varying species of amoeba. Using immunocytochemistry, confocal and light microscopy, cytoskeletal characters were studied including distribution density co-localization and arrangements of actin and microtubules.
**The Effect of Zinc Concentrations and Nicotinic Acid on atwbc19; Kanamycin Resistance Gene**  
**Presenter/Author: Theophilia Dusabamahoro**  
**Advisor: Mentewab Ayalew, Ph.D.**

Plants mine the soil to obtain essential nutrients and in so doing, they can take-up several antibiotics produced in the soil by some microorganisms. One such antibiotic is kanamycin, originally isolated from the soil bacterium Streptomyces kanamyceticus. Plants are sensitive to antibiotics therefore have developed different mechanisms of responding to them. The Arabidopsis thaliana ATP Binding Cassette (ABC) transporter AtWBC19 (ABCG19) gene is known to confer kanamycin resistance. From the previous research results, Arabidopsis thaliana plants exposed to kanamycin indicated changes in their ways of iron up taking which implies that the antibiotic resistance gene WBC19 appears to also have a role in zinc uptake. Being the second most abundant microelement in plants, Zinc is crucial for growth and knowing how it affects plants under different conditions is important. Nicotinic acid is known to contribute to the uptake and distribution of minerals including Zinc in plants. In this study, the effect of zinc concentrations and nicotinic acid on kanamycin resistance imparted by the AtWBC19 gene was studied. MS media with different zinc concentrations with or without kanamycin and/or nicotinic acid were prepared and both mutant and control seeds were plated. After ten days of germination, roots were compared. Arabidopsis thaliana plants were seen to grow their roots better when plated in the absence of kanamycin with high zinc concentration combined with nicotinic acid.

**Drug Design and Synthesis: Inhibitors of the Hypoxia Inducible Factor 1**  
**Presenter/Author: Chanel Stallings**  
**Advisors: Binghe Wang, Ph.D. (Georgia State University); Jalisa Holmes (Georgia State University)**

Many cancerous tumor cells have an over expression of Hypoxia Inducible Factor 1 (HIF1) due to poor circulation in specific tumors. Our research strives to synthesize compounds that can help inhibit HIF1 in cancerous tumor cells and stop them from growing and multiplying. Based on previous research, amide 37 showed improved activity over the sulfonamide 26a, therefore our goal is to change the sulfonamide functional group to an amide to see if there is an improvement in the inhibitor activity.

**Color/Texture Image Segmentation**  
**Presenter/Author: Courtney Lett**  
**Advisor: Jeffrey Ehme, Ph.D**

This research introduces a method of image segmentation for an image file based on color and texture variability. The approach described has the ability to recognize real world objects in an image similar to how human perception would perceive them using ppm images. The program employs a texture descriptor that captures the texture patterns in a local neighborhood. Color for each pixel is described by extracting and smoothing the RGB color value using a Gaussian filter. Each pixel is then assigned a four dimensional vector using its texture.
descriptor and color value as parameters. For a local neighborhood, Euclidean distance between each vector is calculated to serve as edge weights in an image graph representation. A predicate is applied using given thresholds to determine if the graph’s connected components should be combined or separated by a boundary based on the texture and color variability of each component. The results yield a set of components separated by boundaries, which serves as the final segmentation. The approach works best for smaller images with smaller textures. Larger images and larger textures can cause the program to group pieces of the same texture as separate objects. Images with simple textures are used.

**Flight Cancelled?! Tracking Impact of Bad Weather using Twitter Data**
**Presenter/Author: Elizabeth Sengoba**
**Advisor: Brandeis Marshall, Ph.D.**

Flights are delayed, postponed and even cancelled in large part due to rapidly changing or massive weather patterns. The aviation industry relies on processed data that may not reflect current weather conditions. Through this research, we investigate how timely data can be better used by the aviation industry. We are developing an independent system that acquires flight-related data to assess the impact of bad weather on commercial aviation. Real-time data, especially as it pertains to customer-related information, will prove advantageous to help track inefficiencies within commercial aviation.

This system is divided into three parts: the Input Module, the Processor Module, and the Storage Module. The Input Module consists of pre-determined hashtags and keywords related to aviation and weather that serve as input for the system. The Processor Module consists of a framework that searches for tweets based on the keywords generated from the Input Module. These tweets are streamed in intervals using the Twitter Application Interface (API) and a Python package, called Tweepy, to connect to the API. Each tweet contains JSON-encoded metadata that must be formatted and decoded for the Storage Module. The Storage Module takes the tweets collected from the Processor Module and stores them in a database for data analysis and recommendations. The Processor Module and Storage Module are still under development with preliminary results to follow.
Bullying Prevention in Educational Environments  
Presenter/Author: Taylor Jackson  
Advisor: Chateé Richardson, Ph.D.  
This project will address underrated issue of school wide bullying. In addition, this project will also address the impact of building strong communities in schools with students with disabilities. This project will include children who demonstrate speech delays due to hearing loss and the role Speech Language Pathologists play a part in preventative methods. This project will examine the impact that a school’s culture has on individual.

