

FARQUHAR COLLEGE OF ARTS AND SCIENCES

# 14<sup>th</sup> Annual Undergraduate Student Symposium



Friday, April 10, 2015

Alvin Sherman Library, Research, and Information Technology Center

## Undergraduate Student Symposium 2015

The Undergraduate Student Symposium, sponsored by the Farquhar College of Arts and Sciences, presents student projects through presentations, papers, and poster displays. The event serves as a “showcase” demonstrating the outstanding scholarship of undergraduate students at NSU. The symposium is open to undergraduate students from all disciplines. Projects cover areas of student scholarship ranging from the experimental and the applied to the computational, theoretical, artistic, and literary. They are taken from class assignments and independent projects. The projects do not have to be complete; presentations can represent any stage in the concept’s evolution, from proposal and literature review to fully completed and realized scholarly work. As in past symposia, the definition of scholarship will be sufficiently broad to include work presented in the biological and physical sciences, the social and behavioral sciences, computer science, mathematics, arts and humanities, education, and business. This is the fourteenth annual Undergraduate Student Symposium.

### USS 2015 Keynote Speaker

Charles L. Zelden, Ph.D., professor in the college’s Division of Humanities, is the author of seven books dealing with the topics of civil rights, voting rights, election law, and the judicial process. His publications include “The Southern Roots of the Reapportionment Revolution” in Sally Hadden and Patricia Minter, eds., *Signposts: New Directions in Southern Legal History*, University of Georgia Press, (April 2013); *Thurgood Marshall: Race, Rights and the Struggle for a More Perfect Union*, Routledge (May 15, 2013); “Old Vinegar in a New Bottle: Vote Denial in the 2000 Presidential Election and Beyond” in *Winning While Losing? Civil Rights, the Conservative Movement and the Presidency from Nixon to Obama*, University of Florida Press, (December 2013); *Bush v Gore: Exposing the Hidden Crisis in American Democracy*, Lawrence, KS: University Press of Kansas, (September 5, 2008), Abridged and Updated 2<sup>nd</sup> Edition (September 5, 2010); *The Supreme Court and Elections: Into the Political Thicket*, Washington D.C.: CQ Press (September 30, 2009); *Battle for the Black Ballot: Smith v Allwright and the Defeat of the Texas All White Primary*, Lawrence, KS: University Press of Kansas (August 2004); *Voting Rights On Trial*, Santa Barbara, CA.: ABC-Clio Press. (January 2002); and *Justice Lies in the District: The U. S. District Court, Southern District of Texas, 1902-1960*, College Station: Texas A & M University Press. (April 1993). His current book projects include *The Way We Vote: A History of Suffrage in America* and *The American Judicial System: A Very Short Introduction*.

### USS 2015 Organizing Committee

Don Rosenblum, Ph.D.; Michael Caldwell, Ph.D.; Tom Fagan, Ph.D.; Matthew He, Ph.D.; Marlisa Santos, Ph.D.; and Vanessa Mezquia.

**14<sup>th</sup> Annual  
Undergraduate Student Symposium**

**April 10, 2015**

**Abstract Proceedings**

**Farquhar College of Arts and Sciences  
Nova Southeastern University**

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**Keynote:** Charles Zelden, Ph.D., Division of Humanities

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## **A Comparative Study of Microorganism Populations from Storm Water Treatment Areas and Select South Florida Locations**

**Sabina Joseph and Tamara Gali**  
Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Aarti Raja, Ph.D., and Paul Baldauf, Ph.D.**

### **Abstract**

Nova Southeastern University (NSU) faculty and students are collaborating with Yale University to discover novel antibiotics produced by soil dwelling microorganisms. Pathogens responsible for many hospital-acquired infections are increasingly resistant to several antibiotics, driving the need for novel antibiotics. Antibiotic producing microorganisms present in soils should change with the concentrations of nutrients found in the soil or interstitial water in soils. To test this hypothesis, we screened for bacteria in samples from nutrient-poor soils in Davie and nutrient-rich soils in storm water treatment areas (STAs) in the Everglades. Soil samples were obtained, serially diluted and then plated on different media. Microorganisms isolated from the plates were subject to various biochemical tests. Antibiotic screening techniques were performed to identify isolates demonstrating production of antimicrobial agents. Isolates were tested for antibiotic production against tester strains to observe colony interactions. Those that presented a zone of inhibition were further characterized via polymerase chain reaction of the 16S rRNA gene of the bacteria followed by a Basic Local Alignment Search Tool (BLAST) analysis. BLAST finds regions of local similarity between sequences and helps identify members of bacterial gene families. Of the organisms identified in Davie soils, five organisms tested positive for antibiotic production against the tester strains; results indicate that these organisms were most closely related to the *Pseudomonas* and *Bacillus* genera. Future and ongoing studies include chemical extraction of the microbial antibiotic. Further characterization of the antimicrobial compound(s) and comparison of organisms isolated from the two different sites is currently being conducted.

## **A Day in the Life of Elvis**

**Angie Ballesteros**

Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Cathleen Dean; Chetachi Egwu, Ph.D.; and Weylin Sternglanz, Ph.D.**

### **Abstract**

“A Day in the Life of Elvis” is a short film about a Dachshund dog named Elvis, and his everyday life as a canine. The film follows Elvis from the time he wakes up until he goes to bed. Elvis is a very active dog and loves to play around with his owner. Elvis maintains a healthy life by venturing into the backyard with his owner Dyane, which is where the majority of the film takes place. The film is directed by Angie Ballesteros. Other crew members and actors include Dyane Ballesteros, Stephen Rafferty, Tyler Lindauer, and Elvis the dog.

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## **A Guide to Exoplanets: Observed Properties, Classification, and Habitability of Alien Worlds**

**Rosario Echeguren**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Stefan Kautsch, Ph.D.**

### **Abstract**

We present a study of exoplanets. Exoplanets are planets orbiting not our sun but other host stars. The thousands of known exoplanets are extremely diverse in terms of mass, orbit, and host-star type. This study will examine the physical properties of exoplanets and their characterization, as well as exoplanetary habitability through the lens of the emerging discipline of astrobiology. The goal of this study is to create a guidebook, which will act as a unique and engaging reference guide for future space travelers.

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## **A Novel Assay to Screen Drugs That Target Bacterial Type III Secretion Systems**

**Poorandai Sanicharran and Joanna Theodorou**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Julie Torruellas Garcia, Ph.D.**

### **Abstract**

In recent years antibiotic resistant strains of bacteria have increasingly become a problem and pose a global threat. Several problematic bacteria utilize a type III secretion system (T3SS) to infect their host. T3SSs are needle-like appendages on the bacteria used to inject the host cell with toxins which disrupts the cell's defense. Hence, the T3SS would be a good target for a novel antibiotic drug. The goal of this study is to develop an assay to screen for compounds that inhibit bacterial T3SSs. *Y. enterocolitica* uses a T3SS to cause gastroenteritis and will be utilized as the test organism. A disc diffusion assay on congo red-magnesium oxalate agar (CR-MOX) will be used to detect inhibitors of T3S. Previous studies demonstrated that low levels of  $\text{Ca}^{2+}$  triggered secretion of toxins which simultaneously restricts bacterial growth at  $37^{\circ}\text{C}$ . The CR-MOX agar contains a  $\text{Ca}^{2+}$  chelator, which sequesters  $\text{Ca}^{2+}$  from the agar. The lack of  $\text{Ca}^{2+}$  and incubation at  $37^{\circ}\text{C}$  will induce toxin secretion and restrict bacterial growth. Therefore, bacteria will grow in smaller red colonies, which indicate that they are secreting the toxins. Disks inoculated with different compounds will be placed onto CR-MOX agar plates containing 100-200 bacteria and incubated overnight at  $37^{\circ}\text{C}$ . Inhibition of the toxin secretion will be indicated by growth of large, white colonies around the disk. The development of this assay will be a useful, quick and inexpensive way to screen for possible compounds that may inhibit T3S secretion.

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## **Agricom: A Soil Nutrient Additive and Its Effect on Soil Microbial Growth and Tomato Plants**

**Lisa Marie Pace**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Joshua Loomis, Ph.D.**

### **Abstract**

The purpose of these experiments was to assess the efficacy of a novel nutrient stimulant in enhancing the growth of plants in the absence of fertilizer. Agricom is a natural mixture that works to increase the nitrogen fixation capabilities of the bacteria in the soil, thus aiding in the growth of the plants. Prior to working with the plants, the growth of the soil bacteria, in the presence of Agricom, was tested using respirometry. Agricom produced a significant positive effect on the overall growth rate of the soil bacteria that had been treated. Next, a series of four different groups of tomato plants were analyzed, two of which contained Agricom. Soil treated solely with water was used as the control group (Group 1). For this experiment, the plant growth was measured based on their dry mass weight, ash weight and their nitrate concentration. The tomatoes plants in Group 4 which contained Agricom and Water have shown the most growth as measured by dry weight and nitrate concentrations when compared to the other groups.

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**An Algebro-Geometric Approach to Reverse Engineering the Lac Operon in *E. coli***

**Priscila Reyes and Ly Nguyen**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Vehbi Emrah Paksoy, Ph.D.**

**Abstract**

Discrete modeling of biological mechanisms such as the lac operon is crucial in giving us a thorough understanding of their function and the related control mechanisms. This, in turn, provides us with a deeper insight into the organisms that employ these biological mechanisms as a whole. In this work, we utilize certain techniques from algebraic geometry, such as Gröbner basis, to attain a polynomial representation of the lac operon in *E. coli* based on its required catalysts and environmental conditions. First, we construct a Boolean network and wiring diagram of the lac operon system in order to predict the status of the system at any point in time given an initial condition. In the second part of the project, we concentrate on the time evolution of a certain state of the system and using reverse-engineering techniques, we reconstruct the polynomial equations. Finally, we compare the polynomial equations obtained in both parts.

## **An Unusual Meeting**

**Alessandra Sironi**

Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Cathleen Dean; Chetachi Egwu, Ph.D.; and Weylin Sternglanz, Ph.D.**

### **Abstract**

“An Unusual Meeting” is a short film about two strangers who happen to be living the same lifestyle. These two characters have a similar routine every morning; they wake up, stretch, brush their teeth, make coffee, read magazines, navigate the internet, and drink the same brand of coffee, “Café Bustelo.” The two characters live near each other, and they meet while shopping for coffee at the grocery store. The universe and the coincidence of being coffee-holics leads them to fall in love at first sight. The film is directed by Alessandra Sironi. Andres Martinez Paz serves as the principal actor and the director of photography.



