

Welcome

Welcome to the fourth annual Graduate and Professional Student Association (GPSA) Research Day, which showcases current student research at Florida Atlantic University. This GPSA signature event is part of our continuing effort to support graduate student education and professional development. It is a unique opportunity for graduate and professional students to bring together ideas and research findings from different colleges and disciplines, showcasing their scholarly pursuits and achievements. Furthermore, it provides a platform for exhilarating exchanges of ideas, invigorating interactions and valuable networking between participants, faculties, departments, research entities and potential employers. This endeavor could pave the way for interdisciplinary research discussion and future collaboration. Nearly 100 abstract entries were accepted this year, representing the entire university. The theme of this year's event is "Florida's Bright Future: Excelling through Innovation, Discovery and Inquiry." Students participating in this event are setting their foundation for future success in careers, whether in academia, government, medicine or industry. The Research Day is in support of the goal articulated in the University's Strategic Plan, which aims to position Florida Atlantic University as an internationally recognized center of excellence in research, knowledge creation, and innovation.

2013 GPSA Research Day Committee:

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Agenda

Welcome

Poster Session

Luncheon (for Participants and Judges)

Research Day Program

Introduction of Speaker

Keynote Address

Ken Pruitt

Awards Ceremony

Closing Remarks

Keynote Speaker

Ken Pruitt



Ken Pruitt is the elected Property Appraiser in Saint Lucie County and President of The P5 Group, a governmental affairs consulting firm.

Ken served in the Florida Legislature for almost twenty years, culminating his legislative career as Senate President from 2006-2008. During his time in office he spearheaded passage of the Bright Futures Act, the Bert Harris Private Property Rights Act and other landmark measures to enrich Florida's educational and economic opportunities.

Locally, Ken Pruitt has been a strong advocate in the creation of the Research Coast, a region of the state that is committed in building a sustainable, knowledge based economy.

Some of Ken's achievements include securing funding for the expansion of Indian River State College, Florida Atlantic University, Harbor Branch Oceanographic Institute, Torrey Pines Institute for Molecular Studies, Vaccine & Gene Therapy Institute and Max Planck Institute.

Ken loves college sports and can be found working in his yard on most weekends.

Ken Pruitt and his wife of over thirty-one (31) years, Aileen, reside in Fort Pierce and are the proud parents of five children and one grand-daughter.

Tracing Feminisms in Brazil: An Analysis of Gender and Race in Academic Discourses and Online Activism

Renata R. Bozzetto, Wairimu Njambi, Ph.D.

Women's Studies; Dorothy F. Schmidt College of Arts and Letters

Women's movements and feminisms in Brazil have taken various shapes along the years, contributing significantly to socio-political actions that favor gender justice. Despite the significant contributions of feminist scholarship and activism to establishment of state feminism in the country, which demonstrates the merging of theory and praxis, very little is known about Brazilian feminisms in the United States. The invisibility of Brazilian feminisms within feminist scholarship in the United States justifies the need of further research on the topic. The conceptualizations of feminisms in the United States are often complicated by the identity politics that categorize certain political actions as feminist while dismissing others. These complexities are expanded to global south feminisms, demonstrating the need of critical perspectives within any investigation of feminisms outside the United States. This research will use postcolonial, postmodern and critical race feminist theories as a framework to examine scholarly texts and online feminist activism through a content analysis methodology. Through a cross-cultural analysis, this thesis will also investigate the types of theories and works that are imported by Brazilian feminisms, with the objective of identifying practices within feminisms that might either challenge or emulate the social, economic, and geo-political order that divides the world into global north and south.

"Satan in High Heels": Representation of the Feminine in the American Popular Songbook and Its Impact on Performance, Interpretation, and Audience Reception

Kathryn Bridwell Briner, Tim Walters

Music; Dorothy F. Schmidt College of Arts and Letters

In this research, I explore the representations of the feminine and the female voice in the "American Popular Songbook." The "American Popular Songbook," or APS, from which most jazz and cabaret singers draw, encompasses jazz standards or anthems, Broadway show tunes, musical numbers, movie theme songs as well as popular tunes. Unfortunately, the APS has not received as much attention for its representations of the feminine as other areas, most notably those of opera, visual arts, and literature. Representations of femininity vary wildly throughout the jazz vocal canon, from songs such as "I Said No" and "But Baby, It's Cold Outside," songs that both illustrate the reluctant girl scenario, to lesser known songs, such as "The Female of the Species is More Deadly Than the Male," a song about the female domination of men from the 1962 sexploitation film, *Satan in High Heels*, and "I Wanna Be Evil," a song that addresses the need to openly embrace the seedy side of life.

In this presentation I differentiate the categories of feminine representation in some of the most requested songs from the APS, as well as discuss a few of the obscure songs that feature a strong or unorthodox female voice. This discussion also includes the impact of feminine representation and audience expectation on performance choices, arrangements, compositions, and audience reception.

“As long as you can find yourself, you’ll never starve”: Green Consciousness in The Hunger Games Trilogy

Sarah Tucker Jenkins, Josephine Beoku-Betts

Women, Gender, and Sexuality Studies; Dorothy F. Schmidt College of Arts and Letters

While The Hunger Games trilogy is clearly commenting on governmental control, corruption, the exploitation of labor, and capitalism it is also providing commentary on the role of nonhuman nature in the Western consciousness and our treatment of the earth. The Capitol symbolizes humankind’s ultimate break from nonhuman nature and a need for reverence for the earth. Katniss represents a renewal of the connection between human and nonhuman nature and an appreciation for the earth’s gifts. Katniss and the mockingjay symbolize the strength and resilience of nonhuman nature and the Capitol’s inability to control human and nonhuman nature. The overthrow of the Capitol is a cautionary tale against mistreating and exploiting the resources of the earth, including both human and nonhuman nature. This paper will investigate the aspects of green consciousness and ecofeminism in The Hunger Games trilogy. I will examine Collins’ (2008, 09, 10) choice to interrogate the existence of dualisms within the trilogy. Next, I will provide an ecofeminist analyze of the Capitol and Katniss and show how these characters are warning us (the Western world) against our current path, and encouraging us to return to a more respectful way of living.

