

16th Annual
Undergraduate Student
Symposium

*Undergraduate
Student Symposium*



Friday, April 7, 2017

Alvin Sherman Library, Research, and Information Technology Center



NOVA SOUTHEASTERN
UNIVERSITY

Farquhar Honors College

Undergraduate Student Symposium 2017

The Undergraduate Student Symposium, sponsored by the Farquhar Honors College, presents student projects through presentations, papers, films, 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. Project presentations can represent any stage in a 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 and engineering, mathematics, arts and humanities, nursing and health care, education, and business. This is the sixteenth annual Undergraduate Student Symposium.

USS 2017 Keynote Speaker



H. Thomas Temple, M.D., is a General Orthopedic Surgeon specializing in musculoskeletal oncology with a strong clinical interest in regenerative medicine. He also holds the title of Senior Vice President of Translation Research and Economic Development at Nova Southeastern University. Dr. Temple received his undergraduate degree from Harvard University, and his medical degree from Jefferson Medical College in Philadelphia. He completed an Internship in General Surgery and Residency in Orthopaedic Surgery at Walter Reed Army Medical Center in Washington, D.C. He trained in Orthopaedic Oncology at the Massachusetts General Hospital and Boston Children’s Hospital. Dr. Temple is a member of the American Academy of Orthopaedic Surgeons, the American Orthopaedic Association, the Musculoskeletal Tumor Society, the International Skeletal Society, the American Association of Tissue Banks, the Girdlestone Society and the

American Orthopaedic Foot and Ankle Society. Dr. Temple’s previous position was affiliated with University of Miami helping to train and mentor future surgeons. In addition to his teaching career, Dr. Temple has also authored over 150 scientific articles and book chapters. He is an Assistant Editor for Foot and Ankle International, a long-standing reviewer for Clinical Orthopaedics and Related Research and the Journal of Bone and Joint Surgery.

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**16th Annual
Undergraduate Student Symposium**

April 7, 2017

Abstract Proceedings

**Farquhar Honors College
Nova Southeastern University**

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Senior Vice President of NSU Translational Research and Economic Development

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A Compression Of Digital Data Using Linear Algebraic Methods

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Abstract

Data compression is the most important software tool to enhance the performance of digital devices without implementing significant and costly hardware modifications. This poster will discuss the basics of digital data compression and how it is used to optimize data storage. By highlighting some pitfalls of current compression methods, the need for more efficient methods will be illustrated. The mathematical foundations of a novel compression method based on linear algebraic operations will then be presented. One goal of this poster is to present some issues within a number of current compression methods, such as JPEG compression. Another goal is to showcase some applications of the newly developed compression method.

Academic and Emotional Intelligence in First Year College Students: A research proposal

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Abstract

The relationship between academic intelligence and emotional intelligence (EI) is essential for the success of first year college students. This research proposal reviews the literature on the teaching and learning of students in first year seminar type courses. Goleman's (2001) 2x2 emotional competencies model of EI predicts recognition and regulation of self and other. The ability to recognize and regulate one's emotions enhances student's academic performance. The main purpose of the research study is to generate hypotheses about the measurement of emotional intelligence as it complements GPA.

Assessment of Heavy Metals in Subsistence-Harvested Alaskan Pinniped Vibrissae

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Abstract

In the past 40 years, three species of pinnipeds -harbor seal (*Phoca vitulina*), Steller sea lion (*Eumetopias jubatus*), northern fur seal (*Callorhinus ursinus*) and the northern sea otter (*Enhydra lutris*) have undergone significant population declines . Archived vibrissae (whiskers) from these four species from the Bering Sea and throughout the Gulf of Alaska from 1993 to 2014, are used in the project. To our knowledge, this is the first time that whiskers are being used for heavy metal analyses. Whiskers are comprised of keratin, much like fur and hair, which has been proven to accumulate heavy metals. The heavy metals tested, Hg, Se, As, Zn, Cr, Co, Cu, Pb, Cd and Ni, can provide a baseline concentration for heavy metal bioaccumulation in higher trophic species. The results of this research will provide additional data to possibly help with the question of the pinniped and fissiped population declines, without compromising the health of the animal since it is a noninvasive procedure. The information will also be shared with Alaskan subsistence communities regarding the level of safety in regards to consumption of various marine mammal tissues.

Behavioral Response of Small Everglades Fish to Hydrological Variation, Predator Cues and Parasites

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Abstract

Small fish are important to the Everglades ecosystem as primary and secondary consumers and as a food source for higher trophic levels. In short-hydroperiod wetlands, these fish must migrate to refuge areas or risk stranding, and have been observed to rapidly recolonize during the wet season. The goals of this study are to understand what influences annual migrations to and from short-hydroperiod wetlands. We aim to link individual variation in behavior to population-level movement. We specifically tested whether the willingness of fish to explore and move through unknown environments varied among species, with hydrological season, wetland hydroperiod, or parasite load). We tested the hypothesis that waterborne cues might influence risk aversion and likelihood of entering unknown areas. We used a factorial experimental design to measure effects of visual predator cues (using a bird model), chemical cues from bird feces, or food motivation on the behavior of eastern mosquitofish. Fish were filmed exploring an artificial habitat, and we examined data like the time spent hiding, total distance traveled, variation in speed and other movement variables. We found that behavior varied significantly among species, with eastern mosquitofish (*Gambusia holbrooki*) the most likely to explore and golden topminnow (*Fundulus chrysotus*) the least so. Most fish were parasitized, some with parasites from taxa known to modify host behavior. To date, small sample size limits our ability to draw conclusions from this experiment, but it seems likely that these factors influence fish migration in nature.

Biomechanics Differ between Highest and Lowest Race Finishing Places of Collegiate Distance Runners: A Case Analysis

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Abstract

Faulty running biomechanics have been associated with injury, yet their role in performance is poorly understood. We sought to determine if gait and functional movement mechanics could differentiate between high and low performing distance runners. Three top and three bottom place finishers from a men's university cross-country team were studied, [(top; 22.7±2.9 yrs, 63.0±4.0 kg, 1.73±0.04 m) (bottom; 19.7±4.6 yrs, 62.8±6.0 kg, 1.71±0.07 m)]. They were identified by reviewing six NCAA races for consistent performance in Fall 2016, and represent six of 11 team members. Participants underwent a 3D analysis using a camcorder and 10-camera motion capture system while running on an instrumented treadmill (2.86-3.28 m/s). Running technique was qualitatively and quantitatively examined for known faulty biomechanics such as excessive hip internal rotation (HIR), hip adduction (HADD), knee valgus (KVAL), rearfoot eversion (REV), and contralateral hip drop (CHD). Movement patterns were assessed using the Functional Movement Screen (FMS), a tool that categorizes seven movements as dysfunctional, compensatory, or adequate. Five of seven movements are scored bilaterally to evaluate asymmetries. Results showed both groups had one asymmetry and no dysfunctional scores on the FMS. However, 3/3 bottom placing runners displayed a CHD; 2/3 excessive HIR; 2/3 KVAL outside of normal limits; 1/3 excessive REV. Two of three top finishers showed a CHD and 1/3 excessive HADD. We conclude that the bottom finishers had a greater number of faulty biomechanics than the top finishers, while there were no differences in movement patterns. Coaches should promote proper mechanics to positively impact performance.

Case Studies: Developing a Cost-Effective Approach to treating HIV in Africa

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Abstract

The purpose of this research is to investigate the cost-effectiveness of government-subsidized HIV intervention programs and its effects upon the labor force in Africa. This study will discuss how Africa became one of the densest regions in the world to fall victim to HIV/AIDS along with a discussion on the present framework of intervention programs and treatments and their shortcomings. One of the largest government-subsidized programs is the antiretroviral therapy (ART) offered to those who have already contracted HIV/AIDS. The ART treatment will be assessed as to how cost-effective it is and whether the incidence rate has truly fallen enough to show a measurable growth upon the diminished labor force. Medically invasive treatment for those who have contracted the disease is not the primary concern, rather it is to reduce the actual contraction and expansion of this disease. These preventative techniques come in the form of counseling, peer and school-based education, and the use of the mass media. The success of these programs will be assessed to showcase whether there has been a considerable improvement in preventing the incidence among certain age-based populations. The survey of information will be conducted through case studies, epidemiological analyses, and health economics researches ongoing or completed.

Catfish Get Caught and Punished: Dating Profile “Cheaters” and Mate Value Ratings

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Abstract

People who break social rules by trying to take more than their fair share are often singled out and punished by those around them. Although this phenomenon has been studied across a wide range of human behaviors, it has not yet been investigated in one situation in which people are consistently trying to “get more than they deserve”: dating. This study tested the extent to which people may punish those potential romantic partners who falsely present themselves as valuable mates. Participants completed a task in which they (1) read a fictitious online dating profile that described a person as having either a high or low mate value, (2) provided a mate value rating of that person, (3) read a set of reviews indicating that the profile “lied” and the person was either less valuable or more valuable than was depicted, and (4) provide a second, post-review mate value rating of the person depicted in the profile. We hypothesized that, in the context of dating, people would be more likely to “punish”—that is, assign excessively low mate value ratings to—those who tried to appear more valuable in their profile, while those who tried to appear less valuable would receive no such punishment. Preliminary results support the hypothesis, and indicate that the extent to which participants engaged in punishment may be moderated by individual difference variables, including participant self-esteem and mate value.