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## **Antibacterial Activity of ByoPlanet's Advanced Oxidation Prototype**

**Karan Patel, Poorandai Sanicharran, and Joanna Theodorou**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Julie Torruellas Garcia, Ph.D.**

### **Abstract**

In today's effort to improve public health, antimicrobials have been a key point of focus in reducing the spread of infectious disease. ByoPlanet, a total solutions provider for bringing advanced science for killing today's germs, took on the challenge of developing new products for sanitation in its Advanced Oxidation Prototype. In this system, distilled water is exposed to UV light and infused with ozone. Our goal was to determine if the treated water exhibited antibacterial activity. Ten liters of distilled water was pumped through the Advanced Oxidation Prototype for 15 minutes. The treated water was applied to *Escherichia coli* or *Staphylococcus aureus* for ten minutes and serial dilution plating onto nutrient agar was used to determine the percent reduction of the bacteria. Distilled water was used as a control. Plates were incubated overnight at 37°C and colonies were counted post incubation. The percent reduction was calculated by subtracting the number of bacteria on the test plates from the control plates, dividing by the number of bacteria on the control plates and multiplying by 100. All experiments were performed in triplicate. The results showed that the treated water led to an 87% reduction of growth of *E. coli* and a 68% reduction of growth of *S. aureus*. The goal is to have a 99.999% reduction as seen in ByoPlanet's Vital Oxide Disinfectant. This experiment shows that with some modifications, the Advanced Oxidation Prototype has potential use as a novel disinfectant. This project was funded by ByoPlanet International.

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## **Antibacterial Activity of Natural Plant Extracts and Synthetic Compounds**

**Joanna Theodorou and Poorandai Sanicharran**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Julie Torruellas Garcia, Ph.D.**

### **Abstract**

Due to the growing problem of antibiotic resistant pathogens, development of new antimicrobials is a necessity. Biologically active plant extracts have the potential to combat the detrimental effects of pathogens without the risks sometimes associated with synthetic drugs. However, synthetic drugs have the benefit of having antibacterial activity and being well characterized. Mixing a natural plant extract with a synthetic compound could be an extremely beneficial and potent antibiotic. The purpose of the present study is to evaluate the antimicrobial efficacy of various classes of plants and synthetic compounds (2-Oxindole derivatives) against gram-negative and gram-positive bacteria. The antibacterial activity of the plant extracts and synthetic compounds were tested on gram-negative bacteria *Escherichia coli* and *Pseudomonas aeruginosa* and gram-positive bacteria *Staphylococcus aureus* and *Streptococcus pyogenes* using the Kirby-Bauer disk diffusion method. DMSO was used as a negative control and tetracycline was used as a positive control. The results indicated that Rosemary and Allspice had a large zone of inhibition on *S. aureus*. Of the ten synthetic compounds tested, none inhibited the growth of *P. aeruginosa*, one inhibited the growth of *E. coli* only and one inhibited the growth of *S. aureus* only. Interestingly, five of the ten compounds inhibited the growth of both *S. aureus* and *S. pyogenes*, indicating that the compounds are more effective against gram-positive bacteria. Compounds were diluted and re-tested to determine the minimum inhibitory concentration. Further analysis includes evaluation of synergism between natural products and synthetic compounds.

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## **Attitudes of Rural Ecuadorians Toward Conservation of Species and Environmental Education**

**Amanda Craig**

Division of Social and Behavioral Sciences  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Eileen Smith-Cavros M.F.A., Ph.D.**

### **Abstract**

The exploration of people's attitudes in regard to other animal species with whom they co-exist in a shared ecosystem is a key element necessary for the improvement of local and regional conservation initiatives. In Ecuador, species such as the jaguar (*Panthera Onca*) require vast ranges of tropical rain forest and stretches of riverbank in order to survive in the wild. Increasing numbers of people share the forest with jaguars and other species. Habitat destruction and conversion, hunting and the potential lack of knowledge regarding the species' ecological role continue to influence the conservation efforts of these threatened large cats. Many other species depend on the survival of jaguars for their own continued existence. During a weeklong trip to Baños, Ecuador in the month of March 2015, brief qualitative interviews of native Ecuadorians were conducted to find out how interviewees feel about, view, measure, and understand the presence of select animal species in the forest around them. Through examination of the responses to these interviews using qualitative thematic analysis insight can be gained regarding the local attitudes and ideas about species conservation and environmental education. Consulting those who live amongst the animals in the ecosystem day to day allows for a clearer understanding of the significance of jaguar and other species to the local people. The goal of this study is to observe how the culture views local environmental and biodiversity issues with a focus on endangered jaguar populations. This research has the potential to inform conservation efforts locally and regionally about the priorities, sentiments, challenges, and realities for the local people most intimately affected by conservation initiatives.

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## **Attractiveness Perception and the Influence of Mate Availability**

**Ashley Stelmaszek and Mariah Chadukiewicz**

Division of Social and Behavioral Sciences  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Glenn Scheyd, Jr., Ph.D.**

### **Abstract**

Psychological studies on the perception of facial attractiveness have shown that attractiveness perception can be influenced by nonphysical factors, such as relationship status and limited or plentiful availability in the mating pool (Kniffin, K; Wilson, D, 2004), (Madey, 1996). The focus of the present study is to examine perception of physical attractiveness when presented with a manipulated verbal cue that gives an illusion of either a limited or plentiful population of mates. We want to determine if the participants will adjust their perceptions of physical attractiveness when it is implied that there is a limited selection of mates. We hypothesize that a participant who is told a majority of fellow participants have indicated they are in a relationship will have lower standards of attractiveness perception. We are interested in determining if the adjustment of perception is made consciously or unconsciously. Participants rate both contemporary and early 20th century photographs; conscious adjustments would result in an increase of ratings in only the recent photographs as the dated photographs do not present viable mates. Preliminary data are ambiguous, further data collection is ongoing.

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## **Can Affordable Housing Stimulate the Fort Lauderdale Economy?**

**Andrew Socarras**

H. Wayne Huizenga School of Business and Entrepreneurship

Faculty Sponsor: **Charles Harrington**

### **Abstract**

The purpose of this research is to determine whether or not affordable housing can have a positive impact on the Fort Lauderdale economy and, if possible, to identify the methods on how to extract the most profitable outcomes for society. Many times, affordable housing is managed improperly and after only a matter of years is regarded by locals as the “projects” or “ghetto.” As a result, the neighborhoods that encompass these developments depreciate in value, impairing the local economy.

Fort Lauderdale has experienced a grown spurt within the past 5 years and is continuing to grow at a steady pace as it becomes more recognized by snowbirds and local South Floridians. In addition, its poverty rate is noticeably higher than the state average, which testifies to the need of proper low-income housing units.

By analyzing the Fort Lauderdale markets at a macro and micro level, I seek to formulate an effective strategy that will enrich the local economy by enhancing the job market and stimulating local economic development. I aspire to develop a successful method that will convince neighboring communities that affordable housing units will increase the value of their districts, while internally increasing the value of the communities these units inhabit.

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## Changes in Coral Cover (*Diaseris distorta*) at Isla Catalana, Gulf of California, Mexico

**Kyle Nixon**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Joshua Feingold, Ph.D.**

### Abstract

*Diaseris distorta* is a free-living fungiid coral that typically inhabits dense rhodolith beds in the SW Gulf of California where they are often overlooked in this atypical coral habitat. *Diaseris distorta* ranges throughout the Indo-West Pacific, however the study site at Isla Catalana is its northern-most limit within the Eastern Pacific. On four dates, June 2008, November 2009, July 2010, and August 2014, population density and mean size were documented. Each survey obtained 30 randomly placed  $\frac{1}{2} \times \frac{1}{2}$  meter photo quadrats. Live coral presence in each quadrat was quantified using CPCE software, then analyzed for differences using a Kruskal Wallis test followed by a Tukey *a posteriori* test. Coral cover significantly increased (Tukey Test,  $p < 0.05$ ) from 2008 through 2014. In 2008 there was 0.98% coral cover that increased to 3.04% in 2014, a 310% increase over a 6 year period. Also, there was a significant decrease (Tukey Test,  $p < 0.05$ ) in coral size over this period. The size of coral individuals changed from  $1.63 \text{ cm}^2$  to  $1.33 \text{ cm}^2$ , a decrease of 19%. Thus, increased cover was due to population growth rather than increased coral size. These results are associated with improving (warmer) conditions at this northern limit of coral distribution, consistent with other observations of increased coral populations at higher latitudes. Increased coral cover has important ecological benefits by providing additional carbonate structure, creating habitats for associated organisms such as invertebrates and fish. This information is useful for National Park personnel to better manage this valuable resource.

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## Changes in Population Densities of *Porites sverdrupi*, an Endemic Coral of the SW Gulf of California

**Stephan J. Robson**

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Farquhar College of Arts and Sciences

Faculty Sponsor: **Joshua Feingold, Ph.D.**

### Abstract

At Isla Catalana in the SW Gulf of California, Mexico an endemic coral species *Porites sverdrupi* lives unattached within rhodolith beds. Very little biological and ecological information is known about this species. Where previously described, *Porites sverdrupi* was found as widely scattered colonies in very low densities (0.0038%). Random walk quadrat sampling was done within a primarily monospecific aggregation of *P. sverdrupi*. Twenty five (½m x ½m) photo quadrats obtained in August 2014 were analyzed using CPCe software and compared to values in 40 quadrats from 2011. The number of colonies per square meter significantly increased from 54.7 in 2011 to 74.6 in 2014 (T-test,  $p \lll 0.001$ ). Average colony size increased significantly over this period from 2.47 cm<sup>2</sup> to 6.61 cm<sup>2</sup> (T-test,  $p \lll 0.001$ ). There was a significant increase in coral cover from 1.35% in 2011 to 5.39% in 2014 (T-test,  $p \lll 0.001$ ); a 399% increase over a 3 year period. Thus, increased coral cover was due to both population growth and increased coral size. Early studies had led researchers to believe *Porites sverdrupi* was undergoing a natural extinction process. However, this research documents a vibrant and growing coral community, heartening news during a time of coral cover loss in most other locales. This community is of ecological value due to its carbonate production that increases structural heterogeneity, providing habitat for a wide variety of associated organisms. This study further clarifies the need for conservation efforts in this unique location.