Cultural Capital or Cultural Resources? Culture's Role in Moderating Class Standing and Educational Attainment

Todd W Schoonover, Marsha Rose

Sociology; Dorothy F. Schmidt College of Arts and Letters

Social class remains the single best predictor of educational attainment in the United States. Bourdieu proposed that the relationship between social class and educational success is mediated by “cultural capital,” or knowledge of and familiarity with high-brow cultural activities, symbols and settings. He proposed that schools informally and covertly evaluate students on the basis of cultural capital. Students who possess cultural capital can thus more readily navigate school settings than can students who lack cultural capital. This paper reviews the research on cultural capital and educational attainment in the United States from 2001-2012. This review suggests that as researchers have gone in search of better explanations for the relationship between social class and educational attainment, they have abandoned many of Bourdieu’s core assertions about the ways that cultural capital affects educational success. Findings show that the school’s standards of evaluation are not arbitrary, teachers do not reward students who possess cultural capital solely on the basis that they possess it, and cultural capital may be useful only insofar as it increases a student’s human capital. But institutionally useful resources are disproportionately available to students with higher socio-economic status. Therefore, we ought to think of cultural capital in terms of cultural resources in order to dissociate it from Bourdieu’s thesis about culture’s role in reproducing inequalities. Future research should focus on longitudinal and qualitative data in order to settle unresolved questions of causal direction and to further investigate the ways in which parenting practices lead to educational success.

Properties of Situations Related to Evolved Goals

David G. Serfass, Brittany A. Thompson, Ryne A. Sherman

Psychology; Dorothy F. Schmidt College of Arts and Letters

For years personality and social psychologists have documented the power of the situation, however, until recently no broad measure of situations existed (Wagerman & Funder 2009). This new measure, the Riverside Situational Q-Sort (RSQ) contains 89 items quantifying many psychologically important properties of situations. Using an online sample from MTurk, this study examines the relationships between the RSQ and six evolutionarily important situational domains including coalition formation, mate selection, and mate retention (see Kenrick et. al, 2003; 2011). The results indicate that many situations experienced in daily life fall into these six domain categories and that the RSQ is related in theoretically predicable ways to situations falling in these categories. For example in “social status” domains subjects reported these situations as “involving social comparison” ($r=.27$), and “raising issues of power” ($r=.25$) to name only two. The utility of the RSQ for quantifying theoretically important properties of situations is discussed.

A Box of Wires: An Analysis on Synthpop

Michael Suarez, Marina Karides

Sociology; Dorothy F. Schmidt College of Arts and Letters

The musical genre of Synthpop emerged out of its New Wave roots of the 1980s that favored the use of a synthesizer. While there have been studies on the Synthpop genre for various reasons, this study uses the grounded theory method in order to analyze Synthpop in another perspective to interpret the genre’s lyrics and the perceive meanings behind those lyrics. This study focuses on fifty-five songs within five albums from a diverse group of musical artists chosen by their gender, nationality, and perceived popularity associated with the Synthpop genre. Every stanza in all fifty-five songs were put into different sets of codes that were eventually simplified into one overarching category supported by two subcategories that found the dominant themes behind Synthpop. The primary theme that this study found in Synthpop is that it is a genre about the failures or the lack of romantic love that shatters the preconceive perceptions that an individual may hold when viewing their source of affection. As a result of the preconceive perceptions shattering, this study also finds individuals must ultimately choose to either negatively or positively cope without having romantic love in their lives anymore. This study is intended to provide another theoretical perspective to add with other perspectives in order to establish a more comprehensive framework on analyzing Synthpop and other musical genres when possible.

Sequence stratigraphy of the Arcadia Formation: An ichnologic approach

Caroline Wright, Anton Oleinik

Geoscience/Geology; Dorothy F. Schmidt College of Arts and Letters

Shallow marine lithofacies of the Arcadia Formation can be correlated using an integrated stratigraphic approach. One main continuous core located in Broward County, Florida will be stratigraphically analyzed using geophysical, lithologic, and ichnologic techniques. Interpreted sequence stratigraphic surfaces will be correlated with known surfaces previously identified in three previous cores. Two cores down to approximately 420 meters are located on the Florida Keys in Monroe County, one down to approximately 200 meters in Miami-Dade County. In Miami-Dade County, the lithology transitions from dominantly limestone to interbedding of carbonate and siliciclastic sediments. In areas where the formation is composed of fine-grained sediments, it behaves as a confining unit, but in areas where the formation is made of limestone and dolomite, it may behave in part as an aquifer. Previously identified lithological changes within the Arcadia Formation possibly indicate four transgressive sequences that correspond to glossifungites ichnofacies. Each sequence in the Monroe and Miami-Dade Counties begins with a subaerial exposure surface and ends with offshore carbonate muds. The exposure surfaces may be traceable to the Broward County core where the drop in the sea level might not have resulted in the subaerial exposure. Each sequence has a characteristic system tract pattern that will be correlated with biostratigraphic analysis, geophysical borehole logs, and seismic reflection data. Integration of these methods will allow for a more accurate mapping of the paleotopography that existed during the Late Oligocene to Miocene Epochs, and for correlation of the sequences between all three counties.

Aligning Firm Decision Making Processes with Environmental Conditions to Enhance Performance

Kevin C. Cox, Gary Castrogiovanni

Management; College of Business

The following provides multiple contributions to both strategy and entrepreneurship research by proposing a relationship between environmental conditions and performance that is moderated by the decision making orientation of the firm. The primary focus is to expand and extend the decision making research regarding effectuation (a cognitive decision making technique) by identifying environmental conditions that are best suited for effectuation decision making processes and lead to superior performance outcomes. This investigation relies on both the resource based view (RBV) of the firm, and work done on strategic alignment. The theoretical foundation is then used to develop a series of propositions concerning environmental conditions best suited for effectual decision making. This research endeavor identifies important firm characteristics that moderate the relationship between challenging environmental conditions and firm performance.