Colleges Must Require a Diversity Course

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Abstract

It has been over half a century since the Civil Rights Act was passed into law, however, prejudice and discrimination rooted in race, color, religion, sex or national origin is still prevalent in our society today. In fact, hate crimes, motivated entirely or partly by an offender's bias against a race, religion, disability, sexual orientation, ethnicity, gender, or gender identity, increased 6% between 2014 and 2015. Implementing a diversity course requirement for all undergraduate college students nationwide would help to combat this outbreak of hatred in the country by fostering graduates who are better equipped to understand the perspectives of others with backgrounds, cultures, and socioeconomic statuses different from their own. This paper reviews literature both in favor of and against the requirement, and ultimately determines that mandating a diversity course for all undergraduate students would allow for the development of more tolerant members of society. The research shows that if students can learn to think critically about one significant difference in US society, they will be able to think critically about other differences as well.

Combating Cooperative Antibiotic Resistance

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Abstract

Antibiotic resistance is a significant public health concern, causing more than 2 million illnesses and 23,000 deaths each year. To better combat the problem of antibiotic resistance, we studied the effects of cheater bacteria using a strain of *Escherichia coli* with the ability to express β -lactamase. Specifically, we mapped the conditions that cause cooperative bacteria to exhibit a strong Allee effect – in which colony survival depends on the initial population exceeding a certain minimum threshold. Bacteria that express β -lactamase confer protection to the population when ampicillin is present. This provides an incentive for cheater bacteria to enjoy the benefits of the enzyme without paying the metabolic costs of production. Using an intraspecific competitive Lotka-Volterra model along with experimental data, we studied the growth of normal (“cheater”) and resistant (“cooperator”) bacteria under various initial conditions of population, fraction resistant, and antibiotic concentration. The strongly nonlinear nature of the equations leads to a pronounced Allee effect within a certain range of antibiotic concentrations. The final population density as a function of the initial population becomes increasingly sigmoidal in shape as the level of cooperativity increases, measured using a modified Hill function. At the extremes, a population of all cooperators shows a “all-or-nothing” survival curve characteristic of the Allee effect, while an experiment with only cheaters (“every bacterium for itself”) has a much more linear response. Cooperativity is strongest with a small initial population of pure cooperators. The threshold dose required to eradicate the infection may be reduced by the purposeful introduction of cheater strains. The results of this study may inform efforts to design antibiotic treatment regimens that minimize the risk of resistance.

Comparison of Porifera Bacterial Symbiont Community Profiles Based on Species and Source Template

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Abstract

Sponges exhibit complex, species-specific microbial symbioses. The role of symbiont communities, known as “microbiomes”, to create a “holobiont” with their host is not fully understood. Microbiomes can be characterized by sequencing 16S rRNA fragments from total community genomic DNA (gDNA). The purpose of this study is to sequence bacterial rRNA from previously isolated cDNA (complementary DNA synthesized from RNA samples) and compare the profiles to gDNA. The samples were derived from the Porifera Tree of Life (PorTol.org). I hypothesize that microbial profiles derived from gDNA templates will be nearly identical to those found in cDNA of the same sponge species. We assume that cDNA sequences represent active and viable bacteria that can be compared with microbial profiles of gDNA templates (which may hold inactive, or less viable microbes). Samples were PCR amplified using universal 515/806 primers which have been applied in the EarthMicrobiomeProject.org. The PCR products were then analyzed using gel electrophoresis to confirm the presence of bacterial genes (specifically 16S rRNA, a nuclear housekeeping gene). Next, the samples were purified and run on a genome sequencer (Illumina MiSeq) to acquire variable region V4 sequences of active bacterial communities present in the sponge cDNA and DNA samples. The next step for this research will be to analyze the raw microbiome data using R-based statistical software and QIIME. Bacterial community identities present in each sample will be compared across sponge species and group in order to determine the levels of relatedness, as well as compare differences between cDNA and DNA results.

Continuous Dependence and Differentiating Solutions of a Second Order Boundary Value Problem with an Average Value Condition

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Abstract

Using a few conditions, continuous dependence, and a result regarding smoothness of initial conditions, we show that derivatives of solutions to the second order boundary value problem $y'' = f(x, y, y')$, $a < x < b$, $y(x_1) = y_1$, $\frac{1}{d-c} \int_c^d y(x) dx = y_2$, $a < x_1 < c < d < b$, $y_1, y_2 \in \mathbb{R}$ with respect to each of the boundary data x_1, y_1, y_2, c, d solve the associated variational equation with interesting boundary conditions. Of note is the second boundary condition with an average value condition.

Cytotoxic Effect of *Iphinoe*: A Marine Natural Product on LNCaP Prostate Cancer Cells

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Abstract

Prostate cancer is one of the most common forms of cancer among men in the United States. It is estimated that one in every three men will develop prostatic intraepithelial neoplasia, among them one in six will progress to carcinoma of the prostate. Surgery, radiation therapy, and chemotherapy are commonly sought-after treatments for prostate cancer. However, recently there has been a growing number of discoveries reported in favor of the chemopreventative abilities of natural products. Therefore, the primary focus of this study was to determine the cytotoxic effect of *Iphinoe* extract (IE) from marine cyanobacteria, on LNCaP prostate cancer cells. During our experiments, the LNCaP cells were grown in a 96-well cell culture plate with RPMI-1640 medium containing 10% Fetal Bovine Serum (FBS) and 1000 units/ml of Penicillin-Streptomycin. The IE was added to the culture plates at varying concentrations [1-10 $\mu\text{L}/\text{mL}$] and the cells were incubated for 24 hours. At the end of incubation, the cytotoxicity was determined by performing MTT assay. The results from our experiments showed that with an increase in the concentration of the IE, there was a significant decrease in the survival of the LNCaP cells. From this preliminary study, a significant level of cytotoxic effects exerted by the IE against LNCaP prostate cancer cells is confirmed. Further experiments are underway to determine some of the underlying mechanisms that may be mediating the cytotoxic effects of IE (This project was supported by the Royal Dames of Cancer Research, Ft. Lauderdale, FL).

Differences in Jump Height and Reactive Strength Index-Modified in Dancers and Non-dancers Performing the Vertical Jump from Two Positions

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Abstract

The vertical jump (VJ), the gold standard for assessing leg power, is most commonly performed from a squat stance (SS). However, dancers often initiate jumps/leaps from a plié, externally rotated from the hip or “turned out” (TO). Testing dancers from a SS may not indicate activity specific power. This study’s purpose was to determine differences in jump height and leg explosiveness, as measured by reactive strength index-modified (RSI-mod) when performed from TO and SS positions in dancers and non-dancers. Thus far, five healthy participants who are physically active at least ten hours/week have been studied; three dancers, having at least four years of ballet training (19.3 ± 2.1 yrs, 66.7 ± 11.7 kg, 1.70 ± 0.05 m), and two non-dancers (24.5 ± 3.5 yrs, 71.0 ± 2.5 kg, 1.70 ± 0.03 m). Post warm-up, participants performed three jumps from both TO and SS conditions. Time to take-off was determined as the time difference between the beginning of the eccentric lowering phase and take-off. Jump height was measured with a Vertec. RSI-mod was calculated as jump height/time to take-off. Preliminary results show dancers jumped higher TO vs. SS (18.83 ± 3.55 vs. 18.33 ± 4.37 in), and non-dancers jumped higher SS vs. TO (18.25 ± 5.30 vs. 17.75 ± 5.30 in). RSI-mod was higher for TO than SS for dancers (0.70 ± 0.18 vs 0.64 ± 0.23), and similar for SS vs. TO for non-dancers (0.41 ± 0.11 vs $.40 \pm 0.08$). Dancers appear to have greater leg power overall than non-dancers, and generate more power in the TO vs. SS condition as indicated by higher jump heights and RSI-mod. Testing dancers from a TO position improves VJ performance.

Does stress hurt everyone? Individual differences in susceptibility to psychosocial stressors

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Abstract

Despite the critical role working memory plays in controlling attention, when people experience negative or stressful life events working memory task performance is impaired (Klein & Boals, 2001). Further, daily variation in stress corresponds to variation in working memory performance (Sliwinski, Smyth, Hofer, & Stawski, 2006). In contrast to robust findings that stress impairs working memory, recent evidence suggests there are individual differences in susceptibility to stress manipulations (Plieger, et al., 2016). To examine this, the current study randomly assigned one hundred NSU undergraduates to either a speech or control condition. Participants in the speech condition gave a three-minute speech about a body part they liked the least. All participants completed two working memory tasks, AOSPAN and three-back, and a state/trait anxiety inventory. A median split was used to create high and low trait anxiety groups. A 2 (condition) x 2 (trait anxiety) ANOVA was conducted to examine difference on the two working memory tasks. A significant interaction between condition and trait anxiety was observed on the AOSPAN, $F(1, 72) = 4.53, p < .05$, partial $\eta^2 = .06$. The high trait anxiety group in the speech condition performed significantly worse than the low trait anxiety group in the speech condition, ($t = 2.36, p < .05$), and both low and high trait anxiety groups in the control condition ($t = 2.12, p < .05$; $t = 2.46, p < .05$, respectively). No interaction was observed on the three-back task, suggesting the two tasks may tap different components of working memory.

Dollar

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Department of Writing and Communication
College of Arts, Humanities, and Social Sciences

Abstract

Although many of us live seemingly unconnected lives, separated by social and economic stratospheres, we are often linked through commonplace objects and locations. A dollar bill, for example. A dollar bill survives an average of 5.9 years, according to the Federal Reserve. By some estimations, it can change hands 110 times a year. And while a dollar's economic value doesn't change much from wallet to wallet, a dollar can change the people who carry it.