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## Correlation of Nutrient Contamination with Rainfall in the Everglades

**Belen Perez**

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Farquhar College of Arts and Sciences

Faculty Sponsor: **Paul Baldauf, Ph.D.**

### Abstract

In this study, we investigated the correlation between concentrations of nutrient contaminants and rainfall in the inflow and outflow from engineered wetlands in the Everglades. These engineered wetlands, referred to as Stormwater Treatment Areas (STAs), are designed to remove phosphate (PO<sub>4</sub>) from water in the Miami Canal and North New River Canal.

Methods: Quality and quantity of water entering (inflow) and leaving (outflow) STAs are monitored by South Florida Water Management District (SFWMD) and stored in the publicly accessible DBHYDRO database. DBHYDRO water quality data from one inflow monitor (G370) and two outflow monitors (G376B and G376E) at STA3/4 were used. Data from weather station EAA5 were used for rainfall estimates. We summed seven days of precipitation measurements at EAA5 and compared those values to weekly measurements of PO<sub>4</sub> concentration. Correlation of PO<sub>4</sub> concentrations to rainfall was tested using a standard linear regression model. Results show strong correlation between PO<sub>4</sub> concentration and rainfall in canal water in years 2008 and 2011. 2014 anonymously shows no correlation. Results from the clean outflow at G376E show that while there are PO<sub>4</sub> fluctuations, fluctuations are not correlated with rainfall events. Thus, PO<sub>4</sub> concentrations in the canal water are strongly correlated with rainfall events. However, water that flows through the STA becomes progressively cleaner as plants take up the PO<sub>4</sub>. As a result, the relationship between rainfall and PO<sub>4</sub> concentrations diminish. Possible causes of PO<sub>4</sub> fluctuations in STAs include groundwater seepage, dry atmospheric deposition, changes in plant productivity, and animal activity.



**D.A.R.K.**

**Lauren McGarrett**  
Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Cathleen Dean; Chetachi Egwu, Ph.D.; and Weylin Sternglanz, Ph.D.**

**Abstract**

“D.A.R.K.” is a silent, avant-garde short film that highlights the very possible, and commonly unseen, repercussions of our day-to-day positive interactions with others, or lack thereof. The smallest act of kindness often makes the largest difference. The film is directed by Lauren McGarrett.

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## **Determining the Binding of Phycocyanin to the LNCaP Prostate Cancer Cells by Fluorescence Microscopy**

**Shona Joseph and Syed Hussain**  
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Farquhar College of Arts and Sciences

Faculty Sponsors: **Mir Saleem, M.D., and Appu Rathinavelu, Ph.D.**

### **Abstract**

Phycocyanin (C-PC) is a natural pigment found in blue-green algae known as *Spirulina*. Since it has anti-inflammatory properties, it was speculated that it might also be effective in treating cancers. Therefore, the main purpose of this study was to see whether C-PC would bind to the receptors on the cell membrane of cancer cells or penetrate the cell. Furthermore, the study was conducted to see whether the C-PC was able to bind to the membrane receptors with high or low affinity. For our binding and uptake experiments, LNCaP cells were used. After incubating with C-PC, the cells underwent multiple washes to see whether the binding was strong or transient. It was initially predicted that C-PC would bind to receptors on the cell membrane and as a result would not be washed away easily. The fluorescence imaging results of the experiment showed that C-PC could bind to the cell membrane and not to the intracellular receptors. Secondly, the results also indicated that C-PC did not bind to these receptors with high affinity because, as the cells underwent more washes less fluorescence was observed since unbound C-PC was washed away. Thus, the results suggest that C-PC can stimulate cellular response through binding with membrane-associated receptors. However, the binding appears to be of low affinity and the identity of the receptors is yet to be determined (This research was supported by the Royal Dames of Cancer Research, Inc., Ft. Lauderdale).

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## **Don't Think It, Don't Do It: Controlling Executive Control**

**Karissa Delorme and Hannah Dean**  
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Farquhar College of Arts and Sciences

Faculty Sponsors: **Leanne Boucher, Ph.D., and W. Matthew Collins, Ph.D.**

### **Abstract**

Self-control involves the ability to control immediate impulses and desires. According to the ego depletion model, self-control is a limited resource. Many studies have found that participants who perform a self-control task show impaired performance on subsequent executive control tasks, such as those measuring working memory and attention. In this study, we hypothesized that individuals who perform a self-control task would subsequently demonstrate poorer inhibitory control as measured in a Stroop and stop signal task. Participants were first given instructions to list their daily activities for five minutes as they either attempted to not think about a white bear (self-control condition) or to think about a white bear (control condition). Then they engaged in either the Stroop task or the stop signal task, which were counterbalanced across participants. The Stroop task consists of naming the ink color of a word, while disregarding the word's meaning. This test measures attention and inhibitory control. The stop signal task requires participants to respond to stimuli (a box or a circle) unless interrupted by an external stimulus (such as a "beep"). This task measures inhibitory control. We found that inhibitory control was affected by the self-control task. This suggests that individuals wishing to partake in activities requiring the use of self-control (such as dieting, exercising, and quitting smoking) should do so gradually rather than abruptly.

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## **DSC and TGA Analysis on 3-Flowable Dental-Light Cured Restorative Composite**

**Samon Nazemian**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Maria Ballester, Ph.D.**

### **Abstract**

Since their introduction in 1996, dental-light cured flowable composites have been used as restorative materials for filling and repairing minimally invasive cavities. They are commonly used because they are insoluble, aesthetic, insensitive to dehydration, easy to manipulate, and reasonably inexpensive. Various brands advertise multiple advantages and are comprised differently. One property prior flowable composites exhibited was a significant polymerization shrinkage, which makes it unsuitable for occlusal wear. In this project, we analyzed the marginal shrinkage and stability of three different types of composites: CLEARFIL MAJESTY ES Flow, Genesis Flowable Light Cure Composite, and GrandioSO Heavy Flow. The composites were cured with blue light from a halogen light curing unit and then analyzed by chromatography –using Shimadzu Gas Chromatograph GC-2010 System (DSC)—and Thermogravimetry (TGA) –using a TGA-50 Shimadzu Thermogravimetric Analyzer. DSC scans show no exotherms, suggesting no residual activity and reorganization of these polymers, related to their reported marginal shrinkage. TGA shows different mass losses, accounting for their stability and the amount of fluoride released by this technique.

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**Dynamic Regulation of Toxic Engineered Bacteria Prevents Learning in the Model Nematode  
*Caenorhabditis elegans***

**Olena Bracho and Cyril Manchery**  
Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Robert Smith, Ph.D.; Christopher Blonar, Ph.D.; and Evan Haskell, Ph.D.**

**Abstract**

Infections due to parasitic nematodes result in nearly 125,000 deaths annually. Strikingly, this rate remains nearly unchanged in the past 50 years likely owing to the fact that treatment options are either inefficient or inaccessible. Prior to infecting humans, most parasitic nematodes begin as larvae where they feed nearly exclusively on bacteria. This unique property may offer an opportunity to develop new biological control agents with the use of synthetic biology. Recently, we have engineered a bacterium, consisting of an attraction module and toxin module that lures in and kills nematodes, respectively, using the principles of synthetic biology to act as biological control agent of the model nematode *Caenorhabditis elegans*. While independently characterizing of the two genetic modules governing the behavior of the engineered bacterium was successful, combining both modules in the same bacterial cell resulted in a reduction in attraction and killing efficacy. In this study we show that this reduction in efficacy is due to the ability of *C. elegans* to learn that our engineered bacterium is deadly. To circumvent learning, and thus increase efficacy, we dynamically regulate the modules of our engineered bacteria. We demonstrate that the order to activation of the modules is critical to successful attraction and killing of *C. elegans*. Our study paves the way for the engineering of autonomously regulated modules that may be optimized to be specific against diverse parasitic nematode species.

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## Effects of Functional Pattern Training on Hip and Knee Kinematics in Healthy Runners

**Justin Romanes**

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Farquhar College of Arts and Sciences

Faculty Sponsor: **Monique Mokha, Ph.D.**

### Abstract

Faulty running biomechanics such as excessive hip internal rotation and knee valgus have been linked to overuse injuries in runners. Therapy interventions such as hip strengthening and mirrored gait retraining produce inconsistent results. The role of movement pattern training, predicated on Functional Movement Screen™ (FMS) performance has yet to be investigated. The objective of this study was to examine the effects of 6 weeks of functional pattern training on hip and knee kinematics in healthy, competitive runners with low FMS scores. 9 healthy adults [(males, n=6; age, 24.3±8.1 yrs; height, 1.78±0.09m; mass, 68.4±9.3kg) (females, n=3; age, 31.0±15.6 yrs; height, 1.70±0.06m; mass, 64.3±7.9kg)] who ran at least 20 mpw having FMS scores of lower than 14 underwent a 6-week training program aimed at correcting limited and asymmetrical movement patterns on the FMS (4 sessions per week). Corrective exercises were obtained via Functional Movement Systems.™ FMS and 3D motion analyses of peak hip adduction (HADD) and internal rotation (HIR), and knee valgus (KVAL) kinematics were conducted pre- (PRE) and post-training (POST). Differences were assessed using paired *t*-tests. Results showed FMS scores improved (PRE 12.8±1.1; POST 16.0±1.4,  $t(8)=-6.183$ ,  $p<.001$ ). Peak HIR (PRE 25.9±13.1<sup>0</sup>; POST 15.3±6.4<sup>0</sup>) and KVAL (PRE 18.7±6.2<sup>0</sup>; POST 7.8±10.7<sup>0</sup>) decreased, but not significantly,  $p>.05$ . Peak HADD stayed stable (+0.7<sup>0</sup>),  $p>.05$ . In conclusion, 6 weeks of functional pattern training significantly improves FMS scores and reduces faulty running biomechanics such as excessive HIR and KVAL. Correcting low and asymmetrical functional movement patterns appears to positively change higher level movement patterns such as running.