First provided is an overview of the theory of effectuation as originally put forth by Sarasvathy (2001). Second, research findings associated with the use effectual decision making are discussed. Third, I provide a different and unique conceptualization of effectuation which allows for investigation of decision making at the firm level, rather than at the individual level of decision making. Fourth, I provide reasoning for the preference to use effectuation in certain decision making situations. Finally, the environmental factors of velocity, dynamism, complexity, and volatility are considered as related to effectuation decision making processes. This culminates in the development of a conceptual model of circumstances when effectuation decision processes are likely to lead to enhanced performance outcomes for firms that are more effectually oriented.

Transition to a Paperless Clinical Monitoring Process to Support Pharmacy Practice Model Changes

Osmel Delgado, Darshika Patel, Dr. Attila J. Hertelendy

MBA (Health Administration); College of Business

Purpose: At Cleveland Clinic Florida (CCF) the pharmacy structure followed a specialist model where each clinical specialist only reviewed patients on their specific service. Specialists used both paper and electronic monitoring tools that varied among practitioners. CCF transitioned to a patient centered model for pharmaceutical services to ensure that every patient admitted to the inpatient setting would be monitored by a pharmacist. A standardized electronic monitoring and documentation tool was created to facilitate the workflow. Standard productivity metrics were identified to evaluate the impact of the new practice model.

Methods: Several changes were made to the daily workflow for clinical services. These changes included using shared clinical dashboard, removing paper monitoring forms, electronic handoff process, standardizing daily electronic progress notes, and standardized intervention documentation. A pharmacy technician was added to the decentralized pharmacy group to provide discharge prescription services to all patients. To evaluate these changes, the total number of interventions and discharge prescriptions per month was reported.

Results: The mean number of interventions increased from 3,126 per month before implementation to 4,322 per month after implementation of the patient centered model. The mean number of interventions per patient-day increased from 0.84 to 1.14. Approximately forty percent of all discharge prescriptions were filled in-house prior to the patient leaving the hospital.

Conclusion: Implementation of a standardized, electronic monitoring and documentation tool to support practice model change resulted in increased monthly interventions. Volume of discharge prescriptions generated from the discharge program supported the addition of a full time pharmacy technician.

H1N1: Effective Emergency Response Plans in 2009 vs. Today

Kimberly Scott, Carol Seamon, Dr. A. Hertelendy

Health Services Administration; College of Business

Influenza A, also known as H1N1, is a viral infection that caused the hospitalization of 272 patients throughout the U. S. (Wenzel & Edmond, 2009). The outbreak of this virus was serious enough to merit being classified as a pandemic by the World Health Organization (WHO). Therefore, it is with great interest to identify the response plan that was taken by agencies in 2009 to deal with this outbreak versus the response plan that is used today to deal with future pandemics. Accordingly, there is need for improved procedures, training, and coordination. With this understanding today, many agencies such as Department of Health and Human Services (DHS), Federal Emergency Management Agency (FEMA), and the Centers for Disease Control and Prevention (CDC) have collaborated to form an effective response plan. At the end of the investigation, the results should indicate whether agencies responsible for overseeing public health awareness procedures have in place an adequate and effective plan to deal with a potential pandemic similar to the 2009 H1N1 influenza virus. This work increases our understanding of how data is used to update response procedures and community awareness.

Is it ever prudent to form a global conglomerate? An industry specific investigation.

Garrett C. Smith, Dr. Jeffrey Madura

Finance; College of Business

In spite of the vast amount of literature covering diversification, as well as the effect, both in an industrial and international setting there remains an area left under investigated. Namely, is the effect whether value enhancing or destroying uniform across different industry groups? Prior literature typically assumes the effect (positive or negative) to be uniformly distributed. Using panel data covering a 30 year period (1982-2011) it is found this effect is not homogenous. Twenty-seven portfolios were constructed following Fama and French's thirty portfolio specifications, to investigate the industrial effects. First, the sample was used under a pooled ordinary least squares (OLS) framework showing that different industries respond to the different diversification possibilities differently. The results still exist after controlling for "self-selection" bias using Heckman's Two Stage regression framework. Lastly, a quantile regression technique was also employed to test for the existence of this non-uniform response using both enterprise value and return on assets (ROA).

Bioterrorism: Athrax - A Case Study

Beth Swerdloff, Dennis Poore's; Brandon Ta, Attila Hertelendy

Management Programs MHA; College of Business

Anthrax takes on three different forms; cutaneous, intestinal, and inhalation. The anthrax attacks in 2001 involved man-made deadly inhalation agents. Due to the frequent self-misdiagnosis that inhalation anthrax is pneumonia or flu, typically death occurs for many patients before they finally seek treatment. Treatment for anthrax involves strong antibiotics such as Ciprofloxacin.

Utilizing anthrax as a weapon requires sophisticated equipment and advanced knowledge. In 2001 the U.S. experienced anthrax attacks in Florida, New York, and Washington D.C., simultaneously marking the first biological attack on U.S. soil and anthrax as an agent.

The delivery mechanism for the attack eluded investigators for weeks, but finally it was determined that the anthrax that affected one American Media Incorporated employee in Boca Raton, Florida, was delivered via the U.S. Postal Service. The U.S. public became very suspicious of any anomalies in the mail and worried about attending large public gatherings.

As of 2003, the U.S. Postal Service is better prepared and has added anthrax detection systems for biological agents. Lower tier sentinel labs continue to screen and diagnose agents as possible threats to the U.S. security. The Federal government continues to review its authority and handling of this incident as compared to other events. Local hospitals realize how important it is to have a plan in place, even at the most basic level. Over the past ten years more U.S. institutions are adopting the framework of the Incident Command System.

Does corporate diversification enhance firm value during times of crisis?

Nik Volkov, Dr Luis Garcia-Feijoo

Finance; College of Business

This paper examines the effect of corporate diversification on firm value by comparing the actual diversified firm value to imputed firms value calculated by estimating firm's segment values based on the values of single segment firms operating in the same industry. Overall findings show an existence of a significant discount associated with all types of diversification. A specific focus of this paper is to analyze the effect of crisis on the observed discount. I find that during time of crisis the discount in value of diversified firms decreases significantly, therefore suggesting that diversified firms are relatively more valuable in times of financial distress. I do not find any evidence of diversified firms increasing their relative leverage during time of crisis, and therefore conclude that reduction in the amount of discount associated with diversification is caused by reduction in agency cost and more efficient management decision making during times of crisis.