Don't Hug Me I'm Scared: Sense or Cents?

Adam DeRoss

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Department of Writing and Communication
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Abstract

In 2011, British artists Becky Sloan and Joseph Pelling released the first episode of what would become a viral YouTube sensation. The short film series “Don't Hug Me I'm Scared” has over 42 million views on its first episode alone. I completed an analysis paper on the series putting forth my explanations and theories on the small details and plotline of the ambiguous and open series. Through my oral presentation, I aim to help others think a little bit more critically about this art form and what implications it holds for the real world.

Evaluation of FAK and MDR1 Crosstalk in Platinum Resistant Ovarian Cancer Cells

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Halmos College of Natural Sciences and Oceanography

Faculty Sponsor: **Dr. Appu Rathinavelu**
Rumbaugh-Goodwin Institute for Cancer Research

Faculty Sponsor: **Dr. Arkene Levy**
Rumbaugh-Goodwin Institute for Cancer Research

Abstract

Platinum resistance continues to be a major challenge in the chemotherapeutic management of ovarian cancer. Increased phosphorylation of a tyrosine kinase, Focal Adhesion Kinase (FAK) has been implicated in the development of this platinum resistance. A multidrug resistant gene (MDR1) codes for the P-glycoprotein, a protein that plays an important role in the chemotherapeutic resistance of the platinum resistant ovarian cancer cells. Therefore, it was suspected that there may be an intracellular link between FAK and MDR1 that can determine the drug resistance and consequent escape from the cytotoxicity of the drugs in ovarian cancer cells. Hence, it is hypothesized that FAK plays an important role in activating the MDR1, that can lead to platinum resistance in a sub-set of ovarian cancer cells. To verify our hypothesis, the platinum resistant cells were treated with varying concentrations of Y15, and the DNA fragmentation and poly ADP ribose polymerase (PARP) cleavage assays were performed to determine the extent of cell death. Western blot analysis for the phosphorylated FAK and P-glycoprotein were also utilized to evaluate the levels of phosphorylation and protein expression respectively, in response to Y15 treatment. The results of our study provides great insight in confirming a potentially new targeted approach to treat recurrent ovarian cancer, as it is the first to link the FAK dependent cytotoxic mechanism of Y15 to the MDR1 gene in platinum resistant ovarian cancer cells. I would like to thank the Royal Dames for providing the financial support to conduct this research.

Examining the stress-gut microbiome interface in a human population

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Abstract

Diverse symbiotic microbial communities are harbored on and within most eukaryotic host organisms, including humans as “microbiomes”. The human gut microbiome represents one of the best-studied microbial communities in nature. Recent research on the gut has indicated that the microbiome can influence human behavior, metabolism, and disease states. However, it currently remains unclear as to how the diversity in the gut microbiome may affect stress. To address this open question, we sought to sample gut microbiome from two populations of participants: stressed and non-stressed males. Neurobehavioral measures of emotion processing and cognition were assessed through the NIH Toolbox platform and the Joggle cognitive battery, respectively. We observed that biological markers of stress, such as cortisol, were highly correlated with perceived stress and preliminary data show that, overall, neurobehavioral scores were lower in the stressed group relative to the non-stressed group. To correlate gut microbiome diversity with biological and neurobehavioral measures of stress, we are currently using Illumina genomic sequencing to identify abundant genera in fecal samples taken from patients. Overall, our study is the first to examine the correlation between gut-microbiome diversity and stress. Our results may lead to novel mechanisms to reduce stress by rationally perturbing microbial diversity in the human gut.

Fluorinated Porphyrin Interactions in Cancer Cells

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Rony Saleeb

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Abstract

Photodynamic therapy is a contemporary cutting-edge cancer treatment that is currently being studied intensely. A common agent used in photodynamic therapy is a manufactured porphyrin molecule. Porphyrin molecules are activated when exposed to specific wavelengths of light, and upon activation, either cellular apoptosis or tissue necrosis occurs. Through the alteration of the chemical structure of a porphyrin molecule, differing outcomes take place in the development of the cancer treatment. Careful examination of fluorinated porphyrin derivative compounds can be implemented in order to determine applicable compounds for treatment.

Frozen Brain Atlas: Individualized Brain Mapping for Research and Education

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College of Pharmacy

Abstract

The Frozen Brain Atlas provides students, educators, and scientists with a tool to further explore the architecture of the brain. Current brain atlases allow users to navigate sectioned brain tissue using histological staining; however, they fail to capture naturally visible fiber tract structures post sectioning. Through immediate post sectioning image collection, the natural contrast of the brain reveals unique structural details that are rarely seen by traditional staining procedures. The Frozen Brain Atlas project creates a user friendly online interactive brain atlas available to the public as a teaching tool, along with researchers as a source for reference. The project aims to highlight specific structures and explain their functions, allowing users to navigate through all the sections of the rat, mouse, and potentially brains of other species. While there are other brain atlases available that are used as resources, including the Allen Brain Atlas, and the Paxinos and Watson rat and mouse Brain Atlases, we anticipate the Frozen Brain Atlas will complement these other atlases by virtue of its ability to show neuroanatomical characteristics that are apparent in freshly cut sections, opposed to stained sections. By utilizing indexing and interactive labeling, the Nova Southeastern University's Frozen Brain Atlas will allow identification of brain regions when used as a correlative tool for modalities including receptor autoradiography, immunofluorescence, and other anatomical methods.

Galaxy Morphology Classification System

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College of Engineering and Computing

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Abstract

Citizen scientists are becoming more and more important in helping professionals working through big data. An example in astronomy is crowd sourced galaxy classification. But how reliable are these classifications for studies of galaxy evolution? We have created a tool that allows us to use crowd sourced data from college students to investigate morphological classifications and compare the data against existing professional classifications. User generated data is prone to error and comparing said data against a professional classification allowed us to establish a margin of error, which we then corrected using machine learning. The program was coded using C++, the data was obtained and processed using Google's Cloud Engine platform, and the charts allowing us to visualize the data were processed locally using excel.

Heavy Metal Contamination at Unregulated Target Shooting Sites in the Everglades

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Abstract

Heavy metals such as lead and copper can negatively impact organisms and the environment exposed to the pollution. These metals can enter the environment in many ways; for example, hazardous waste, discarded sporting gear, leaded gasoline, pesticides, or roadways. A heavily used, unregulated target range was discovered in the Everglades. This location, Krome Avenue, is unregulated and bullets and shell casings litter the area. We hypothesize that the Krome Avenue range will have higher levels of lead and copper than control sites. Water, soil, plant, and invertebrate samples were collected from the site to identify if any metal pollution is bioaccumulating or biomagnifying. An Atomic Absorption Flame Emission Spectrophotometer will be used to detect the concentrations of lead, copper, and aluminum in the samples. The detected concentrations will be used to compare the Krome Avenue location to a control site located upstream along the same levee, a control site in the Everglades, a control site near a levee, and a control site at Markham Park shooting range. Markham Park shooting range is used to show any differences between a government regulated range and the unregulated Krome Avenue location. Ammunition found at the Krome Avenue site will be evaluated for metal components that could contribute to heavy metal pollution. Lead levels were slightly elevated at the Krome Avenue site samples and particularly high in samples from Markham Park.

How Peripheral Substitutions Affect Porphyrin Basicity

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Abstract

Using H₂TPP as a central reference, a set of proton competition studies of free base octa alkyl and meso substituted porphyrins were carried out. The H₂TPP was selected since it has a large absorption for dication at 650 nm. The octa alkyl substituted porphyrins used in this study were H₂OEP, H₂OMP and H₂etio1; selected because they are a good representation of natural occurring porphyrins. H₂TPP, H₂TBPP, H₂DPP, and H₂TTFMPP, using different arrangements on substitution, were also investigated to further study their meso substitution effect on basicity. The results against the H₂OEP produces the free base H₂OEP, the dication H₄OEP⁺² and the monocation H₃OEP⁺¹. The monocation is easily seen in solution but it is difficult to isolate since a type of disproportionation reaction seems to take place upon crystallization, where the dication is formed at the expense of the monocation. In each experiment, the resultant spectra were obtained by mixing and analyzing an equimolar solution of two free-bases, added to compete.

Additionally, meso phenyl substituted porphyrins were tested against H₂TPP. It was suspected that the porphyrins studied would not be as basic as H₂TPP, because of the electron withdrawing substituents which might increase acidity, thus decreasing basicity. We concluded that the H₂TPP was again preferentially protonated, and hence more basic than the octa alkyl substituted porphyrins H₂OEP, H₂OMP and H₂etio1. However, H₂TBPP and H₂TTFMPP were more basic than H₂OEP, H₂OMP, H₂etio1 and H₂DPP. Using MM+ and semi empirical methods, computations studies were carried out to validate porphyrin basicity.