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## **Exhausted from Decision Fatigue: Do Personality Differences Influence Decision Making?**

**Basmatee Manohar**

Division of Social and Behavioral Sciences  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Leanne Boucher, Ph.D., and W. Matthew Collins, Ph.D.**

### **Abstract**

Making lots of decisions can result in what is known as decision fatigue. As past research has indicated, decision fatigue happens after contemplating choices while making decisions; this ultimately inhibits our ability to self-regulate and follow through on undesirable tasks. However, there is limited research that shows how the number of decisions people make impacts self-control. In this study, participants either rated how appealing food images looked or made a choice between two food images; the number of ratings/choices was either 10 or 30. Participants then engaged in the self-regulatory task of solving a difficult riddle. We hypothesized that participants in the rating condition and those making fewer ratings/choices would persist longer on the difficult riddle than those in the choosing condition or making more decisions. We also hypothesized that personality traits would correlate with aspects of decision making: participants low in neuroticism and agreeableness, but high in extraversion, conscientiousness, and openness will spend more time attempting the difficult riddle task. We found trends of longer persistence on the riddle when participants were asked to make more decisions and less persistence when they were high in agreeableness. The results of this study provide insight on connections between different dimensions of personality and its impact on the occurrence of decision fatigue among different individuals. Such implications could help decipher possible contributors to poor decision making, as well as, give insight on strengthening our ability to make decisions.

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## **Flings and Things: The Effects of Men's Tattoos and Companions on Women's Short- and Long-Term Romantic Interests**

**Tair Dar Perl and Fanny Shuster**  
Division of Social and Behavioral Sciences  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Jason Piccone, Ph.D.**

### **Abstract**

Women use available cues to determine men's fitness as long and short term mates. Previous studies have shown that men with tattoos are perceived as more dominant and prone to risk taking. In study 1, women rated men who were electronically manipulated to either have or not have visible tattoos. We hypothesize that tattooed men will be preferred for short-term mating strategies, but less-preferred for long-term mating. Further, a woman's impression of a taken man includes pre-conceived assumptions that he has compelling qualities as a potential mate. These impressions, however, may be attenuated by how attractive the man's romantic partner is. For instance, a man who is seen with an attractive woman will be assumed to possess a high mate-value. In study 2, women rated four conditions of photos with men. The men were presented as single, with an attractive, average, or unattractive woman. We hypothesize that women will rate men as possessing higher desirability as a long term and a short term mate when accompanied by an attractive woman.



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## **Hangings and Body Snatchings: The Exploitation of Humans in 18<sup>th</sup> Century London in the Name of Medicine**

**Chanice Allen**

Division of Humanities  
Division of Social and Behavioral Sciences  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Edwin Stieve, Ph.D., and Joyce Avotri-Wuaku, Ph.D.**

### **Abstract**

This project is an exploration into the cultural and sociological intricacies of 18<sup>th</sup> century London that allowed for and even necessitated the practice of the procurement of human bodies via public execution, grave robbing, and murder in the name of medicine. This uncommon glance at medicine examines aspects such as economic benefits of the black market activities of body purchasing and grave robbing by the medical profession, how the social hierarchy (and, inherently, religion) of pre-modern London played into corpse selection, and the juxtaposition of the attainment of corpses by medical professionals to the regulation of social order. This exploration ends by coming full circle, suggesting that in the 21<sup>st</sup> century there exists similar circumstances that allow for humans, both alive and deceased, to be used for spectacle in the name of medicine.

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## **Hawaiian Monk Seals: Record of Environmental Influence in an Endangered Species**

**Courtney Cenkner, Krista Colburn, and Samantha McNear**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Amy Hirons, Ph.D.**

### **Abstract**

The Hawaiian monk seal (*Monachus schauinslandi*) is one of the most endangered species on the planet, largely due to environmental and anthropogenic influences. Analysis of the animals' tooth and bone complexes allows us to ascertain critical information regarding changes to their habitats and the effects on the animals. Tooth and bone samples from 240 naturally deceased Hawaiian monk seals were collected from the Northwest Hawaiian Island chain (NWHI) and Main Hawaiian Islands (MHI). Stable carbon, nitrogen and oxygen isotope ratios ( $\delta^{13}\text{C}$ ,  $\delta^{15}\text{N}$ ,  $\delta^{18}\text{O}$ , respectively) provide a record of dietary and environmental change, and are reflected in the growth of teeth and bone collagen. Two hundred fifteen canine teeth were sectioned and growth layers counted to identify growth during specific years; tooth annuli dated from 1960 – 2011. These teeth represented seal occupation in the northern, central, and southern NWHI during that time. The  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  reveal interannual fluctuations that appear to correlate with the limited physical oceanographic data available for the region. Two hundred forty bone samples from 1910 – 2011 had collagen extracted and processed for  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ . Our data indicate primary productivity within the central and southern NWHI is much less than the productivity throughout the northern NWHI. Less production indicates less food and longer food webs for the organisms in these areas. The combination of all three stable isotope data indicate physical changes in the environment of the central North Pacific Ocean have a greater influence on the survival of this endangered species than direct anthropogenic influences.

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## **Hypoxia Inducible Factor Mediated Human Angiotensinogen Gene Regulation**

**Nida Rizvi**

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Farquhar College of Arts and Sciences  
Department of Pharmaceutical Sciences  
College of Pharmacy

Faculty Sponsors: **Aarti Raja, Ph.D., and Rais Ansari, Ph.D.**

### **Abstract**

Alcohol usage is linked to increased blood pressure and fibrotic transformation of the liver. Angiotensinogen (AGT) is the source of Ang II which regulates blood pressure and participates in fibrotic transformation of the liver after the hepatocyte death. Ang II is produced from AGT by sequential action of renin followed by angiotensin converting enzyme. The levels of AGT are less than the Michaelis-Menten constant of renin. Therefore, an increase in blood AGT levels would result into corresponding increase in Ang II levels that might affect blood pressure regulation and liver fibrogenic processes.

Alcohol metabolism by the liver produces oxidative stress (ROS) that activates hypoxia inducible transcription factor-1 $\alpha$  (HIF-1 $\alpha$ ). Moreover, alcohol-mediated hepatic injury activate immune responses causing increased interleukin-1 $\beta$  and other cytokines levels which further increase cellular ROS levels. Since hepatocytes lose alcohol metabolizing enzymes after passages, the alcohol mediated HIF-1 $\alpha$  activation was studied by treatment of hepatocytes with hypoxia mimetics to investigate the effects on AGT secretion. It was observed that angiotensinogen levels were increased with HepG2 and Huh7 after deferoxamine (60nM and 120 nM) and cobalt chloride (10mM and 20mM) post four hours and six hours treatment. . The presence of hypoxia response element(s) (HRE) in human angiotensinogen 5.0 kb promoter was analyzed by ApoE program. The consensus HRE sequences were searched and a total of 5 HREs were found. It is likely that hypoxia mimetics increase angiotensinogen secretion through HREs and these HREs may cause increased AGT secretion from hepatocytes after ethanol exposure.

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## **Investigating the Causes of Antibiotic Resistance in a Periodic Environment**

**Haley McKissack, Uzair Mohammed, Kyle Cahill, and Steven Thomas**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Louis Nemzer, Ph.D., and Robert Smith, Ph.D.**

### **Abstract**

Misuse of antibiotics, coupled with a lack of new antibiotics being discovered, has threatened our ability to treat bacterial infections. Confounding our ability to effectively combat antibiotic resistance is the myriad of ways in which bacteria can resist antibiotic treatment. One mechanism is the inoculum effect, a phenomenon in which the inhibitory concentration of an antibiotic increases with initial cell density. Previously acquired data has indicated a mutation exclusive mechanism by which resistance arises. However, it is currently unknown as to whether or not the generation of antibiotic resistant bacteria due to spontaneous mutation plays a role in the inoculum effect. The purpose of this study was to examine the role, if any, that spontaneous mutation plays in resistance due to the inoculum effect. To assess this, we grew *Escherichia coli* in the presence of increasing concentrations of the antibiotic kanamycin. Here, we observed the presence of spontaneous mutation that led to antibiotic resistant bacteria. Furthermore, by perturbing the cellular network responsible for the inoculum effect, we were able to alter the mutation frequency. To examine if spontaneous mutations could also arise in a dynamic setting, we built a microfluidic flow system that allowed antibiotics to be delivered at defined intervals to a population. We observed that under these dynamic conditions, spontaneous mutants could still arise but not completely account for the total bacterial growth observed. Overall, our results indicate that the inoculum effect may provide an extended window in which antibiotic resistance due to genetic mutations can arise.

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## **Journey of a Thousand Miles**

**Cerone White**

Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Cathleen Dean; Chetachi Egwu, Ph.D.; and Weylin Sternglanz, Ph.D.**

### **Abstract**

“Journey of a Thousand Miles” is a short documentary film about two gay African-American men who have been living with HIV for over 30 years combined. This documentary will serve to highlight the journey of these two men, focusing on their triumphs and struggles endured when they were first diagnosed. This film will also take us on a journey documenting the progress on the HIV/AIDS epidemic then and now, examining how far we as a society have travelled over time. The hope for this film is to shine a spotlight on men who are HIV-positive and living life to the fullest -- frequently breaking all the rules that society has cast on them because of their sexual status. There is life and there is hope after a positive test result. Life doesn't stop. These men are living testimonies of that fact. The film is directed by Cerone White, and chronicles the life of Mychael Williams and his friend Adrian Ross. The film was shot in Atlanta, Georgia.

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## **Induction of Apoptosis by JFD-WS in Human Breast Adenocarcinoma Xenograft Implanted Athymic Nude Mice**

**Janelle Alvarez; Meera Bhalani; Thanigaivelan Kanagasabai, Ph.D.; Sivanesan Dhandayuthapani, Ph.D.; and Appu Rathinavelu, Ph.D.**

Division of Math, Science, and Technology | Farquhar College of Arts and Sciences  
Rumbaugh Goodwin Institute for Cancer Research | Nova Southeastern University  
Department of Pharmaceutical Sciences | College of Pharmacy

Faculty Sponsor: **Appu Rathinavelu, Ph.D., and Deanne Roopnarine, D.P.M.**

### **Abstract**

Apoptosis (programmed cell death) can be stimulated when a cell has reached its pre-determined life-span. The intrinsic pathway is typically activated for cell cycle regulation, thus preventing tumor formation. Bcl-2 family proteins can play a pro or anti-apoptotic role by regulating the expression levels and modes of action of other proteins such as caspases, which cleave cell parts until the cell is no longer functional. Many studies are focusing on proteins that regulate the apoptotic pathway, as anomalies may lead to tumor formation. The purpose of this study was to assess effects of a novel water-soluble cancer drug, known as JFD-WS, on the intrinsic apoptotic pathway in human breast adenocarcinoma xenograft implanted athymic nude mice. JFD-WS was compared to Sutent, a control drug that is currently used as an anti-cancer treatment. It was hypothesized that JFD-WS would down-regulate anti-apoptotic proteins such as Bcl-2 and up-regulate pro-apoptotic proteins such as p53, Bax, and Apaf-1. Western blot analysis showed significant upregulation of the aforementioned pro-apoptotic proteins, along with downregulation of the anti-apoptotic protein Bcl-2. The release of cytochrome C found in the cytosolic fraction was significantly higher in JFD-WS treated animals as compared to untreated controls. Induction of apoptosis in the JFD-WS treated group was confirmed by the presence of cleaved caspase-3. JFD-WS treatment induced apoptosis as shown by the presence of DNA fragments; thus results confirmed the pro-apoptotic effects of JFD-WS in human breast adenocarcinoma xenograft implanted athymic nude mice.