Restored Voices: A Living Link to the Past

Cathryn Smart, Sandra Norma

Non-profit Management; College for Design and Social Inquiry

When the 2nd Maine Infantry marched down the hill from the Essex Street Armory on May 14, 1861, it halted in front of the James Crosby house at 13 Broadway. There, the soldiers heard speeches by Mayor Isaiah Stetson and Vice President Hanibal Hamlin. There, Colonel Jameson received a flag from the townswomen. There, crowds shouted; the Bangor Cornet Band played; passengers on The Daniel Webster cheered; the Brewer Artillery field pieces boomed. And, there, in the drizzling rain, aboard the railroad cars, the 2nd Maine began its journey into the silence of history.

The Civil War soon ended. The tattered flag was laid to rest in the Maine State Archives--forgotten, along with the memory of the house at 13 Broadway. Despite its earlier renown, only a few disparate remnants of the Bangor regiment survived.

Among them is a set of twenty-four unpublished letters that comprise the foundation of this ongoing project. They tell the tale of a regiment in its first year--stories of young men who fought for posterity.

The current phase of this study expands those stories to include the voices of the descendants of the soldiers in the 2nd Maine who still reside in the Bangor area. Comprised of a series of oral history recordings, transcripts and ancillary documents, it provides a living link to the past.

The first two interviews will be archived at the FAU library this spring. The completed project will also be housed in the University of Maine Folklife Center.

Campus Rainworks Challenge: A Green Infrastructure Masterplan for the Downtown Fort Lauderdale Campus

Christina Fermin, Bret Waldman, Elliott O'Roark, Alexandra Andrei, Cynthia Gutierrez, Demetrius Carter, Samuel Harding, Diana Mitsova

MURP/Arch/MFA; College for Design and Social Inquiry

This project sought to analyze the existing conditions in order to create a plan that would improve storm water management on the Downtown Fort Lauderdale campus through the installation of green infrastructure.

Do Parent Internal Working Models Affect Cortisol levels, The Development of Positive Attachment in Infants and Promote Positive Affect Regulation?

Susan Boklaga, Dr. Michael Frain

Counselor Education; College of Education

Memories of early relationships and early attachments as encoded into the brain as an “internal working model.” These models include expectations, beliefs, emotional appraisals, and rules for processing or excluding information. When a child develops a poor internal working model, a blueprint is then formed that serves as the blueprint from which all other relationships may be judged and modeled.

Current literature indicates children with secure attachments to their primary caregiver develop positive internal working models with minimal psychopathology and negative behavior. This study will examine the implications that a one-to-one parenting instructional approach may have on the parent child attachment relationship, internal working model, and child affect regulation. Saliva samples will be collected pre and post intervention and measured for cortisol, a steroid hormone frequently examined in studies of stress. Elevated cortisol levels are linked to memory deficits, immune-system impairments, lowered thresholds for activation of fear and anxiety neural circuits, and sometimes irreversible damage to neurons. 20 infant/mother dyads will receive an intervention of 12 weeks of infant/child psychotherapy using a reflective observation and filial therapy model. The attachment styles of the dyads will be categorized and coded. All mothers will complete a measurement measuring self internal working models. 10 mothers of the dyads will also receive individual therapy. By understanding the relationship between cortisol, attachment, and affect regulation, it is proposed that parenting programs could be developed for high risk infants consequently improving child and adult trajectories consequential to negative internal working models, poor early attachment and parenting.

Assessment of Public Acceptance of a Multi-unit Housing, Smoke-free Policy in Broward County, FL

Jamala Patterson, Dr. Michael Hall

Exercise Science & Health Promotion; College of Education

The impact of smoking cessation education programs has allowed for insight on the health implications of exposure to secondhand smoke (SHS). SHS is the combination of smoke from the burning end of a cigarette and the smoke exhaled. The increase in awareness amongst the population can be credited to a collection of government agencies and their research. However, the implementations of smoke-free zones are seldom enforced and lead to exposure concerns. This study defends the growing demand to cease involuntary exposure to tobacco smoke within residences. In townhomes and apartments multiple units in one building allow for smoke to pass through connecting ventilation systems. Despite, the toxic repercussions of SHS, multi-family smoke free policies are at the discretion of the property manager. Utilizing survey instruments previously conducted on smoke-free housing initiatives, The American Lung Association produced a fifteen question survey to ensure the representativeness of Broward county Tenants and condominium owners. The questionnaire measures opinions about smoke-free multi-unit communities. Surveys were accessed through the SurveyMonkey website and the paper format was disbursed at 8 tri-rail stations and 3 major bus stations in Broward County, FL. The data were analyzed using Statistical Package for the Social Sciences version 20 to determine frequencies, correlations and regressions. Additional analysis will determine if associations exist between age, type of home, education, income level and willingness to support a multi-unit, smoke free policy. The intention of the analysis is to help focus resources to advocate for the adoption of a multi-unit smoke free policy.

A Proposal for the Investigation of the Relationship Among Panic Disorder and Locus of Control, Learned Helplessness, and Anxiety Sensitivity

Amanda Rafkin, Dr. William Nicoll

Mental Health Counseling; College of Education

The purpose of this manuscript is to provide the rationale for a statistical analysis of the relationship between three factors as they are related to panic disorder. The three factors of interest in this proposal are locus of control, learned helplessness, and anxiety sensitivity. The current professional literature supports a correlation between these three factors' independent relationship to panic disorder as it is defined by the DSM-IV-TR (American Psychiatric Association, 2000). The author posits that the presence of these established relationships calls for an investigation of the relationships among locus of control, learned helplessness, and anxiety sensitivity themselves. This analysis would require four individual investigations. Included would be an investigation of the following pairings: locus of control and learned helplessness; locus of control and anxiety sensitivity; learned helplessness and anxiety sensitivity; as well as locus of control, anxiety sensitivity, and learned helplessness. The purpose of the current proposal is to define the rationale and research methodology for the investigation of these potential relationships. Future studies aim to generate and analyze quantitative data to identify the relationships between the three aforementioned factors known to be correlated with panic disorder. This would lay the groundwork for future development of preventative measures and treatment modalities with the intent of improving both case conceptualization and the efficaciousness of treatment interventions.