Impact of MDM2 on the Expression Level of XIAP on Various Cancer Cell Lines

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Abstract

Transcription of the mouse double minute 2 homolog (MDM2) gene is amplified during cancer development and continues through disease progression. X-linked inhibitor of apoptosis protein (XIAP)-MDM2 heterodimerization occurs when XIAP binds to the RING domain of the MDM2. This interaction is a pro-cancerous mechanism, which counteracts the cellular stress caused by cancer therapy, and plays a significant role in the stabilization of MDM2 and related functions. Additionally, XIAP inhibits the pro-apoptotic proteins caspase 3, 7 and 9; which are key factors in intrinsic cellular apoptosis. The objective of the study is to test the effect of MDM2 inhibitor RG7388 to determine whether inhibition of MDM2 decrease the level of XIAP in MDM2 overexpressing cancer cell lines. Initially, the expression level of XIAP was tested in the following cell lines: LNCaP (Prostate), LNCaP-MST (MDM2 transfected LNCaP cells), SJSa-1 (Osteosarcoma) and GI-101A (breast). Notably, the XIAP expression is significantly higher in the LNCaP-MST and SJSa-1 cell lines, which has elevated expression of MDM2. So far our results show a positive correlation between MDM2 and XIAP expression. Treatment with RG7388 showed a decrease in the levels of XIAP, which is well correlated with the upregulated levels of caspase enzymes, and activation of intrinsic apoptosis pathway. However, further studies are warranted to confirm the intracellular mechanisms involved in the regulation of XIAP in MDM2 positive cancers. (This project was supported by The Royal Dames of Cancer Research Inc., Ft. Lauderdale, Florida).

Improving Functional Movement Patterns Reduces Pathomechanics in Competitive Distance Runners

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Abstract

Running related injuries are linked to faulty running biomechanics such as excessive hip adduction (HADD), hip internal rotation (HIR), knee valgus (KVAL), and contralateral pelvis drop (CPD). Functional movement pattern (FMP) training is a novel intervention used by clinicians to correct underlying FMPs (stepping, squatting) with the aim of affecting more sport specific mechanics. The purpose of this study was to evaluate the effectiveness of an 8-week FMP corrective program to reduce pathomechanics in six runners with dysfunctional FMPs. We used paired t-tests to evaluate changes in peak motion in degrees for HADD, HIR, KVAL, and CPD; and total Functional Movement Screen (FMS) scores out of 21. Five of seven FMS movements are scored bilaterally to evaluate asymmetries. Five male and one female adult competitive runners who ran at least 50 mpw (18.5±0.5 yrs, 1.7±0.1 m, 55.4±3.8 kg) and had dysfunctional FMPs as identified using the FMS participated in this study. They underwent 3D motion analysis of running biomechanics using a 10-camera motion capture system while running on a treadmill (3.10±0.3 m/s). An 8-week corrective exercise program based on their FMS results was incorporated into their team's strength and conditioning sessions. Improvements were shown in FMS scores (pre 14.8±1.0 vs post 16.0±1.7, p<.05), number of asymmetries (pre 4 vs post 2) and HIR (pre 16.2±3.6° vs post 10.4±3.6°, p<.05). There were no significant changes in HADD or CPD, p>.05. Correcting underlying FMPs may reduce known running pathomechanics. This novel approach may be effective in developing injury prevention programs.

Interview

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Abstract

As college students, we all have that dream job that we have been preparing for our whole lives. We spend time joining groups and organizations in hopes to prepare for that one special job. However, what happens if everything goes wrong and you don't get the job?

Interview, follows a young woman who must relive her interview every day after it goes wrong. She must now find out the true intentions of this day. Does she continue to pursue the interview, even though it is destined to go wrong, or is there a bigger picture that she is missing? Interview, tells the story about what we're going to all face after we leave college.

Investigation of Fecal Contamination of Urban Tidal Flood Water in Southeast Florida

Hyo Won Lee

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Faculty Sponsor: **Dr. Christopher Sinigalliano**
Atlantic Oceanographic and Meteorological Laboratory
National Oceanic and Atmospheric Administration

Faculty Sponsor: **Dr. Emily Schmitt Lavin**
Department of Biological Sciences
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Abstract

Since many diseases can spread through water-borne transmission, water quality management is a big part of public health. Contamination of water by exposure to human or animal feces represents a potentially high public health risk for spread of fecal related pathogens. Thus, good water quality management seeks to better ensure the cleanliness and safety of water that people and the environment are exposed to. Due to sea level rise, tidal flooding is becoming an increasingly serious problem for coastal populations, a result of more frequent flooding of contaminated coastal landscapes. Therefore coastal flooding is a problem due to both the volume of floodwater and the impacts on coastal water quality. In the case of Southeast Florida, tidal flood water can also come up through porous limestone bedrock and soil, picking up a variety of chemical and microbial contaminants, including pathogens from leaking sewage and septic systems. For this project, tidal floodwater samples were collected during “King Tide” and “Super-moon” flooding from streets, canals, and from pumps discharging floodwater at different locations within the City of Miami Beach and the City of Fort Lauderdale. Fecal indicator bacteria in floodwater samples were measured using the EPA method 1600 mEI plate counts. Many floodwater samples were found to contain elevated or highly elevated levels of fecal indicator bacteria above regulatory limits for receiving waters and the concentration in the receiving water was typically higher while the pumps were discharging.

Isolation and characterization of antibiotic producing bacteria from Storm Water Treatment Areas

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Abstract

With the diminishing supply for new antibiotic drugs to fight the rising number of infections caused by drug-resistant pathogens, a novel program called the Small World Initiative (SWI) was developed. SWI is a collaborative research effort that combines scientific education with research. The research is performed by undergraduate students from select Universities throughout the world. The majority of antibiotics in current use originate from soil dwelling bacteria; thus, discovery of new antibiotics produced by soil microbes is used as a scientific driver to combat the antibiotic crisis. 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 from nutrient-poor soils in suburban south Florida and nutrient rich soils near the Everglades. The current project involves samples obtained from the Storm Water Treatment (STA) areas near the Everglades, as well as soil obtained from the marine environment; off the shore of Dania Beach. Results obtained from the suburban soil study will be compared with new samples obtained from nutrient rich soils. Collected soil samples were serially diluted and plated to isolate bacteria. Isolated bacteria are being analyzed via biochemical tests and using polymerase chain reaction to identify the genus of the organisms. The organisms will be screened to determine if they produce antibiotic compounds. The active compound will be extracted from the organisms. Analyses of the extracted active compounds will be performed using Mass spectroscopy, and Infra-red spectroscopy to determine their chemical composition.

Longevity of Visual Improvements following Electro-Stimulation Therapies and Efficacy of Retreatment in Retinitis Pigmentosa subjects

Marsha Zaman

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Faculty Sponsor: **Dr. Ava Bittner**
College of Optometry

Faculty Sponsor: **Dr. Kenneth Seger**
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Department of Biological Sciences
Halmos College of Natural Sciences and Oceanography

Abstract

Background: Roughly half of retinitis pigmentosa (RP) subjects who received Transcorneal Electrical Stimulation (TES) and 29% who receive electro-acupuncture developed significant improvements in vision during a small-scale randomized controlled trial by our group.

Methods: We longitudinally monitored four RP subjects for declining vision due to natural RP progression, at which time a retreatment course of six weekly TES sessions or 10 electro-acupuncture sessions was administered.

Results: A 44 y/o female improved from 20/665 to 20/66 in the worse eye following the initial course of TES, but diminished to 20/333 ten months later, at which time retreatment improved vision to 20/83. Follow-up visits at 6-9 months post-retreatment revealed slight declines to 20/120-126, then improved again to 20/63 after receiving a second retreatment. A 47 y/o male improved from 20/279 to 20/106 in the worse eye after the initial course of TES; then 11 months later he was relatively stable at 20/116, which then declined to 20/168 three months later, at which time he was retreated and improved to 20/140. A 34 y/o female improved binocularly from 20/264 to 20/200 after initial TES, then after slight declines every 3-4 months, she received 3 retreatment courses, which helped maintain her vision over 18 months. A 46 y/o male who received three electro-acupuncture courses and one TES course had no progressive macular atrophy or visual function loss over 27 months.

Conclusions: Following encouraging improvements after electro-stimulation therapies that lasted for several months, it appears possible to restore slowly diminishing vision over time with retreatments.

Funding support: Nova Southeastern University's President's Faculty Research Development Grant award

Low Vision Patients' and Providers' Satisfaction with Telerehabilitation

Alisha Trivedi

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Tony Succar, Pat Yoshinaga, Angie Bowers, John Shepherd, Nicole C. Ross

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Abstract

Purpose: A recent systematic review found no publications with results on the topic of telerehabilitation for low vision (LV). Our goal was to develop and evaluate components to deliver LV telerehabilitation services. **Methods:** Three LV providers conducted telerehabilitation sessions from their office with eight visually-impaired adults in their homes. Subjects received a hand-held magnification device for reading, and self-reported difficulty with returning for a follow-up at their provider's office. We obtained providers' ratings for the use of hardware devices (i.e., iPad and Android tablets) and commercially available, HIPAA compliant, secure videoconference software (zoom.us) during telerehabilitation sessions at which subjects received training on magnifier use for reading. **Results:** All subjects agreed they were comfortable receiving telerehabilitation and being evaluated via videoconferencing. Three-quarters of subjects reported their hand-held magnifier use improved after the session. Providers reported little difficulty with evaluating subjects' reading speed, reading accuracy and working distance. Video quality was rated from excellent to good by both the providers and subjects, but audio quality was reduced for some due to poor signal strength and use of Android tablets. All except one subject had never used videoconferencing prior to our study, and three (38%) had never used the Internet. **Conclusions:** Positive feedback from the participants and providers in this pilot study supports the feasibility and potential value of LV telerehabilitation. **Support:** Envision Research Institute. **Disclosure:** None.