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## **Modeling and Simulation of *Caenorhabditis Elegans* Chemotaxis in Response to a Dynamic Engineered Bacteria**

**Divya Pandya**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Evan Haskell, Ph.D.; Robert Smith, Ph.D.; and Christopher Blonar, Ph.D.**

### **Abstract**

Parasitic helminthes remain important causative agents of human, plant and animal diseases. Helminthes seek out food sources and navigate toward potential hosts using olfaction of simple chemical cues, a process called chemoattraction. While several studies have examined how nematodes, including *Caenorhabditis elegans*, behave in response to a chemoattractant, how the characteristics of the chemoattractant affect worm behavior has yet to be explored. In this manuscript, we develop a mathematical model to examine how characteristics of common chemoattractants affect movement and behavior in the model nematode *C. elegans*. Specifically, we model a scenario where a toxic, engineered bacteria designed to express a chemoattractant influences the behavior of a population of worms. Through the model we observe that, under static conditions, the diffusion rate of the chemoattractant is critical in influencing the choice of *C. elegans*. Here, the higher the diffusion rate, the more the worms are attracted to the chemoattractant. We then show that if the worms learn that the chemoattractant is associated with toxicity, the choice index is counterintuitively more strongly reduced with increasing diffusion rate. Finally, our model predicts a tradeoff between pulse period and attractant strength when the chemoattractant is dynamically pulsed in the environment. Our results reveal unique tradeoffs that govern chemoattraction in worms and may have implications in designing novel strategies for preventing or treating infections with parasitic worms.

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**Morphological Variation of the Penis and Cirral As Well As Potential Denticulated Bristle Function in the Barnacle, *Chthamalus stellatus***

**Dan Schneck**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **J. Matthew Hoch, Ph.D.**

**Abstract**

Many barnacles have phenotypically plastic cirri and penises. We studied this ability in *Chthamalus stellatus* over a range of wave exposure, height and population density along the John U. Lloyd State Park jetty. We also examined specialized, serrated bristles found on the cirri to determine functionality of these bristles, as well as to document any variation. We observed no meaningful variation in penis or cirrus morphology with wave exposure, height or crowding. However both correlate with body size, which is greatest in the middle of their vertical range. Barnacles in the middle of their vertical range also had more denticulate setae. These setae were only present on the first and second cirri. The second cirri had more setae than the first. Within the paired appendages that make cirrus #I, we found that the shorter ramus had more denticulate setae while the longer essentially had none. Both rami of cirrus #II had many denticulate bristles with the shorter having slightly more. Greater than 97% of penises were tucked between cirri #I and #II. The lack of plasticity amongst these barnacles may be a result of the sites sampled having lower variation in the properties of the sites compared to other parts of their geographic range. Self-fertilization may reduce the need for such a response as well. High rates of fertilization in non-crowded specimens also supports this. The denticulate setae may function as a grooming device for the penis and possibly to comb food particles out of the cirral net.



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## **Neural Stem Cell Proliferation, Differentiation, and Survival in Response to AT<sub>1</sub> and AT<sub>2</sub> Angiotensin II Receptor-Specific Agonism**

**Puja Patel, Sujay Kamisetty, Brigitte Blanco, and Leena Couling**

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Department of Pharmaceutical Sciences | College of Pharmacy

Faculty Sponsors: **James Munoz, Ph.D., Mark Jaffe, D.P.M., and Robert Speth, Ph.D.**

### **Abstract**

Major components of the brain Renin-Angiotensin System may provide modes of therapy for impaired neurons. Angiotensin II via its receptors, AT<sub>1</sub> and AT<sub>2</sub>, induces proliferation and differentiation of rodent neural stem cells. This study was undertaken to determine if AT<sub>1</sub> and AT<sub>2</sub> receptor stimulation by Angiotensin II induces proliferation and differentiation of human neural stem cells (hNSC). This study will assess whether selective agonism of AT<sub>1</sub> and AT<sub>2</sub> receptors on hNSC could possibly induce proliferation and differentiation in damaged areas of the brain caused by stroke, traumatic brain injury, and several neurodegenerative diseases in a therapeutic manner. Using hNSC, this study aims to enhance our understanding of how neural differentiation and proliferation are affected by selective agonism of both the AT<sub>1</sub> and AT<sub>2</sub> receptor. It was hypothesized that stimulating the AT<sub>1</sub> receptor would induce proliferation and stimulating the AT<sub>2</sub> receptor would induce differentiation upon addition of selective agonists. Preliminary analyses of this ongoing research support the hypothesis, as there was a 78% increase in neuronal differentiation induced by AT<sub>2</sub> agonism, and a 5% increase in proliferation with selective AT<sub>1</sub> agonism. Further investigation of these preliminary results will determine if these trends are genuine and statistically significant.

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## **Nova Southeastern University's Participation in Many Labs 3: Evaluating Participant Pool Characteristics Across the Semester Via Replication**

**Guy Merus, Andrea Moran, Boglarka Varga, Stephanie Ponce,  
Idania Elizabeth Cater, and Alexis Murphy**  
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Farquhar College of Arts and Sciences

Faculty Sponsors: **Leanne Boucher, Ph.D., and Weylin Sternglanz, Ph.D.**

### **Abstract**

A crowdsourced project from 23 university participant pools, including NSU (total  $N = 2,696$ ; NSU  $N = 131$ ), examined variation in 10 well known psychological findings and 8 individual difference measures over the course of the academic semester. Undergraduate psychology participant pools serve as a major resource for behavioral research studies. Many researchers have hypothesized that the traits and attentiveness of student research participants vary across an academic term (e.g., students who participate later in the semester may be lower in conscientiousness and higher in openness to experience). However, there is very little systematic evidence regarding the magnitude of such differences across the academic term, as well as whether such differences might influence experimental or correlational research findings. A secondary purpose of the “Many Labs” collaborative research is to replicate well known scientific findings on a large scale, an endeavor that editors of *Nature* have called essential and sorely lacking throughout most of the sciences. Preliminary analyses from NSU indicate that the point in the semester when individuals participated in these experiments and their “Big 5” personality traits (extraversion, openness to new experiences, agreeableness, conscientiousness, emotional stability) were uncorrelated. Of note, we did replicate two well-known effects: the Stroop effect and the availability heuristic. However, two highly publicized findings that have raised some skepticism recently, the “warmer hearts, warmer room” effect and the “weight as an embodiment of importance” effect, both failed to replicate. These results underscore the importance of large-scale replications of scientific findings.

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## **Osteogenic Differentiation of Human Umbilical Cord Derived Stem Cells in a 3- Dimensional (3-D) Hydrogel**

**Anastasia Talalenko and Kevin Petersen**  
Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Umadevi Kandalam, Ph.D.**

### **Abstract**

**Introduction:** Bone Regeneration in craniofacial region due to traumatic injuries and congenital defects is a major clinical problem. Cleft palate is the second most common congenital defect. Our long-term goal is to regenerate bone in the palatal region using tissue-engineering approaches. Bone tissue engineering utilizes osteogenic cells, osteoconductive scaffolds and osteoinductive signals. Mesenchymal stem cells derived from human umbilical cord (HUMSCs) are highly proliferative with the ability to differentiate into osteogenic precursor cells. **Objective:** The primary objective of the study was to encapsulate HUMSCs in PuraMatrix™ (PM), a peptide hydrogel, and investigate their survival and osteogenic differentiation. PM is an injectable 3D nanofiber hydrogel scaffold capable of self-assembly when exposed to physiologic conditions. **Methodology:** HUMSCs as monolayer cultures were plated for 3-4 weeks in either complete medium (CM) or osteogenic medium (OM). Gene expression, protein expression, and alkaline phosphatase markers were used to analyze osteogenic differentiation. To determine the cytocompatibility and osteogenic differentiation HUMSCs and cells were encapsulated in Puramatrix cell viability and osteogenic differentiation was examined. **Results:** Live-Dead cell assays showed that cells implanted in Puramatrix were viable. A two- fold upregulation of Alkaline phosphatase (ALP) gene was observed in cells encapsulated in PM with OM compared to cells in CM ( $p < 0.05$ ). **Conclusion:** Puramatrix supports the cell growth and osteogenic potential of HUMSCs.

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## Post-Exercise Ice Bath (10 Degrees Celsius) and Athlete Recovery

Sierra Lelii

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Farquhar College of Arts and Sciences

Faculty Sponsors: **Corey A. Peacock, Ph.D., and Jeff Doeringer, Ph.D.**

### Abstract

Coaching professionals implement post-workout ice baths with athletes; however, minimal research exists demonstrating the effectiveness of these practices on athletic performance and recovery. **Purpose:** To assess the effects of a post-workout ice bath on recovery. **Methods:** Ten athletic subjects (18-24 yrs.; 171.5±11.2 cm.; 68.1±14.9 kg.; 23.0±3.5 BMI) were tested for flexibility (sit-and-reach), power (vertical jump), strength (squat), agility (5-10-5), speed (10-m) and pain perception (scale). Following performance measures, each athlete completed a damaging eccentric plyometric protocol. Athletes were randomly assigned into a post-workout ice bath group (ICE), which took a 15 minute ice bath (10° C) following exercise protocol; or a control group (CON). All subjects reported 48-hours post- for same performance measures. **Results:** A 2 time (pre-, post-) x 2 condition (ICE, CON) repeated-measures analysis of variance (ANOVA) demonstrated significant ( $p = 0.005$ ) differences favoring ICE in post-exercise pain alleviation (1.4±0.9 pre 0.6±0.8 post, ICE; 0.7±1.0 pre 3.4±0.5 post, CON). ANOVA demonstrated non-significant ( $p \geq 0.05$ ) differences in flexibility (34.5±7.3 pre 35.6±7.7 post, ICE; 35.1±2.7 pre 33.6±4.3 post, CON), power (64.2±11.0 cm. pre 61.9±10.8 cm. post, ICE; 61.5±8.2 cm. pre 62.2±8.0 cm. post, CON), strength (101.4±45.4 kg. pre 103.5±46.5 kg. post, ICE; 106.9±23.7 kg. pre 106.5±27.6 kg. post, CON) agility (5.2±0.9 sec. pre 5.4±0.6 sec. post, ICE; 5.6±0.3 sec. pre 5.7±0.3 sec. post, CON) and speed (1.8±0.3 sec. pre 1.8±0.3 sec. post, ICE; 1.8±0.3 sec. pre 2.0±0.1 sec. post, CON). **Conclusion:** Benefits of post-workout ice bath cooling can be seen in recovery measures of pain perception, but not in performance.