Spiritually Competent Rehabilitation Counseling: Adjusting to Disability

Layven Reguero, Dr. Peluso

Counselor Education; College of Education

To enhance awareness of contemporary research that indicates service delivery outcomes for consumers with disabilities, as well as the resilience of their families: improved through spiritually competent professional counseling practices. Consumers with disabilities and their families have needs that may differ from a non-disabled population. This presentation will discuss the implications and applications of recent research on spiritually competent practice and attempt to adapt such findings to the specific concerns of dealing with a disability. It also serves to highlight literature that posits Rehabilitation counselors can greatly benefit consumers with disabilities through acquiring the knowledge, sensitivity, and ability to formulate and act upon spiritually competent interventions.

Family Resiliency, Social Support and Validation to Determine the Quality of Life in Caregivers and Persons with Alzheimer's Disease.

Havovi B. Shroff, Michael Frain, PhD

Counselor Education; College of Education

Alzheimer's disease (AD) is a progressive, degenerative disorder that attacks the brain's nerve cells, or neurons, resulting in loss of memory, thinking and language skills, and behavioral changes. Family members of persons with Alzheimer's disease can assume added responsibilities and stress due to the progressive and degenerative component of this disability and places an added strain on the family system. This study was designed to examine predictors of quality of life of persons living with AD. This study hopes to empower the caregivers and test the resiliency model of family stress, validation therapy and social support, while incorporating individual patient and family needs by surveying caregiving family members and group facilitators working with patients with AD. Specific aims of the study include validating relationships of the resiliency model while determining the importance of social support and the role of validation therapy in the lives of persons with Alzheimer's disease, to predict the perceived quality of life.

Reliving one's personal history through the canon

Evana R. Tamayo, Dilys Schoorman

Curriculum, Culture, and Educational Inquiry; College of Education

In this autoethnographic study, the author, a high school teacher, entered into communication with five female characters from five separate full-length works of the American literary canon. Each work depicted at least one woman who faced experiences that were at times disempowering; hence, in these communications, the researcher engaged her own life story along with the female character's life experiences with the two-fold purpose of understanding fully the nature of the character's disempowerment and her response to it as well as the researcher's negotiation of her own disempowering moments and reclamation of an identity separate from those experiences. By comparing her life to the female characters she selected, the researcher sought to gain a deeper understanding of herself, and more significantly, the cultural messages she has sent her students about female identity. Though this autoethnographic research, this writer and teacher sought to gain the understandings she needed in order to focus a study of these women as they are, in all of their complexity, and not as the sum of their choices. The intent of such analysis is to encourage a meaningful dialogue regarding the choices high school literature teachers make in drafting their syllabi.

For the purposes of this study, the following women and works were selected: Mary from *The Crucible*, Edna from *The Awakening*, Maggie from *Maggie: A Girl of the Streets*, Myrtle from *The Great Gatsby*, and Janie from *Their Eyes Were Watching God*.

A Review of the Stability of Feature Selection Techniques for Bioinformatics Data

Wael Awada, David Dittman, Randall Wald, and Amri Napolitano, Taghi M. Khoshgoftaar

CEECS; College of Engineering and Computer Science

Feature selection is an important step in data mining and is used in various domains including genetics, medicine, and bioinformatics. Choosing the important features (genes) is essential for the discovery of new knowledge hidden within the genetic code as well as the identification of important biomarkers. Although feature selection methods can help sort through large numbers of genes based on their relevance to the problem at hand, the results generated tend to be unstable and thus cannot be reproduced in other experiments. Relatedly, research interest in the stability of feature ranking methods has grown recently and researchers have produced experimental designs for testing the stability of feature selection, creating new metrics for measuring stability and new techniques designed to improve the stability of the feature selection process. In this paper, we will introduce the role of stability in feature selection with DNA microarray data. We list various ways of improving feature ranking stability, and discuss feature selection techniques, specifically explaining ensemble feature ranking and presenting various ensemble feature ranking aggregation methods. Finally, we discuss experimental procedures such as dataset perturbation, fixed overlap partitioning, and cross validation procedures that help researchers analyze and measure the stability of feature ranking methods. Throughout this work, we investigate current research in the field and discuss possible avenues of continuing such research efforts.

Indoor Localization using WiF iWireless LANs

Saeid Mirzaei Azandaryani, Ionut Cardei

Computer Science; College of Engineering and Computer Science

Nowadays the widespread availability of wireless networks has created an interest in using them for other purposes, such as localization of mobile devices in indoor environments because of the lack of GPS signal reception indoors.

As part of the Campus 2020 project we develop an indoor localization platform for WiFi nodes (such as smartphones and laptops) that identifies the building name, floor number, and room number where the user is located based on a fingerprint location identification of WiFi access point signals.

We use J2EE technology with the Apache Tomcat web server for managing WiFi signal data from the FAU WLAN. A nearest neighbor method applied at runtime maps the WiFi client node to the precise location inside FAU buildings. The prototype localization client application runs on Android cell phones and operates in the East Engineering building at FAU.

More sophisticated classifiers will be used to improve the localization accuracy once we gather sufficient training data.