Keywords: bullying, community, inclusion, disabilities, speech – language pathologist.

Assessment of the Relation between Water Quality and Water Quantity for Proctor Creek, GA  
Presenter/Author: Alexandra Price  
Advisor: Nirajan Dhakal, Ph.D.  
Much of our nation's storm water infrastructure was developed assuming a non-varying climate. As a result, we now see floods and infrastructure failure due to miscalculated design estimates. Such flooding events can cause runoff into watersheds, bringing pollutants into our community's water sources—a recurring public health hazard. Storm water management is a huge problem for metro Atlanta and specifically for downstream regions in the Proctor Creek watershed. This research explores how extreme rainfall has impacted water quality in Proctor Creek at Jackson Parkway. Using instantaneous data collected every 15min over the course of one year (2014-2015) from U.S. Geological Survey (USGS), this research project evaluates the correlation between rainfall, temperature, floods and several water quality parameters. We will also look at the temporal pattern through a seasonal assessment of these parameters. Winter of 2015 was affected by El Nino, so our work will further explore if the large scale circulation pattern caused by El Nino has any effect on the observed pattern/trend during the winter season.

African American Male Adolescent Detainees and Substance Use: The Influence of Childhood Trauma  
Presenter/Author: Armani Wynn  
Advisor: Lisa Hibbard, Ph.D.  
Compared to any other race or gender, previous studies have reported that African American male adolescents are three times more likely to be incarcerated. Adolescents that are constantly exposed to negative home environments, such as childhood maltreatment, are susceptible to emotional and behavioral consequences that may contribute to their delinquent behaviors. To cope with traumatic home experiences, researchers discovered that adolescents engage in alcohol and marijuana. Substance use among youth has been related to the increase in violent and criminal offenses. The purpose of this investigation is to examine the influence of childhood maltreatment experiences on substance use among African American male adolescent detainees. Using a de-identified secondary dataset from a previous study, a sample of 133 African American male adolescent detainees in the south is being examined. It is hypothesized that (1) male adolescent detainees who experienced childhood maltreatment will be more likely to engage in substance use than detainees who didn't experience childhood maltreatment, and (2)
childhood maltreatment experiences will influence the age of first use of substance in male adolescent detainees, meaning that more child abuse experiences will be related to younger age of first engagement. Data is currently being analyzed. Possible results from this study can be useful for psychologists when developing treatment options for African American male adolescent detainees who experienced trauma.

The Effectiveness of Neuropeptide Y in Reducing the Behavioral Effects of Social Defeat Stress via Inescapable Versus Escapable Defeats in Syrian Hamsters

Presenter/Author: Kelsey Kenniel
Authors: Tiara Lacey, Janae Best, Jill Cartwright, Malcolm Edwards, Rody Kingston
Advisor: Chris Markham, Ph.D.

Syrian hamsters are solitary animals that show good levels of anxiety and fear (Huhman, Solomon, Janicki, Harmon, Lin, Israel, & Jasnow, 2002). They are also known to be aggressive toward invaders of their residence, and will engage in defensive behavior by the use of combat. If the residential hamster is defeated in this combat, they exhibit high levels of submissive behavior mimicking the effects of stress, fear, and anxiety, even in the face of a non-aggressive intruder. On the other hand, if the invading hamster is defeated by the residential hamster, it is not able to exhibit the once aggressive nature and becomes submissive in his own territory (Human, 2003). Many animal models of social stress utilize inescapable and escapable defeat experiences, in which hamsters are not allowed to escape their attacker during the trial of defeat, or they are allowed to escape, respectively. Neuropeptide Y (NPY), is an abundant amino acid in the brain that plays functions such as increasing food intake and storage of energy as fat, and reducing pain perception. A number of animal models have suggested that one of the most profound properties of NPY is its anxiolytic affects (Thorsell, A., 2008). The purpose of this study was to compare the levels of anxiety, as measured by the elevated plus maze (EPM), of hamsters introduced to escapable or inescapable social defeats, and investigate the effects of Intracerebroventricular infusions of NPY during social defeat. We hypothesized that hamsters in the inescapable defeats that were infused with NPY would show significantly longer durations in the closed arms of the EPM than hamsters in the escapable defeat condition. Hamsters received ICV infusions of NPY, and were placed into the escapable or inescapable defeats. They were later tested in the EPM to measure their levels of anxiety.