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## **Posture and Cognition**

**Jana Mrkaja**

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Farquhar College of Arts and Sciences

Faculty Sponsors: **W. Matthew Collins, Ph.D., and Leanne Boucher, Ph.D.**

### **Abstract**

This experiment examined how priming and posture influence attention. Previous experiments have shown that different body postures can influence cognitive focus and task performance. For instance, participants adopting an unfocused posture were slower at performing a visual search task (Chisholm, Risko, Evan, & Kingstone, 2013). However, this could be due to the effects of priming on attention (Bargn, Chen, & Burrows, 1996). In the current experiment, participants adopted either a focused leaning, forward upright or an unfocused, back slouched posture. Furthermore, participants were either primed or not primed by indicating that the posture will either increase or decrease their attentional awareness. While in the postures, participants completed tasks measuring search efficiency, reaction time, and attentional control and inhibition. Results indicated a relationship between posture, priming and attention and these results could have important implications for understanding how attention can be manipulated.

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## **Retention of Enzymatic Activity of a Proteinase K-PEG Silica Nanoparticle Conjugate for Use on a Biomedical Point of Care Device**

**Nicholas Ledra**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Terry McCaffrey, Ph.D.**

### **Abstract**

We wish to report the successful assembly of a nanoparticle silica with proteinase K enzyme using a PEG bridge. The bridge is a hetero-bi-functional activated material which reacts with free amino groups on one end (SVA) and Sulfhydryl groups on the other (MAL). This 20,000 molecular weight cross linker was selected to allow for the retention of enzymatic activity.

The nanoparticles that were created are intended for use in clinical diagnostic devices, such that the enzyme is active on large substrates and can be immobilized according to device architecture.

We report here that the enzymatic activity of this nanoparticle silica conjugate directed against intact hemoglobin incubated at 42<sup>o</sup> C for 15 minutes – allows for complete digestion of hemoglobin molecule we have detected free tyrosine using the Folin-Ciocalteu's phenol reagent and according to the Enzymatic Assay of Proteinase K.

The use of confocal microscopy and flow cytometry emphasized as a technique to validate the attachment of the enzyme PEG +Silica. This was accomplished through the fluorescent label multiplexing. The silica itself was doped with fluorescent dylight 405 and proteinase K was labelled with dylight 594.

We can successfully report that distinct encapsulated silica –dylight 405 as well as a proteinase K+ PEG + Silica conjugate was confirmed by both flow cytometry as well as confocal microscopy. The technique whereby these particles were created has widespread application in the pharmaceutical and biomedical device industry.

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## **Shifting Londoner Medical Practices in the Early 1800s: The Influence of Paris Medicine**

**Aarabhi Rajagopal**

Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Edwin Stieve, Ph.D.**

### **Abstract**

For centuries, Western medicine has developed and flourished in the urban city of London, changing the dynamic between the practice and focus of medicine. This study aims to understand and compare the medical practices in London before and after the introduction of Paris medicine, examining the contributions Paris medicine made to create the “after” medical practices in London. Specifically, in the early 1800s, clinical medicine in London was profoundly affected by Paris medicine, a branch of clinical medicine that flourished in France in the late 1700s and early 1800s, leading to the innovation of medical practices currently in use today. Specifically, Paris medicine has been attributed to the development of the medical “gaze,” which was the point when doctors began to rely more on their own observations versus patients’ descriptions. It is also during the era of Paris medicine that medicine in London became more clinical and hospital-based, shifting from the private practice field. Paris medicine also led to new methods of treatment and diagnosis, such as the stethoscope, psychological evaluation, and the routine use of autopsies. Because of the influences of Paris medicine, practitioners in London became more clinically focused, fostering the rise of medical specialties, modern patient care, and public health.

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## **Source Memory Recognition After a Distractor Task**

**Rajeev Jaundoo**

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Farquhar College of Arts and Sciences

Faculty Sponsor: **W. Matthew Collins, Ph.D.**

### **Abstract**

Without the language to describe the objects and events in the environment, is it more difficult to encode memories of those objects and events? Based on our previous research, we expected better memory for objects we have the language to label. Specifically, in our study we examined the relationship between language and source memory. First, participants were presented the names of novel animals to learn. Participants were then asked to draw some of the animals they just learned, along with some novel animals as well. This exposed the participants to novel stimuli, but without any language or labels to describe them. After the drawing task, participants learned the names of some of the novel animals presented during the drawing task. Following a 40 minute distractor task, participants were tested on their ability to recognize the animals they had drawn. If having the label of an animal allows encoding to occur, then participants should be able to better recognize the animals they studied before completing the drawing task, rather than the animals they learned the names of afterwards. These results could have important implications for understanding the relationship between language and childhood amnesia.



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## **Spatial Analysis of Uniform Crime Reports, Crime Clearance Rates, and Officer Entry-Level Salaries**

**Laraysa Nugent**

Division of Social and Behavioral Sciences  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Kendra Gentry, M.S.**

### **Abstract**

The purpose of this project is to apply environmental criminology theories to spatially examine the distribution of 2013 Part 1 Uniform Crime Report (UCR) offenses and Crime Clearance Rates (CCRs) by Florida judicial circuits (n=20). The goal is to identify judicial circuits with the highest and lowest CCRs; and present a spatial analysis that visually represents statistically significant judicial circuits for the criminal offenses of murder, forcible rape, robbery, aggravated assault, burglary, larceny, and motor vehicle thefts. Additionally, the current study identifies and analyzes cities (n=30) within the 11<sup>th</sup> judicial circuit (Miami-Dade county) because it had the lowest CCR; and compares Part I UCR offense data, CCRs, and entry-level officer salary for possible correlations. ArcGIS mapping software is used to perform hotspot, cluster and outlier, and grouping analyses. Findings suggest that judicial circuits with more property crimes have lower CCRs – and no correlation between officer salary and CCRs.

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## **Spiritual and Supernatural Elements of English Theatre (1550-1612)**

**Mariah Busk**

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Farquhar College of Arts and Sciences

Faculty Sponsor: **Jane Duncan, Ph.D.**

### **Abstract**

In “Spiritual and Supernatural Elements of English Theatre (1550-1612)”, I use four plays to examine the secularization of supernatural elements of English theatre during the High Middle Ages and the Early Modern Period. My research shows that in *Everyman* (c.1500) by Anonymous, *The Tragical History of Dr. Faustus* (c. 1588) by Christopher Marlowe, *Hamlet* (c. 1600) by William Shakespeare, and *The White Devil* (c.1612) by John Webster good and evil characters digress from being religious, spiritual figures to being humanized representations of these figures. Corresponding to this secularization is the loss of a God-like figure and a more common use of devilish qualities within human characters. These changes were made for the purposes of entertainment and the incorporation of religious, political, and social commentary.

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## **Study on the Effects of Tulsi on LNCaP Cells and the Mechanism Used to Induce Apoptosis**

**Omar Garcia and Omar Viqar**

Division of Math, Science, and Technology | Farquhar College of Arts and Sciences  
Rumbaugh Goodwin Institute for Cancer Research | Nova Southeastern University

Faculty Sponsors: **Robert Smith, Ph.D.; Sivanesan Dhandayuthapani, Ph.D.; and Appu Rathinavelu, Ph.D.**

### **Abstract**

Homeostasis is a major property that entails the regulation of internal conditions to maintain stability in the human body. A key aspect of regulation is the removal of unwanted cells. Critical diseases such as cancer may occur due to excess cell proliferation. Inducing apoptosis can be a significant method of treating cancer. Understanding the mechanisms of apoptosis can be advantageous towards combating diseases in which cells are unnecessarily proliferating. Tulsi (Holy Basil) is a plant that has shown many therapeutic properties. Furthermore, it has shown to contain significant antitumor agents. Analyzing the level of expression of proteins when cancer cells are treated with the tulsi extract was expected to provide information on the pathways that the extract uses to induce apoptosis. Major pro and anti-apoptotic proteins of the intrinsic pathway for apoptosis were analyzed. The protein panel included p53, p21, Bcl-2, Bax, Apaf-1. The results from our experimental analysis indicate that the necessary up-regulation and down-regulation of the above mentioned proteins' expression are in favor of the stimulation of the intrinsic pathway and consequent apoptosis in cancer cells. We suspect that the tulsi extract could be a possible supplement that can help to treat cancer more efficiently by inducing apoptosis and decreasing side effects. The Authors would like to acknowledge the Royal Dames of Cancer Research, Inc., Ft. Lauderdale for their financial support.

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## **Synthesis and Characterization of Oxindole Derivatives**

**Armando Perez, Kaitlyn Pope, and Palina Woodhouse**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Venkatesh Shanbhag, Ph.D.**

### **Abstract**

*Uncaria Tomentosa* (Cat's Claw), a plant well known to yield potent antibacterial compounds that contain Indolin-2-one (2-oxindole) as the common moiety has instigated the medicinal chemists to develop broad spectrum antibiotics. Researchers around the world have focused on methodical modification at several key locations of this molecule with the intent of studying the biological activities. In that line, this research focuses on the synthesis of Knoevenagel adducts at the carbon -3. We have synthesized over twenty five analogues starting from Indolin-2-one and substituted aryl aldehydes by condensation reaction in basic ethanolic medium. Reaction conditions needed to be tuned to improve the yield and reaction efficiency. These compounds were isolated, characterized and tested for antibacterial properties.