Propagation of Corrosion in Dry-Cast Reinforced Concrete Pipes after Corrosion Initiation

Hariharan Balasubramanian, Dr. Francisco Presuel-Moreno

Ocean Engineering; College of Engineering and Computer Science

Dry-cast reinforced concrete pipes (D-C-RCP) are used as drainage pipes by the Florida Department of Transportation (FDOT) and other DOTs. Some of these pipes are located in Florida areas where there is a low water table. The time to corrosion initiation period could be shortened by chloride transport due to capillary absorption and diffusion. However moderate or no corrosion has been observed on dry-cast reinforced concrete pipes placed in soils containing high chloride concentration and high moisture conditions. Moreover, the high moisture of the soil could result in low oxygen availability. This investigation is being carried out to better understand the propagation stage on corroding dry-cast reinforced concrete pipes. Experiments were conducted on two different types of D-C-RCP provided by FDOT. These pipes were segmented, instrumented and solution reservoirs installed in horizontal and vertical orientations. Potentiostatic, galvanostatic and migration methods were used to initiate the corrosion. Once the off-potential of the steel reached a value more negative than -250mV $V_{s_{sce}}$ after 24 hrs. Those specimens considered active were transferred to 95~98% high humidity chamber, then to fully or partially buried in simulated saturated soil. Electrical Impedance spectroscopy was performed to obtain the solution resistance. So far these specimens show no visual signs of corrosion. Reason could be that since both concrete types have high porosity the products are moving through interconnected pore structure. From the preliminary results no increase in R_{papp} in time has been observed. Upon further exposure there could be an increase in R_{papp} .

Investigating Nanocomposite Films for Chemical Nanosensors

Charles Davis, Dr. Hassan Mahfuz, Dr. Hassan Mahfuz

Ocean and Mechanical Engineering; College of Engineering and Computer Science

Improvised explosive devices (IED's) are a common threat in the contemporary warzone and difficult to detect because their constituents are eclectic and only produce trace concentrations of gas. Explosives nano-sensors utilize coatings tailored to impart a high sensitivity toward gasses of interest. The goal of this research is to investigate the effects of nano-particle inclusion in the sensor coating to improve the sensors' sensitivity, reusability, and reversibility.

Ammonia was chosen as the analyte because it's a volatile organic compound like many produced by IED's, including toluene, without the dangers of toxicity or explosion. The sensor coating material is composed of Nafion, an acidic ionic polymer, infused with acid-functionalized carbon nanotubes. The composite is then applied to quartz crystal microbalances (QCM's). QCM's oscillate at a specific frequency when subject to AC current. Ammonia particles which react with the coating cause the frequency of the QCM to change relative to the amount of ammonia molecules present.

Experiments have included: calorimetric analysis, atomic force microscope imaging, and frequency analysis of exposure to analytes. Initial testing has shown improvements in sensitivity and selectivity towards ammonia, fast reversal of adsorption, and suggests increased stability of the polymer. Future experiments will investigate repetitive use effects on performance, and work to optimize nano-particle concentration.

Sparse Representation Classification of Dolphin Whistles Using Local Binary Patterns

Mahdi Esfahanian, Dr. Hanqi Zhuang, Dr. Nurgun Erdol

Electrical Engineering; College of Engineering and Computer Science

Compressive sensing has been recently emerged in the area of pattern recognition and signal processing. In this research, a Sparse Representation Classifier (SRC) is adapted and applied to the classification of bottlenose dolphin whistles. This technique relies on near completeness of the training features, rendering their choice no longer crucial as long as certain criteria are met. Classes of dolphin calls are determined by a linear basis pursuit algorithm that minimizes the l1-norm of the error vector. Also Signal sparsity is ensured via the employment of a robust, effective, and computationally simple Local Binary Pattern (LBP) operator that eliminates the need for costly denoising and contour tracing operations. The performance of the SRC is evaluated and then compared with outputs obtained from K-Nearest Neighbor (KNN) and two feature extraction methods: Time-Frequency Parameters (TFP) and raw pixels. The experimental results demonstrate superior capability and accuracy of the proposed method on classifying dolphin whistles into distinct call types. The method can be generalized to all narrowband signals with time varying spectra.

Corrosion Initiation on Corrosion Resistant Alloys via Acceleration Chloride Transport

Francisco Gutierrez, Dr. Francisco Presuel-Moreno

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The corrosion propagation stage is usually assumed to last a few years (typically five years). This duration applies to carbon steel rebar embedded in concrete of moderate durability. Most experimental work has been done to determine the time to initiation and chloride threshold with the specimens terminated shortly afterwards. In recent years the use of corrosion resistant alloys (e.g. duplex stainless steels) has been suggested as a way to achieve a long maintenance-free service life. Two duplex stainless steels rebars: UNS S32304SS and UNS S32101SS, were selected to investigate the propagation stage. Specimens were fabricating with six bars each, three of which comprised a top and three a bottom layer. The specimens are square blocks of concrete mixture. An activated titanium mesh was placed on the bottom when the specimens were cast. The first 45 days the samples were in a high moisture environment. Then samples were exposed for 30 days to laboratory humidity and temperature. Chloride transport was achieved by first exposing the specimens to cycles of three days dry and four days wet, of 20% of sodium chloride solution, inside an elevated temperature room (37.8 °C) for 120 days; Corrosion did not take place within this period. Hence, the specimens were placed in a high humidity chamber at the laboratory. An electric field was then applied to accelerate the chloride transport via migration; 20 V were applied. After corrosion initiated: linear polarization resistance, electrochemical impedance and potential measurements will be performed to monitor the propagation stage.

Campus 2020: Pedestrian and Driver based GPS Navigation for the Florida Atlantic University Campuses

Brandon Jones, Dr. Mihaela Cardei

Computer Science; College of Engineering and Computer Science

Finding ones way around a college campus can be difficult on visitors, new faculty or students. Aid from technology such as GPS navigation is not available, as mapping providers rarely provide directions once one is on a college campus.

The campuses of the future would tackle problems such as these by allowing faculty, staff, visitors and students access to real time data, such as navigation based on current traffic conditions.

The recent rise of smartphone technology has allowed computation power to be at one's fingertips at virtually any given time or place. The quick access to information will allow the campus of the future to begin today.

As one piece of the Campus 2020 project, the FAU Campus Maps Android application allows a user to get driving or walking directions to a given location on any of the FAU campuses. In the case in which a user is driving the application would also provide directions the closest parking lot, which the user is allowed to park in, to their destination. As the application progresses, it will be integrated with other technologies, such as parking lots that report open parking spots, making a smart interactive campus a reality.