Mathematical Approach to Understanding Consumer Behavior

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Faculty Sponsor: **Mr. Charles Harrington**

Department of Finance and Economics
H. Wayne Huizenga College of Business and Entrepreneurship

Abstract

This study examines the theory of consumer behavior, particularly the use of optimization within utility maximization. The science of economics deals with the behavior of economic agents: consumers, producers, and the government. Every consumer is assumed to allocate his or her income to different goods and services that he or she buys, so that the objective is optimized. Similarly, every business firm is assumed to allocate its resources so that its profits are optimized. Government agents are also assumed to allocate resources so that society's benefits or welfare will be optimized. The resources necessary to satisfy unlimited human wants are scarce, necessitating a choice. Every agent is assumed to be rational, attempting to allocate scarce resources in such a way that the agent's objective is optimized. Therefore, optimal allocation of resources lies at the heart of the science of economics. Many relevant studies describe how mathematics can be used by various scientific disciplines, business, and economics to solve quantitative problems, more specifically the optimum problem. Additionally examined is the history of various mathematical approaches to analyzing consumer behavior, ranging from the Austrian marginal utility theory to present-day challenges within behavioral economics.

ME/CFS Genes Study: Creating a De-identified Myalgic Encephalomyelitis/Chronic Fatigue Syndrome Genomic Database and Analyzing SNPs Frequency Trends for Potential Diagnostic Biomarker Establishment

Melanie Perez

Department of Biological Sciences
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Abhaya Moturu¹, Kelly Gaunt⁴, Kristina Gemayel⁴, Syed Shehzad Ali¹, Maria Cash¹, Leonor Sarria¹, Angela Vu¹, Ishan Shah¹, Nirja Patel¹, Marquis Chapman¹, Jacqueline Baikovitz⁴, Kevin Galvez³, Rajeev Jaundoo⁵, Ana Del Alamo⁵, Dr. Irma Rey⁵, Dr. Maria Vera^{2,5}, Dr. Nancy Klimas^{2,5}, Travis Craddock⁵

¹Department of Biological Sciences, Halmos College of Natural Sciences and Oceanography; ²Miami Veterans Affairs Medical Center, Miami, FL; ³Cornell University; ⁴Health Professions Division at Nova Southeastern University; ⁵Institutue for Neuro Immune Medicine

Faculty Sponsor: **Lubov Nathanson**

Department of Biological Sciences
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Institute for Neuro Immune Medicine

Abstract

Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) is a debilitating disease with unknown causes. It is known that Single Nucleotide Polymorphisms (SNPs) play an important role in gene expression. Changes to that can manifest as phenotypic changes. Prior to this ongoing study, there existed no known databases of SNPs in patients diagnosed with ME/CFS.

Our objectives are to create and continually update a novel database of SNPs that are specific for ME/CFS patients, and to identify the relative frequency in our cohort of specific SNPs warranting further

A genetic database was created on-site through the use of a secure user-friendly online platform, REDCap©, for participants to upload their raw genetic data, acquired from 23andMe. The uploaded de-identified genetic data acquired from RedCap is modified to a suitable format for *Seattle Sequence Annotation 138*. The annotated data is then filtered to include only non-synonymous and nonsense SNPs from protein coding regions (exons), microRNAs, and SNPs that are close to splice sites. The frequencies of each SNP will then be calculated within our cohort and compared to public databases. Those SNPs frequencies of differing prevalence between our database and the general public will be noted for further analysis.

Ongoing recruitment for submission of de-identified genetic data to our database leads to a constantly increasing sample size for continual application of the aforementioned method. Additional SNP investigation from the larger sample size will allow for validation of SNP trend significance relative to existing SNP data acquired from public databases.

Mineralogical Analysis of Aeolian Dune Deposits, White River Badlands, South Dakota

Megan O'Connor

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Faculty Sponsor: **Dr. Paul Baldauf**

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Abstract

The body of this abstract sample template contains important instructions that **MUST** be followed. Note the formatting above, including bold, spacing, and underlining. Your abstract (which is a summary of your project) goes here and should be no longer than 250 words. This document is single spaced and formatted in 12-point Times New Roman font. Your faculty sponsor must review and approve this abstract *before* submission. It should be uploaded along with your application using the appropriate naming convention (ProjectTitle.doc). Additionally, the body of the abstract must be aligned with the left margin, like this paragraph is.

Printing 3-D Molecular Models of the Angiotensin II, Type 1 Receptor and its Anti-Hypertensive Ligand (Olmesartan)

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College of Pharmacy

Abstract

Through the use of protein visualization software, such as Jmol, it is possible to design and ultimately print 3-D structural protein models. Literary review and protein database files help shed light on the important structural components of proteins. As an example, the Angiotensin II, AT₁ type receptor, known by its protein database file, 4ZUD, was selected to demonstrate this process. Blood pressure regulation through the Renin-Angiotensin System (RAS) is mediated through the activation and inhibition of Angiotensin II (AngII) from its precursor Angiotensin I (AngI). Activation of AngII leads to vasoconstriction, resulting in an increase in blood pressure, while AngII inhibition prevents vasoconstriction, causing a decrease in blood pressure. In humans, AngII binds to two subtypes of angiotensin G protein-coupled receptors (GPCRs): AngII Type 1 Receptor (AT₁R) and AngII Type 2 Receptor (AT₂R). Almost all physiological and pathophysiological effects of AngII are mediated by AT₁R, while the function of AT₂R remains largely unknown. AT₁R Receptor Blockers (ARBs), or sartans, are non-peptide antagonists that act on behalf of the RAS cascade to inhibit vasoconstriction, thereby lowering blood pressure. Benicar™ is the most common brand of olmesartan, and in this study, its interaction with the Angiotensin II AT₁ Receptor was modeled to depict the effects of angiotensin receptor blockers. Developing 3-D molecular models in this way is a relatively inexpensive process to visually represent important biological relationships that can be useful for students, professors, and physicians trying to understand complex molecular pathways.

Proliferation and Osteogenic Differentiation of Dental Stem Cells in a Nanofibrous Hydrogel

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Abstract

Background: Cleft palate is the second most common congenital defect in the US. This genetic disability can be extremely debilitating affecting individual's speech and facial growth. Bone tissue engineering emerged as a potential option for the repair and regeneration of the bone in the defect area. **Objective:** The objective of the study was to investigate proliferation and osteogenic differentiation of periodontal ligament derived stem cells (PDLSCs) encapsulated in a self-assembling, nano-fiber hydrogel scaffold, Puramatrix™. **Methodology:** PDLSCs were cultured in Puramatrix™. The cell proliferation was measured by a colorimetric WST assay at 1, 2, 3 and 5 day intervals. Cell viability was assessed using live dead cell assay. PDLSCs encapsulated in Puramatrix™ were either grown in the complete medium (CM), which served as the control, or osteogenic medium (OM). The expression of osteogenic marker genes alkaline phosphatase (ALP) and collagen type I (COLI) were assessed by quantitative PCR. The results were analyzed by one-way ANOVA. **Results:** Our results revealed that PDLSCs were viable at all concentrations observed. There was significant increase ($P < 0.05$) in the proliferation in the cells seeded with $(0.1 \text{ and } 3) \times 10^5/\text{ml}$ from day 1 to Day 5. The viability of the cells seeded with $(30 \times 10^5)/\text{ml}$ were comparable with control. The results of live dead cell assay demonstrated PDLSCs encapsulated in Puramatrix™ survived at all concentrations. There was a twofold upregulation of ALP, COL I in Puramatrix™ encapsulated cells compared to control. **Conclusion:** Puramatrix™ supported PDLSCs growth and differentiation. This tissue engineered construct has potential applications for bone regeneration.

Quantification of Metals in the Shells of the Eastern Oyster, *Crassostrea virginica*, utilizing Atomic Absorption Spectrophotometry

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Abstract

The explosion of the Deepwater Horizon oil rig on April 20, 2010 resulted in the largest marine oil spill recorded in U.S. history. Consequently, aquatic and terrestrial wildlife were affected adversely. The purpose of this study was to analyze the level of metals in the shells of the eastern oyster, *Crassostrea virginica*. Bivalves are suitable indicators of the surrounding ecosystem because they are sessile suspension feeders and are known to accumulate both organic and inorganic materials in their shells and tissues. Hence oysters are suitable indicators of the presence of contaminants in the food web. Analyses were performed on tissue and shell samples utilizing atomic absorption spectrophotometry. This procedure quantitatively determines the presence of metals utilizing changes in wavelengths of light, which are specific for each metal. Comparisons were made among oysters from regions in the Gulf of Mexico over time from 2010 to 2015, with oysters from Chesapeake Bay as a control.

Quantitative measurement of learning in *Caenorhabditis elegans* in response to an engineered nematocidal bacterium

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Abstract

Despite their global prevalence, there are very few strategies to prevent infections due to parasitic nematodes. Recent studies have shown that bacteria engineered using the principles of synthetic biology may serve as an alternative approach to intoxicating nematodes. While these engineered bacteria were initially shown to be relatively efficacious in intoxicating the model nematode *Caenorhabditis elegans*, the nematodes quickly learned to avoid the engineered bacteria through aversive associative learning. In this study, we sought to use nematode learning assays to quantify the ideal amounts of toxin and attractant required to reduce aversive learning of *C. elegans* towards the engineered nematocidal bacteria. Testing the intoxication efficiency of the engineered bacteria under different amounts of toxin and attractant allows us to measure aversive learning through learning specificity. Our results are among the first comprehensive studies of learning in *C. elegans* in response to a nematocidal protein, and may allow for optimization of treatment regimens when using nematocidal bacteria as a biocontrol or therapeutic agent.