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## **Temperature Dependent Variation in Self-Reported Contagious Yawning Within a Single Season**

**Melissa Dauzonne, Yana Prilutskaya, Daniel Garcia, and Amani Al Barghouti**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Omar Tonsi Eldakar, Ph.D.**

### **Abstract**

Previous cross-cultural research on humans has shown that self-reported contagious yawning frequency varies between distinct seasons and climate conditions. However, it remains possible that differences in yawning across seasons may be a result of physiological circadian changes across the year. In attempt to address this question, here we discuss the results of a study investigating the variation in the frequency of self-reported contagious yawning within a single season in one geographic location. A total of 142 pedestrians were recruited outdoors during an 18-day period over the summer in an equatorial monsoon climate in southern Florida, USA. Consistent with the thermoregulatory theory of yawning, results showed that self-reported contagious yawning frequency varied only across temperature gradients. This was true after statistically controlling for variables relative humidity, time of day, time spent outside, testing day, age of participant and hours of sleep the night before. These findings provide further evidence suggesting a brain cooling function to yawning.

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## **The Dark Side of Mind Wandering: Examining the Impact of Emotionally Valenced Task Unrelated Thoughts on Working Memory**

**Audrey Hood, Samantha Gestido, and Abraham Yacaman**

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Farquhar College of Arts and Sciences

Faculty Sponsor: **Jonathan B. Banks, Ph.D.**

### **Abstract**

Working memory (WM) is a dynamic system responsible for maintaining and processing information, and controlling attention (Engle & Kane, 2004). Although WM remains stable during adulthood, it is altered by a variety of factors including affect (Ilkowska & Engle, 2010). However, there remains debate regarding whether the impact of affect on working memory is driven by positive or negative affect. For instance, negative affect impairs WM performance due to increases in Task Unrelated Thoughts (TUTs; Curci, Lanciano, Soleti & Rime, 2013). High levels of TUTs reduce performance on a variety of cognitive functions, including sustained attention (McVay & Kane, 2009) and working memory (Banks, Welhaf, & Srour, 2015). While negative affect may decrease WM performance, other research demonstrates that positive affect may increase WM performance (Yang, Yang, & Isen, 2012), possibly due to a reduction in TUTs. The current study was designed to examine the role of the emotional valence of the TUTs in explaining the relationship between affect and WM. NSU undergraduates (N = 45) completed a WM task that included thought probes to measure TUTs. Participants then completed the Positive and Negative Affect Schedule (PANAS). Preliminary results did not indicate a direct relationship between WM task performance and either positive or negative affect. However, mediation analyses indicated an indirect effect of positive affect on WM performance, such that positive affect decreased negative TUTs which resulted in a subsequent increase in WM performance. These findings suggest that the valence of TUTs may alter the relationship between affect and WM.

## **The Devil's Due**

**Ricardo Lugo**

Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Cathleen Dean; Chetachi Egwu, Ph.D.; and Weylin Sternglanz, Ph.D.**

### **Abstract**

“The Devil’s Due” is a short film about a husband desperately trying to save his dying wife. He finds a solution, but what will he be willing to sacrifice? The film is written and directed by Ricardo Lugo. Other crew members and actors include Alex Lugo, Andrew McGarrett, Lauren McGarrett, Aaron M. Abelto, Laura Ten Zijthoff, and Addys M. Guerra.

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## **The Function of Yawning in Reducing Acute Hyperthermia Following Physiological Stressors**

**Melissa Dauzonne, Yana Prilutskaya, Daniel Garcia, and Amani Al Barghouti**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Omar Tonsi Eldakar, Ph.D.**

### **Abstract**

The present study attempts to look at the extent to which yawning reduces stress induced acute hyperthermia. When stressed socially or physiologically, body temperature rises with the stressed subject experiencing acute hyperthermia, essentially inducing a brief fever. Thus, after the removal of the stress stimulus, body temperature should begin to decrease and return to baseline conditions, which may be achieved through various thermoregulatory mechanisms. One such mechanism is yawning. Yawning is a deep inhalation of air accompanied by rapid increases in blood flow around the face head and neck. As supported in recent research across a wide range of taxa, yawning functions like a radiator, replacing hyperthermic blood surrounding the brain with cooler blood from around the lungs. In a recent study, stress was induced by capturing and handling parakeets (*Melopsittacus undulatus*), and resulting under wing temperatures were monitored. Stressed parakeet experienced an initial period of increased body temperature and inhibition of yawning. However, after a brief lag period following the removal of stressors, parakeet body temperature began to decline accompanied by increased spontaneous yawning. Here we build on these findings and directly demonstrate the association between stress-induced hyperthermia and the brain cooling function of yawning in humans. We exposed participants to a standard physiological stressors, measured physiological markers of stress and recovery, and assessed their propensity to yawn at various time intervals after the induction of stress. We hypothesized that yawning is potentiated to reduce acute hyperthermia following the onset of stress and therefore may provide an indicator of the beginning of stress relief. Understanding the role of yawning in alleviating the symptoms of stress may provide further insights to the duration, magnitude, and eventual recovery from stressful encounters.



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## **The Impact of the Affordable Care Act on Small Businesses of Varying Sizes**

**Franklin Saunders Hiffernan**

H. Wayne Huizenga School of Business and Entrepreneurship

Faculty Sponsor: **Charles Harrington**

### **Abstract**

Small businesses face many posing costs when conforming their entire insurance infrastructure to the requirements of the Affordable Care Act. This survey of the literature includes key information on the implications of the ACA on small businesses, providing detailed cost and benefit potential over a range of circumstances. The purpose of this research was to open up the complicated text of the ACA itself and provide true to life situations where the implications can be visualized and better understood. Due to the complicated terminology of the ACA, many Americans are still improperly informed as to how the reform will take effect. The goal of compiling this information was to serve a factual and legible collection of information that applies directly to small businesses in America under the new reform. Change is on the horizon of the healthcare system in the USA, and to realize its potential an understanding of the diverse implications of the reform is necessary.

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## **The Potential Effects of Caffeine, Energy Drinks, and Alcoholic Drinks on Gene Expression Using the Yeast (*Saccharomyces cerevisiae*) Model System**

**Amal Bhullar and Ashley Chang-Story**  
Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Emily Schmitt Lavin, Ph.D.**

### **Abstract**

Especially while in college, young people are supplementing their diets with various additives including caffeine in the forms of pills and energy drinks, in addition to consuming alcoholic beverages. This project aims to investigate the effects of three concentrations (low, medium, and high) of various caffeinated and alcoholic dietary additives/beverages on gene expression. Since yeast share approximately 30% of their genome with humans several conserved genes belonging to various functional groups (digestion, cell cycle, ion channel, molecular chaperone, kinases and transcription) were selectively targeted in this study. High, medium and low concentrations of caffeine tablets, energy drinks (Red Bull energy drink, Arizona Energy drink), ethanol, and alcoholic beverages (Bacardi rum and Bud Light beer) were administered to yeast cultures growing in typical YEPD media. These yeast cultures were allowed to grow for 42 hours to reach a density measure of approximately 1.2 at  $A_{660}$ . Then RNA was extracted, followed by cDNA preparation. The relative degree of expression of the selected genes belonging to the various functional groups was compared through the use of reverse transcriptase PCR. In this presentation, the results of the relative expression of selected digestion, molecular chaperone, kinase, and cell cycle genes (SUC2, TDH1, GPT2, DAP1, GIP2, HSP104, TOR1, MKK1, ASR1, ETP1, ADR1, PCK1, and RAS1) exposed to the different treatments will be highlighted.

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## **Understanding the Mysteries of African Ancestry Along My Maternal Lineage**

**Natalie Negrón**

Division of Humanities

Division of Math, Science, and Technology

Farquhar College of Arts and Sciences

Faculty Sponsors: **James Doan, Ph.D., and Emily Schmitt Lavin, Ph.D.**

### **Abstract**

People have often been interested in their ancestral roots, and the ability to document ancestry via the use of genetic tools has never been greater and more economical. Inspired by the Human Genographic Project, the purpose of this study was to better understand the historical links connecting African ancestry to Puerto Rican individuals along their maternal lineage. Previous research had shown that the researcher's maternal ancestry was linked to Haplogroup L1, which is one of the human subpopulations to have more recently migrated from Africa. For this project, DNA samples were collected from cheek swabs of both the researcher and her maternal grandmother, and tested commercially through Family Tree DNA and 23andMe. Using markers representative of human ancestral migration patterns that are passed down from mother to offspring, the researcher was able to further categorize her haplogroup classification by two subgroupings (Haplogroup L1, Subclade L1c1, T198C). In order to further understand the linkage between African ancestry and her cultural Puerto Rican background, the researcher examined historical records of pre-colonial Puerto Rico and the Taíno culture, the era of Spanish rule, the Atlantic Slave trade, and the current demographics of the island. Together, these major historical events played significant roles in shaping the multiracial population and, consequently, influencing the identity of Puerto Rican individuals. As a result, African ancestry (within the past 500 years) can be found along the maternal lines of many Puerto Rican individuals today.

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## **Viral Videos: Random Phenomena or Reproducible Templates?**

**Marisa Oleski**

Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Eric Mason, Ph.D.**

### **Abstract**

The purpose of this research is to identify the impact of the passage of policies that regulate physician assisted suicide in Oregon and the Netherlands. In the case of Oregon, data was collected from the Oregon State Health Department and was used to identify the number of participants, demographics, and number of deaths as a result of physician assisted suicide. In the case of the Netherlands, data was collected from a Dutch online publication known as *Statline* and supplementary information was gathered from an evaluation titled “Law Termination of Life on Request and Assisted Suicide”, which was done with the assistance of the Central Bureau of Statistics in Voorburg. The results in Oregon depict that there has not been a negative impact of the policy that regulates physician assisted suicide. Furthermore, in Oregon there has been a steady growth in the popularity of the practice. In the Netherlands the results illustrate that even though there has been a decline in the practice, it is not as a result of the policy having a negative impact on the practice but rather other factors.

## **Walking with Liz**

**Paola Zaidi**

Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Cathleen Dean; Chetachi Egwu, Ph.D.; and Weylin Sternglanz, Ph.D.**

### **Abstract**

“Walking with Liz” is a short film documentary about Elizabeth Burbano, an NSU student with a physical disability. Liz’s life has been an arduous journey to overcome the challenges posed by her disability. However, the surgeries, therapies and pain she has had to endure have not been able to slow her down on the road to achieving her dreams. The documentary is directed by Paola Zaidi.