Aerodynamic Analysis of a Propeller in a Turbulent Boundary Layer Flow

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Simulating the exact chaotic turbulent flow field about any geometry is a dilemma between accuracy and computational resources, which has been continuously studied and compromised for just over a hundred years. This thesis explores numerical procedures and applies them along with the Reynolds' Averaged Navier-Stokes equations and Spalart-Allmaras turbulence model to approximate the otherwise chaotic flow ingested by a Sevik type rotor. The complete CFD process is detailed to provide information at every phase in the development of results ranging for geometry creation to solution post-processing. A multiple reference frame fluid model is utilized by ANSYS - FLUENT throughout this thesis and results compared to experimental data. Three interesting rotor configurations are studied including an open rotor with no flow obstruction, an open rotor near a plate, and an open rotor near a plate with an additional thick boundary layer. Furthermore, studies are made to determine the variation in velocity profiles of the ingested turbulent flow due to varying flow conditions. As a result, this study is indicative that adding a plate near a rotor and allowing a thick boundary layer to be ingested could provide improvements in rotor performance at off peak performance range and possibly reduce noise levels within the entire operational range.

Automation of the SHIELD Methodology for System Hazard Analysis and Resilient Design

Anthony Marcus, Gabriel Alsenas, Ionut Cardei, Ph.D.

Computer Science; College of Engineering and Computer Science

The System Hazard Indication and Extraction Learning Diagnosis (SHIELD) methodology was developed as a novel method to perform system hazard analysis and resilient design. In the predecessor to this project, we described SHIELD conceptually and outlined the details necessary to conduct the analysis manually. This approach integrates state space examination into the analysis process in order to facilitate efficient and comprehensive identification of undiscovered risks and hazard scenarios. SHIELD requires that three phases (decomposition, evaluation and prescription) be performed serially to achieve a system hazard evaluation.

The first phase of SHIELD, decomposition, breaks the system down hierarchically and recursively into smaller components so that the state space associated with each component is more manageable for the user. In the evaluation phase, typically experts would analyze the associated state space and transitions for each component, recursively, bottom-up. In the final phase of the analysis, prescription, we apply a set of heuristics to the results from the preceding phase. The concept is such that with these heuristics we incite ideas in the design team to find solutions to the resulting hazardous state combinations from the evaluation phase.

Our main contribution in this project is the automation of the methodology such that the temporal parameter associated with the analysis will be greatly reduced without sacrificing accuracy or overlooking hazardous state combinations.

Fourier telescropy test system

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Electrical Engineering; College of Engineering and Computer Science

Fourier telescropy is a recently-developed imaging method that relies on active illumination of the object, “light bucket” detection of reflected/scattered light, and post processing of the detected signal to extract the magnitude and phase of spatial frequency components of the object reflectance or transmittance function. It has been investigated as a means for high-resolution optical imaging from ground-based observation stations of earth-orbiting satellites, for very large depth of field tomographic optical microscopy, and, most recently, as a means for diffraction-limited imaging through ground-level atmospheric turbulence with large apertures and at large distances.

We report on a versatile yet comparatively simple system for the experimental investigation of basic aspects of Fourier telescropy. The system uses a laser source and a Michelson interferometer equipped with a sinusoidally-moving mirror. System requirements, design, theory of operation, and some applications are discussed.

Keywords: Fourier telescropy, imaging systems, imaging through turbid media, atmospheric optics, remote sensing

Non Redundant Spatiotemporal Array for Time Average Fourier Telescopy Applications

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Two -dimensional non-redundant array (NRA) configurations have been used for decades in the design of radio telescope arrays. To date, NRAs have been non redundant with respect to the separation between any two elements of the array. In our research on time-average Fourier telescopy, a two dimensional non-redundant array is required where each of the active elements in the array is a coherent light source at a unique frequency. In this case, non-redundancy is necessary not only in the separation but also in the frequency difference between any two elements of the array. Furthermore, as bandwidth is a great limitation in our technique, the method of frequency assignment should result in an array with frequency differences that are as compact as possible. Our research explores the problem of adding the frequency difference as a requisite for the NRA and proposes an algorithm for assigning frequencies that will minimize the bandwidth using non-redundancy sets and cyclic difference sets theory.

Berth Scheduling in Container Terminals: A Pro-Active Approach to Address Uncertainties in Arrival and Handling Times

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Container terminals have very complex and dynamic operations. Effective and efficient berth schedules are essential for profitable and sustainable operations. This paper studies berth scheduling under uncertainties in arrival and handling times. Port operators usually face challenges in the development of berth schedules. This paper presents a model formulation of discrete berth space that accounts for uncertainty in arrival and handling times. The problem is reformulated as a bi-objective bi-level optimization berth scheduling problem. A solution approach is presented using evolutionary algorithms and heuristics. The objective of the formulation is to provide a robust berth schedule by minimizing the average and range of the total service times for all vessels served at the terminal. Simulation is utilized to evaluate the proposed berth scheduling policy and compare it to two first-come-first-served policies.

Modeling and Analysis of Hybrid Ship Hull Structure Under Slamming Load

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Department of Ocean and Mechanical Engineering; College of Engineering and Computer Science

A hybrid ship hull is constructed in part from composites which provide the lower magnetic, acoustic, radar, and thermal signatures, and in part from a metal which can provide the required stiffness and in-plane strength for a large combatant ship. In the present research, a simplified model of a hybrid ship hull is investigated. The hull is 73m long and has 12m of beam. It is assembled by Titanium alloy (Ti-6Al-4V) frame and sandwich composite skins. The Ti frame is designed to carry in-plane loads, whereas the sandwich composite is for lateral loads. The core of the sandwich composite is made of PVC foam (200 mm thick) and the face-sheets by glass fiber reinforced polymer (10 mm thick). All the loads including wave bending moment, still water bending moment, wave shear force, bottom slamming pressure and bow impact pressure are calculated according to American Bureau of Shipping (ABS) rules. The hull structure is analyzed using Finite Element code, ANSYS. Stress components for both Ti frame and sandwich composite are extracted. The maximum stress criterion for isotropic material (Ti and sandwich core) and Tsai-Wu failure criterion for orthotropic material (sandwich skin) are applied. Cohesive Zone Model is then used to simulate interface delamination between the layers of sandwich composite. The study performs a comprehensive failure analysis of a hybrid ship hull at various ship velocities and sea states, and estimates the parameters for a future fatigue analysis.