Rationalizing the Irrational Consumer: How Behavioral Economics Impacts Marketing

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Behavioral economics is studying the reasons why people make the economic decisions that they do, based on psychology. Before behavioral economics, most economists assumed consumers were rational in their decisions, which is a false assumption. Consumers are impacted by a variety of different sources to make the decisions that they do, which is why their choices can fluctuate and seem irrational. Marketing strategies can be influenced for the better by behavioral economics, by seeing the reasons why consumers may or may not choose a product and marketing the product based on these responses. This essay strives to explore different principles of behavioral economics and use different marketing examples to display how incorporating behavioral economics impacted consumers and producers.

Realizing Identity through Reflection: Walt Whitman's *Song of Myself*

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Abstract

This oral presentation investigates pronoun choices and environmental imagery in Walt Whitman's *Song of Myself* through direct analysis of stanzas. In exploring why Whitman wrote what he wrote, using such diction as "I", "me", "myself", "you", and "Walt Whitman", this presentation analyzes the poem in hopes of teaching others what they can learn from his writing, as well as their own. With the influence of Transcendentalism pushing Whitman to view his life on a much larger scale, he reveals facets of his character that each add a different layer to how he perceives himself and how he wants to be perceived. Always recreating himself and improving his art, Whitman continually revised *Song of Myself* throughout his lifetime, evolving not only as a man, but also as a student, writer, admirer of natural beauty, and believer of the grand scheme of the cosmos. His poetry aided in shaping the American identity, bringing what it meant to be a man, an American, and an entity of mother nature to the forefront of his readers' minds through a focus on the complexities of human beings. By studying his own verses, the presenter demonstrates how Whitman crafted rich and celebratory poetry that reflects his life experiences while also reaching forward to the unsure yet encouraging future.

***Sargassum*-associated fish communities are stable over time and feature low levels of parasitism**

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Abstract

Sargassum mats are common features of South Florida coastlines. Consisting of pelagically drifting clumps of brown algae (usually of the genus *Sargassum*), these mats are critical nursery habitat for many fish species, providing surface shelter in otherwise exposed open ocean areas. However, the ecology of *Sargassum* mat communities remains unstudied. This project addressed two key knowledge gaps. First, the long term stability of *Sargassum* community structure was assessed in samples collected over an 8-year period. Overall 9 fish species were collected (N=150). Individual *Sargassum* mats typically harbored 2.6 ± 0.7 fish species which were equally abundant in any given sample (Pielou's evenness 0.7 ± 0.2). Although cluster analyses distinguished two distinct groups of co-occurring species, overall community structure was stable across samples and did not vary as a function of collection month, season, or year (ANOSIM; $0 < R < 0.089$; $0.36 < p < 0.75$), nor did they change consistently between 2008 and 2016 (RELATE; $p = 0.002$; $p = 0.48$). Second, this study collected baseline information on parasite infection rates, and explored parasite community composition and structure in *Sargassum*-associated fishes. Parasite communities included unidentified digenean metacercariae, copepods and acanthocephalans. Prevalence of infection with ≥ 1 parasite was 30% (45 of 150 fish examined) and mean intensity was 4.48 parasites per infected fish. This is consistent with parasitism rates in other critical nursery habitats such as mangroves but is much lower than is typical of similarly-sized open-ocean pelagic fishes not associated with *Sargassum*. Further research is needed to determine what processes drive low parasitism rates in fish nursery habitats.

Screening for Type III Secretion System Inhibitors

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Abstract

Commonly used antibiotics are becoming less effective because they target bacterial cell walls or processes, which create a selective pressure for bacteria to become resistant, leading to the formation of “super bugs”. Some of these pathogenic bacteria include *E. coli*, *Salmonella*, *Chlamydia* and *Yersinia*. These species utilize a type III secretion system (T3SS), which are needle-like structures on their surface used to inject host cells with toxins in order to evade our immune system and cause infection. Recently a new method for testing compounds to determine if they inhibit the *Y. pestis* T3SS was developed by our lab. This method uses a special growth medium called Magnesium Oxalate (MOX) agar, which produces distinct growth characteristics based on the bacteria's ability, or inability, to secrete toxins. Serial dilution plating was used to isolate soil bacteria and each isolate was patched onto MOX agar plates pre-inoculated with *Y. pestis*. The areas around each soil isolate were analyzed for the *Y. pestis* growth characteristics associated with blocked T3S. The soil bacteria that exhibited positive results were identified using 16S rDNA sequencing. The goal of this research is to use this method to screen for antimicrobials produced by soil bacteria that may target T3SSs. Many species of bacteria found in soil produce antimicrobials in order to compete with each other for nutrients and space. Using antimicrobials to target the virulence factors in bacteria, instead of cell processes, will reduce the pressure to mutate and adapt while still inhibiting their ability to cause infection.

SENIOR YEAR - NSU Women's Soccer

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Abstract

“SENIOR YEAR - NSU Women's Soccer” is a short documentary about the journey of three senior student-athletes, concretely from the NSU Women’s Soccer team. The film is directed by Monica Orteu. The interviewees are Gabriela Alfaro, Sidney Franko, and Nichole Poppe.

Simulation of Blood Flow through Arteries Afflicted with Atherosclerosis

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Abstract

Atherosclerosis is a major cause of death and morbidity in our society. It refers to the hardening of arteries due to plaque buildup. This can cause complications throughout the body including the heart, arms & legs, or kidneys. The purpose of this experiment was to study how occlusion size affects the blood flow physics within arteries afflicted with atherosclerosis. CFD analysis was utilized to simulate blood flow through an artery with varying occlusion levels.

All simulations performed in this study imposed a Newtonian, viscous model, with laminar flow conditions and the following material parameters: the physical properties for blood were used with density = 1.6g/cm^3 and dynamic Viscosity = 3.5 cp. A zero relative-pressure condition was also applied at the outlet. In addition, a no slip boundary condition was prescribed to the artery walls. In all the CFD simulation runs, the models were analyzed once a convergence criteria of 1×10^{-9} for the momentum and continuity equations were achieved. The results showed increased unidirectional flow as the occlusion size decreased. Higher blockages showed downstream flow areas composed of vortices and higher wall shear stress variability.

Stress, cognitive functioning, mind wandering, and mindfulness: A latent variable examination

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Abstract

Stress is a common facet of daily life. Unfortunately, a clear pattern of a negative impact of stress on a variety of cognitive functions has emerged. For instance, psychological stress has been shown to impair working memory (Banks & Boals, 2016; Klein & Boals, 2001) and perceived stress and PTSD symptoms have been linked to poorer self-report everyday cognitive functioning (Boals & Banks, 2012). Mind wandering—or thoughts unrelated to the current task—increases as a result of daily stressors and increases in mind wandering lead to decreases in cognitive functioning (Banks & Boals, 2016). Mindfulness meditation training improves working memory task performance and reduces negative affect (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010). Therefore, mindfulness may alter both perceived stress and self-report cognitive functioning. One main limitation to prior work is the reliance on single measures of critical constructs. The current study addressed this concern by modeling the relationships between stress, self-reported cognitive functioning, mindfulness, and mind wandering using a latent variable approach. Participants completed three self-report measures of each latent construct of interest: cognitive functioning, stress, mind wandering, and mindfulness. Structural equation model analysis suggested a well-fitting model with four latent variables, $\chi^2 = 129.61$, $p < .0001$, RMSEA= 0.105, CFI= 0.938. Consistent with our hypotheses, stress was negatively related to cognitive functioning, whereas mindfulness was positively related to cognitive functioning and negatively related to stress. Stress was predictive of mind wandering, but in contrast to previous research, mind wandering was not negatively linked to cognitive functioning.

Synthesis and Characterization of tris(4,4-dichloro-2,2-bipyridine) Ruthenium (II)

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Abstract

A new ruthenium (II) $[\text{Ru}(4,4\text{-dichloro-2,2-bipy})_3] \text{Cl}_2$ complex has been synthesized using a new procedural method. The complex was characterized by NMR, IR, and UV-Vis. After purification through column chromatography with alumina, the percent yield was 60.39%. Electrochemistry data confirmed the presence of Ruthenium- bipyridine bonds, very similar to electrochemical data of $[\text{Ru}(\text{bpy})_3]\text{Cl}_2$. The quantum yield of the $[\text{Ru}(4,4\text{-dichloro-2,2-bipy})_3] \text{Cl}_2$ complex was calculated after comparing with calibrated standards. This complex will be used to improve the photosensitizing properties of the complex by adding auxiliary ligands to the chlorinated bipyridine group.

The Cinephile

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Abstract

“The Cinephile” is a short film. After a long movie-binging session and finishing his 1000th movie, our protagonist, the cinephile, notices something is off. It is soon revealed that due to his excessive consumption of cinema, he has gained the ability to manipulate his perception of the world as if he were a video camera, and he can employ various cinematic techniques as superpowers. Unfortunately, rather than using his newly gained powers for good, he almost immediately uses his powers to mess with others for his own personal entertainment.

The Darker Side of Education: The College Affordability Crisis

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Abstract

According to the National Center for Policy Analysis, college prices have increased by 175% (Gonzalez, O'Sullivan, 2010). As a result, the total student debt surpasses more than \$1.2 trillion in 2015 (Schoen, John, 2015). The college affordability crisis is based off of the ubiquitous high price of college tuition that continues to rise over the years. Thus, it is imperative that college students are aware of today's exponential growth of both debt and college cost, because it disrupts students from having a sustainable economic future.