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## **Water—A Source of Life and Disease: The Evolution of Water Quality in London**

**Lisa Marie Pace**

Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Edwin Stieve, Ph.D.**

### **Abstract**

The purpose of this research was to explore the many impacts and changes that have occurred over time due to the quality of water, and the introduction of public sewer systems. This research begins historically in the city of London, focusing on the Thames River, public wells, and the many rivers that provided a source of water to the citizens of London and branches out into modern day water quality in London. If clean water was made accessible to the citizens of London previously many epidemic diseases, such as Cholera, could have been avoided. By providing clean water many lives could have been saved and the spread of waterborne illnesses halted. In doing this research I hoped to focus on some of the many changes that have taken place in London over centuries to make clean water possible. This includes changes in sanitation and drainage laws; scientific and medical discoveries, and most importantly an understanding of how water can serve as a source of disease and, when clean, promote healthy living.

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## **What Has Been the Impact of the Passage of Policies That Regulate Physician Assisted Suicide in Oregon and the Netherlands?**

**Chantel Grant**

Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsor: **G. Nelson Bass III, J.D., Ph.D.**

### **Abstract**

The purpose of this research is to identify the impact of the passage of policies that regulate physician assisted suicide in Oregon and the Netherlands. In the case of Oregon, data was collected from the Oregon State Health Department and was used to identify the number of participants, demographics, and number of deaths as a result of physician assisted suicide. In the case of the Netherlands, data was collected from a Dutch online publication known as *Statline* and supplementary information was gathered from an evaluation titled “Law Termination of Life on Request and Assisted Suicide”, which was done with the assistance of the Central Bureau of Statistics in Voorburg. The results in Oregon depict that there has not been a negative impact of the policy that regulates physician assisted suicide. Furthermore, in Oregon there has been a steady growth in the popularity of the practice. In the Netherlands the results illustrate that even though there has been a decline in the practice, it is not as a result of the policy having a negative impact on the practice but rather other factors.

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## **Why Do Patients Who Are Going Blind Lose Their Blue Color Vision First?**

**Mariana Ferraz**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsors: **Ava Bittner, O.D., Ph.D.; and Mark Jaffe, D.P.M.**

### **Abstract**

Retinitis pigmentosa (RP) is a slowly progressive, inherited retinal degeneration affecting roughly 1 in 4000 people, typically resulting in a loss of peripheral and night vision, with most legally blind by age 40<sup>[1]</sup>. RP is characterized by the apoptosis of retinal rods and cones (photoreceptors). Cones are responsible for central and color vision, while rods provide peripheral and nighttime vision. Over 20 years ago, it was reported that some RP patients initially lose short wavelength cones (i.e., s-cones for blue-violet colors; e.g., imagine a world in which shades of blue look grey), but no further research on this topic has been conducted. We explored factors that may predict which RP patients are susceptible to s-cone loss. Cone function was determined using the PC-based Innova Rabin Cone Contrast Test with 2 tests per session repeated at two visits. Of 18 RP patients tested, only three (17%) had normal s-cone sensitivity, while 14 out of 15 eyes (93%) in 10 patients with measurable s-cone loss had a greater reduction in sensitivity for the s-cones than longer wavelength cones for red and green colors. S-cone sensitivity loss was measurable in those with visual acuities between 20/25-20/50. Amount of peripheral visual field loss, ability to see stars as a child, and duration of night vision loss were not statistically significantly related to s-cone loss across subjects; however, the three participants with normal s-cone sensitivity were the only ones with rod-mediated night vision, indicating there may be a link between loss of rods and s-cones.



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## **Wildfires, Fireworks, and Air Quality: Episodic Events with Impactful Consequences**

**Aarabhi Rajagopal**

Division of Math, Science, and Technology  
Farquhar College of Arts and Sciences

Faculty Sponsor: **Song Gao, Ph.D.**

### **Abstract**

This study aims to identify and quantify the impact of episodic pollution sources, in particular fireworks and wildfire, on the air quality and public health in South Florida. Specifically, two case studies demonstrated the critical impact of episodic events on the regional air quality with long-range and/or regional transport of air parcels. In May 2007, the infamous Bugaboo Scrub Fire at the Florida-Georgia border generated a substantial amount of smoke, significantly increasing the concentration of atmospheric particulate matter (PM 2.5). Detailed meteorological analyses, such as NOAA's HYSPLIT trajectory modeling, showed that certain wind conditions carried the smoke plume over 400 miles to South Florida, contributing to the very high aerosol concentrations that posed threats to the public health from Fort Lauderdale to Homestead. On the other hand, during Independence Day celebrations and New Year's celebrations, the fireworks displays in Miami and Fort Lauderdale emitted substantial amounts of aerosols and smoke. Trajectory analyses showed that these fireworks elevated the atmospheric aerosol concentration in nearby areas to unhealthy levels for various years, posing a public health concern. During such events, precautionary notices can and should be brought to the public's attention using analyses of pollution sources and transport trajectories.

## **Women of the 1950s: American Housewives and the Outrageous Expectations Set by Society**

**Jordyn Hughes**

Division of Humanities  
Farquhar College of Arts and Sciences

Faculty Sponsor: **David Kilroy, Ph.D.**

### **Abstract**

The 1950's was a time when companies took advantage of the sexist and domesticated view that society had on women, they began aiming their advertisements at women and how products would help them please their husbands. These advertisements made people believe they would not be happy or comfortable without the product shown.

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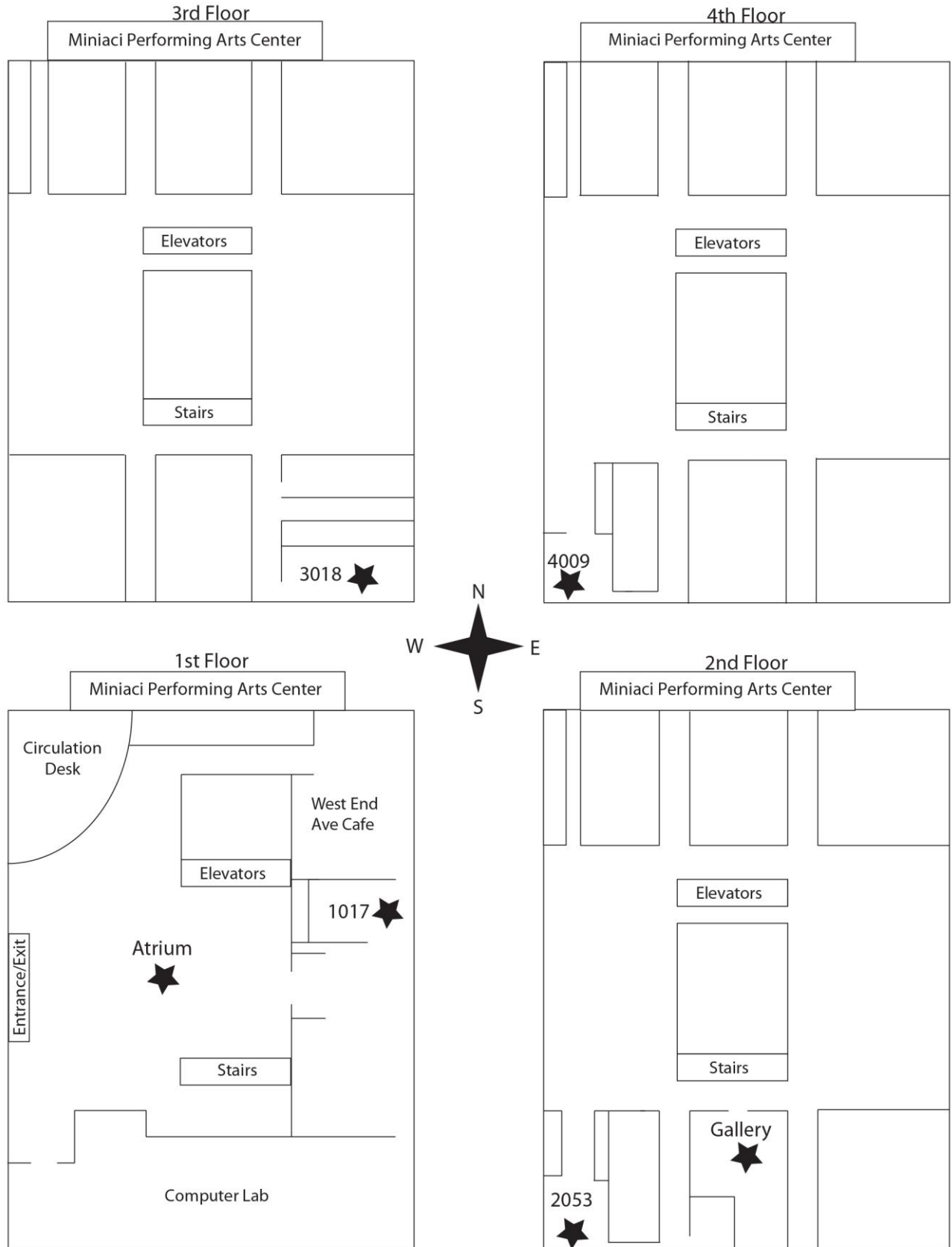
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# Undergraduate Student Symposium Presentation Locations

Alvin Sherman Library, Research, and Information Technology Center



# UNDERGRADUATE STUDENT SYMPOSIUM

## 2015 Program Schedule

TIME	EVENT AND LOCATION		
1:00–1:45 p.m.	<b>Welcome and Introduction</b> – Don Rosenblum, Ph.D. <b>Keynote Speaker</b> – Charles Zelden, Ph.D. <div style="text-align: right;"><b>Performance Theatre    Don Taft University Center</b></div>		
1:45–3:00 p.m.*	<b>Poster Presentations</b>	<b>First Floor Atrium</b>	<b>Alvin Sherman Library</b>
1:45–4:00 p.m.*	<b>Film Presentations</b>	<b>Youth Program Room 1017</b>	<b>Alvin Sherman Library</b>
3:00–4:00 p.m.*	<b>Oral Presentations</b>	<b>Adolfo and Marisela Cotilla Gallery</b>	<b>Alvin Sherman Library</b>
	<b>Oral Presentations</b>	<b>Room 2053</b>	<b>Alvin Sherman Library</b>
	<b>Oral Presentations</b>	<b>Room 3018</b>	<b>Alvin Sherman Library</b>
	<b>Oral Presentations</b>	<b>Room 4009</b>	<b>Alvin Sherman Library</b>
4:30–5:30 p.m.	<b>Awards Ceremony    Performance Theatre    Don Taft University Center</b>		

\*See separate detailed schedule for poster easel numbers, specific film showing times, and oral presentation room assignments.