Analyzing the socio-economical aspects of college affordability allows us to comprehend the impact of high tuition. In doing so, a clearer understanding of the intertwining between society, economy, and tuition is attained. For instance, social push factors and inflation causes college prices to drastically increase.

The goal of our research is to bring awareness to college students about educational capitalism and the consequences of increasing tuition. For example, Universities prioritize providing lavish resources to their "consumers" in lieu of a quality education. (Gonzalez, O'Sullivan, 2010). With more people having a deeper understanding of college affordability and its consequences the chances of the issue continuing to be in the dark will finally be brought into light. The power of change within the issue of college affordability can only be met with discussion about what is college affordability, how will it affect today's students, and more importantly, how it will affect tomorrow's students.

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The Effect of Sucralose on the Inhibition of Three Bacteria Species that Inhabit the Human Gut

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Abstract

The purpose of this experiment is to examine the proposed bacteriostatic (growth-inhibition) effect of sucralose, a minimally metabolized, non-nutritive, and non-caloric sweetener on three species of bacteria commonly found in the human gut. Sucralose has been shown to inhibit the growth of environmental bacteria likely due to the inhibition of the invertase enzyme, which is involved in the breakdown of sucrose. This study attempts to replicate this finding with bacterial species associated with the human gut microbiome and to test if the bacteria are still susceptible to growth inhibition by sucralose while in a monosaccharide rich environment, such as with the addition of dextrose (D-glucose). These results can be relevant to the study of human gut microbiota because sucralose has been suggested to cause changes in the bacterial species composition found in intestines, a monosaccharide rich environment. Three species were used as test organisms (*Escherichia coli*, *Enterobacter aerogenes*, and *Lactobacillus acidophilus*). Initially, each species of bacteria was grown in LB broth with dextrose, sucrose with dextrose, sucralose with dextrose, and sucralose alone. Cultures were incubated for 48 hours and diluted to concentrations of 10^{-7} and 10^{-8} in distilled water via a serial dilution. The diluted samples were plated on TSA media and incubated for 24 hours. Bacterial growth on the plates was recorded by counting the number of colonies and ranking the amount of growth on each treatment using a 1 to 4 rank scale.

The Effects of Video Gaming with a Brain-Computer Interface on Mood and Stress

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Abstract

Previous research has shown that video game playing can alter psychological processing. Noninvasive, but cognitively challenging, video games (e.g. Tetris) have been shown to reduce intrusive memories following a traumatic event. This application has been thought of as a “cognitive vaccine” wherein the limited processing resources following a traumatic event are redistributed to the video game task. Emerging video game apparatuses include brain-computer interfaces (BCI’s) where scalp-recorded electroencephalographic (EEG) data are used to control different aspects of the game. It is possible that BCI-driven video games can serve as a useful addition to video game “cognitive vaccine” treatment following emotional events. However, the extent to which BCI itself alters stress and mood is currently uncertain. In order to address this uncertainty, we assessed mood changes (Profile of Mood States, POMS) and stress (Perceived Stress Scale) in a BCI group relative to a control (keyboard and mouse) group using a first person shooter video game. Results revealed that, relative to the control condition, the BCI group reported greater total mood disturbances ($F(1, 43) = 6.02, p = 0.018$). Subdomains of mood disturbance showed that the BCI condition resulted in significantly increased fatigue ($F(1,43) = 9.89, p = 0.003$) and that the control condition showed significantly higher vigor ($F(1, 43) = 6.09, p = 0.018$). There were no significant group differences on perceived stress ($p > 0.05$). These results suggest that the use of BCI might interfere with a potential therapeutic advantage of video games following traumatic experiences.

The influence of a serotonin 2A receptor gene (HTR2A) on stress responsivity.

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Abstract

A single nucleotide polymorphism on the serotonin 2A receptor gene HTR2A (rs6313) alters neurological functions. Previous research has shown that the “A” allele carriers are at greater risk for increased stress responsivity. It is currently uncertain the extent to which rs6313 affects physiological and psychological responses. To address this uncertainty, we carried out a study with the hypothesis that “A” allele carriers on the serotonin 2A receptor gene would have increased physiological and psychological stress responsivity. The groups did not differ on any self-report measures of anxiety or sensation seeking. There was no difference between the groups on cortisol before or after the CPT. In agreement with previous research, there were differences between the groups on measures of autonomic arousal. Relative to GG homozygotes (mean = 65, SD = 9.3), A allele carriers had a higher heart rate 1 minute after the CPT stress (mean = 71, SD = 12.62), $t(1, 73)=2.30$, $p = 0.02$. Our biomarker of autonomic arousal (sAA) was also higher in the A allele carriers (mean = 99, SD = 68.8) relative to the GGs (mean = 66, SD = 61.5), $t(1, 74)=2.06$, $p = 0.04$ prior to the CPT stress and one minute after the CPT stressor. A allele carriers (mean = 116, SD = 77) relative to the GGs (mean = 78, SD = 78.5), $t(1, 74)=2.03$, $p = 0.04$. The groups were not significantly different from each other after 10 minutes. The findings suggest an increase in autonomic arousal in “A” allele carriers without psychological impact.

The Psychological and Physiological Implications of Sleep Restriction: A Comparison of Voluntary and Experimental Sleep Restriction Groups

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Abstract

Sleep restriction (SR) has profound adverse effects on health and wellbeing; however, it is not clear if there are differential effects of chronic and voluntary SR vs. short-term and involuntary SR. In order to examine this possibility, we tested the extent to which psychological and physical health measures were influenced by a group of participants who voluntarily restricted their sleep (VSR) relative to participants who underwent 7 days of experimental sleep restriction (ESR). We tested a female-specific population since sleep complaints in women are particularly associated with impaired psychological functioning. Upon study enrollment, sleep group categorization (ESR vs. VSR) was confirmed through sleep diary and actigraphy monitoring for 1 week. The VSR group slept less than 7 hours per night and ESR group was asked to sleep 90 minutes less than their average sleep time (actigraphy-verified). Participants completed clinical health measures and provided saliva samples for the quantification of IL-1 β , IL-6, and cortisol. Preliminary results suggest that ESR results in decreased psychological health including perceived stress, moodiness, and state anxiety. In addition, relative to baseline, measures of inflammation were increased with ESR. Comparing VSR to ESR, we found that the ESR group reported worse psychological health and higher inflammation markers. We find that, consistent with previous reports, involuntary experimental SR (ESR) results in decreases in self-reported psychological health and increases in measures of inflammation. New to our study, we show that relative to people who voluntarily restrict their sleep (VSR), the psychological and physiological effects of ESR are more pronounced.

Towards the Development of a 3-D Aortic Valve for Hydrodynamic Evaluation

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Abstract

Aortic Valve Disease occurs when an individual's aortic valve does not function at its optimum level. AVD can be divided into two types: stenosis and regurgitation. AVD stenosis occurs when the leaflets of the aortic valve do not open all the way, restricting blood flow into the aorta. AVD regurgitation occurs when the leaflets don't close all the way, allowing blood to flow back into the heart. The disruption in regular blood flow could lead to heart failure. The purpose of this experiment was to create a replica of an aortic valve using 3D printing methods for subsequent hydrodynamic evaluation. 3D aortic valve models were obtained and recreated using open source models available from the literature.

We Are All Human

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Abstract

Diversity is an ongoing topic of conversation in the United States of America today. What exactly entails diversity? What are some examples of racism, prejudice, and injustice in a society that promotes freedom of speech and encourages a melting pot? The presentation addresses features of diversity as they appear in a few historical and contemporary events. Through a rhythmic re-telling, the accounts establish the core identity of who everyone is despite differences. The presentation's objective is to analyze components of diversity and to display results in an unexpected format.

Whey versus Casein Protein Supplementation on Body Composition and Resting Metabolic Rate

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Abstract

Research shows the benefits of Whey Isolate Protein Powder (Whey) and Casein Protein Powder (Casein) supplementation in regards to body composition and resting metabolic rate; however, minimal research exists comparing Whey to Casein supplementation. Purpose: The purpose of the current study is to compare Whey versus Casein in regards to body composition and resting metabolic rate. Methods: 12 physically trained, healthy individuals (22±4.1 yrs.; 8 males; 4 females) completed a randomized two condition [Combat 100% Isolate (Whey) versus Combat 100% (Casein) intervention. The intervention consisted of subjects supplementing on either Whey or Casein in conjunction with resistance training over a 4-week period. Subjects consumed 60 grams per day. Subjects tested % body fat (BF%) utilizing the Bod Pod® and resting metabolic rate (REE) utilizing the Parvo Metabolic Cart (Parvomedics Inc., Sandy, UT) both (pre-) and (post-) intervention. Results: A 2x2, repeated-measures analysis of variance (ANOVA) demonstrated non-significant ($p \geq 0.05$) effects on BF% (12.6±6.8 %. Whey pre-, 12.8±7.2 %. Whey post- vs. 14.7±6.9 %. Casein pre-, 15.5±7.1 % Casein post-), and REE (1969.3±456.4 kcal. Whey pre-, 1918.7±360.2 kcal. Whey post- vs. 1648.0±285.4 kcal. Casein pre-, 1569.6±643.5 kcal Casein post-). Conclusion: The pilot data concludes no differences in the effects of whey versus casein on body composition and resting metabolic rate.

Zooplankton Community Productivity Determined through Stable Isotope Analysis

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Abstract

Zooplankton samples were collected from five stations off the coast of Fort Lauderdale, FL, between approximately 8 and 18 km offshore over a one year period in 2007. Zooplankton were sorted taxonomically for carbon and nitrogen stable isotope analysis. This study shows evidence that a shift in zooplankton diet takes place throughout the year, from lipid rich diatoms to lipid poor dinoflagellates. Additionally, the stable isotope ratios reveal fluctuations in productivity that we have used to trace distinct water masses and meteorologic conditions. These are the first data of their kind that have used stable isotopes ratios of zooplankton to identify water masses in the ocean.

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Reaghan May
Kristain Mejia
Guy Merus*
Kendall Mockridge
Abhaya Moturu*
Sri Moturu*
Lekha Mutyala*
Samir Nacer*
Akshay Naraine
Afrin Naz*
Kristi Njaravelil*

Widline Nordelus
Megan O'Connor
Domenique Olesen
Monica Orteu
Krunal Patel
Swati Patel*
Melanie Perez*
Valentina Ramirez*
Aidan Rivas
Samantha Rodriguez
Victoria Rushia
Rony Saleeb*
Danielle Sampson
Sierra Sandler
Kaitlyn Seabrook*
Qaas Shoukat*
Nadia Siddiqi*
Chris Soha
Stacey Spadafore
Gianpaolo Stasi
Teodora Suciu*
Stephanie Talavera*
Keerthi Thallapureddy*
Alisha Trivedi*
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Riti Vohra*
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Bertha Amisi
Beatrix Aukszi
Jonathan Banks
Christopher Blonar
Abdelkrim Bourouihiya
Jacilynn Brant
James Brecher
Marcelo Castro
Victor Castro
Robin Chard
Matthew Collins
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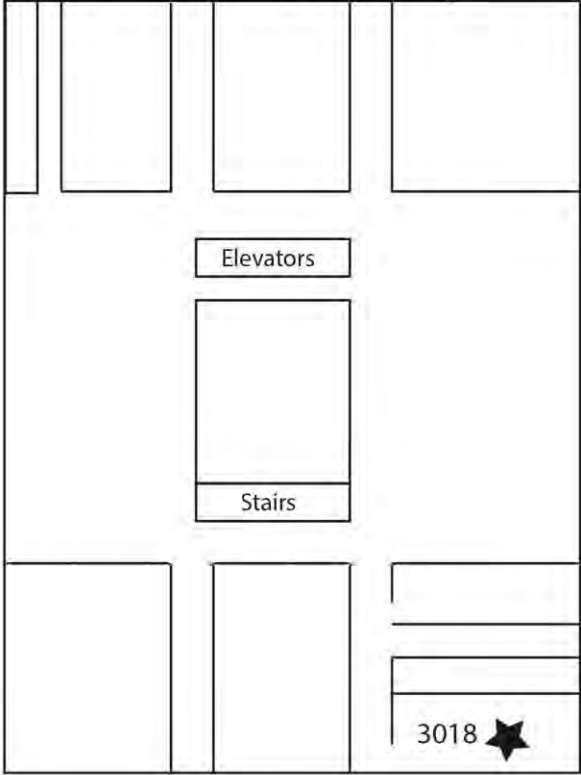
Chetachi Egwu
Suzanne Ferris
Antonio Figueiredo
Lori Ford
Gary Gershman
Regina Greenwood
LeThesha Harris
Darren Hibbs
J. Matthew Hoch
Lia Jiannine
Vanessa Johnson
Erin McLaughlin
Madhavi Menon
David Miller

Monique Mokha
Janine Morris
Kathleen O'Leary
Reza Razeghifard
Michael Reiter
Deanne Roopnarine
Belay Seyoum
Rita Shea-Van Fossen
Aya Shigeto
Robert Smith
Jaime Tartar
Leslie Tworoger
Kathleen Waites
Star Vanguri
Michael Voltaire

Alvin Sherman Library, Research, and Information Technology Center

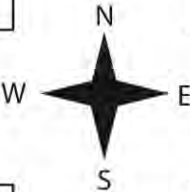
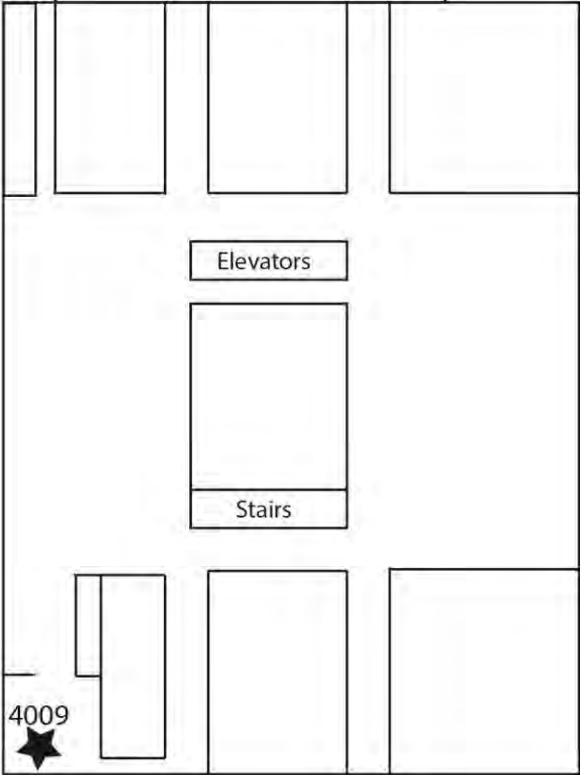
3rd Floor

Miniaci Performing Arts Center



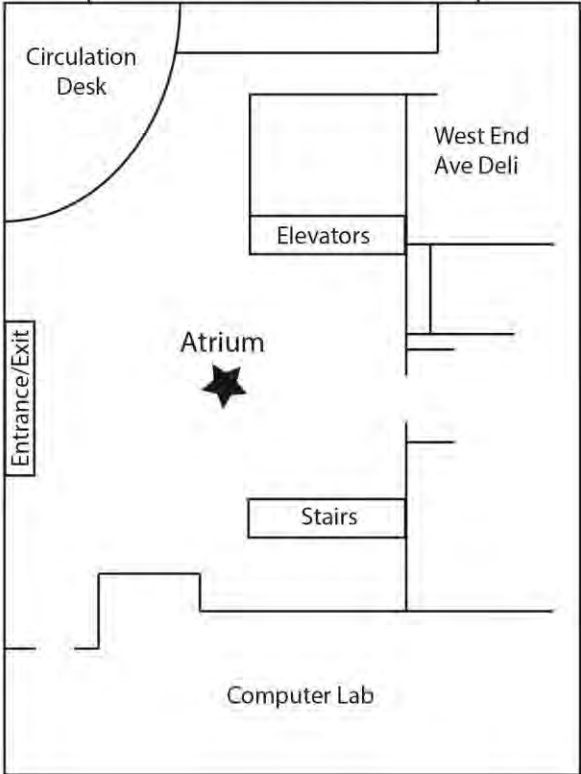
4th Floor

Miniaci Performing Arts Center



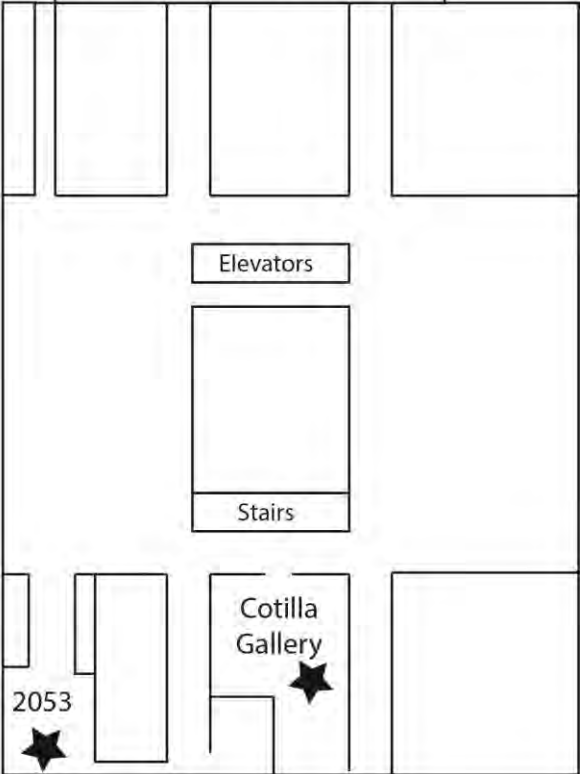
1st Floor

Miniaci Performing Arts Center



2nd Floor

Miniaci Performing Arts Center



**UNDERGRADUATE STUDENT SYMPOSIUM
2017 Program Schedule**

TIME	EVENT AND LOCATION		
1:00–1:45 p.m.	<p>Welcome and Introduction Don Rosenblum, Ph.D. Dean, Farquhar Honors College</p> <p>George L. Hanbury II, Ph.D. President/CEO, Nova Southeastern University</p> <p>Keynote Speaker H. Thomas Temple, M.D. Senior Vice President of Translational Research and Economic Development</p> <p style="text-align: right;">Performance Theatre Don Taft University Center</p>		
1:45–3:15 p.m.*	Poster Presentations	First Floor Atrium	Alvin Sherman Library
1:45–4:00 p.m.*	Film Presentations	Cotilla Gallery	Alvin Sherman Library
2:45–4:00 p.m.*	Oral Presentations	Room 2053	Alvin Sherman Library
	Oral Presentations	Room 3018	Alvin Sherman Library
	Oral Presentations	Room 4009	Alvin Sherman Library
4:30–5:30 p.m.	Awards Ceremony	Rose and Alfred Miniaci Performing Arts Center	

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