Analysis of Carbon Nanotube/Epoxy Composite in the Presence of an Interphase Layer

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A promising method to improve the mechanical behavior of carbon nanotube (CNT)-reinforced composites is to enhance the CNT/matrix interaction with an interphase layer. In the current study, the effective elastic modulus of a polymer composite containing CNTs is estimated using the Composite Cylinders Model. The analysis focuses on the response of a Representative Volume Element (RVE) of the composite to simple axial loading. To simplify the model, RVE is considered as concentric circular cylinders of CNT, interphase, and epoxy matrix. Numerical analysis using ANSYS Workbench together with a theory of elasticity model is employed. In order to investigate the effect of thickness and elastic modulus of the interphase on the mechanical behavior of the RVE, a thickness range of 0.1 to 0.8 nm and three elastic moduli of 0.25, 1 and 5 GPa are considered. The resulting stress distribution maps from uniaxial loading of the RVE demonstrate that CNTs play a significant role in carrying the load. Generally, increasing the elastic modulus of the interphase up to 5 GPa leads to enhancement of the effective modulus of the RVE. For interphase layers with lower elastic modulus than the matrix, increasing the interphase thickness is found to reduce the effective modulus of the RVE. Conversely, for interphase layers with higher elastic modulus, thickening of the interphase up to 0.8 nm causes the effective modulus to improve. Therefore, controlling the thickness and stiffness of the interphase layer can be used as an effective approach to tune the behavior of the bulk composite.

Anatomic Risk Factors for Anterior Cruciate Ligament Injury

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Anterior cruciate ligament injuries are at an epidemic level in the US. Close to 200,000 persons tear their ACL during athletic activities. Majority (larger percentage) of the injured subjects are female. The main purpose of this study was to identify new anatomic risk factors for ACL injury. We believe that subjects that tear their ACL possess anatomic features that expose them to higher risk of injury. The main goal of the study was to measure and compare the volume of the Tibial Eminence between a group of ACL-injured subjects and a group of uninjured subjects (controls). The Magnetic Resonance Images of ----injured and -----uninjured knees were studied. The tibial eminence was segmented and the three dimensional image of the eminence was constructed. The volume of the eminence was then measured in cubic millimeters. Finally, a statistical analysis was performed to assess any differences between cases and controls in men, women, and the pooled population. The results revealed that there are no significant differences between male cases and male controls ($p = 0.36$), there is border-line significance between female cases and female controls ($P = 0.08$), there are no differences between cases and controls in the pooled population ($P = 0.11$). There was a significant differences between male and female controls ($p < 0.05$). The evidence, overall, suggests that female may possess a smaller tibial eminence and this may be a source increased incidences of ACL injury in females.

Technological Abandonment: The Lived Experience of Women Having an Abnormal Prenatal Ultrasound

Jeanne Gottlieb, PhD (c), ARNP, CNM; Dr. Shirley Gordon

College of Nursing; Christine E. Lynn College of Nursing

Over one hundred years ago, health disciplines had limited therapies for neonatal disorders. During this period, the eugenics movement influenced leaders to involuntarily sterilize individuals to prevent disorders in offspring. Today in reproductive health, technology brings a variety of testing and interventions. One of these contemporary technologies is the use of ultrasound and serum bio-medical markers for detection of fetal disorders. When ultrasounds reveal abnormal findings, the perceived perfect pregnancy vanishes to feelings of shock, disbelief, failure and fear. Twelve women were interviewed who had an abnormal ultrasound. The method of van Manen's hermeneutic phenomenology illuminated the meaning for these women. The women's stories revealed suffering. They were unaided as they withheld disclosure to others. They wanted to know more, but could not endure "bad news". Women were abandoned. The significance reveals that nurses and providers need to infuse human caring ways of being, knowing and doing within advanced technological environments.

Health Challenge of Stress Experienced by Native American Adolescents

Melessa Kelley, John R. Lowe

Nursing; Christine E. Lynn College of Nursing

Little is known about how Native American youth experience or manage stress. The purpose of this study was to describe the health challenge of stress experienced by Cherokee-Keetoowah adolescents and to identify approaches used to manage stress. All adolescents regardless of ethnicity face normative sources of stress, such as daily hassles and transition experiences like moving to a new school. Native American youth are known to have significantly greater stress, related to social and economic factors, than their white peers. A qualitative story-theory-guided approach was used to conduct a secondary analysis of a data set collected during a larger study to identify dimensions of the health challenge of stress and approaches used to resolve the health challenge. The written stories of stress were gathered from 50 Cherokee-Keetoowah adolescents ranging in ages from fourteen to eighteen years. Three health challenge groups were identified as: the burden of expectations, relationship disruption, imposing feelings, and the actions of others. Connecting with valued others, engaging in meaningful activities, and choosing a positive attitude about change were themes that characterized ways that these adolescents managed stress. It is essential to understand how Native American adolescents experience stress and what they do to manage it if we wish to deter the physical and mental consequences of stress. Furthermore, the development of stress-reducing culturally competent interventions built on a foundation such as story-sharing is a culturally congruent approach for intervening with Native American adolescents.

P Building Structures for Research: Culturally Congruent End of Life

Mary Martin, Dr. Christine Williams

Nursing; Christine E. Lynn College of Nursing

Understanding how theory and practice is integrally linked is a challenging goal for nursing students. The 10-step process outlined in “Building Structures for Research” (Smith & Liehr, 2008) was utilized in a doctoral course at Florida Atlantic University to address this goal and explore theory development and evaluation in the context of nursing knowledge, guided by caring philosophy. Nursing theories were studied among doctoral nursing students with emphasis on middle range theory as applied to practice and research. Concept analysis methods were introduced as a foundation for theory building and evaluation. In this lively course students had an opportunity to develop a theory related to their phenomenon of research interest with consideration of the relationship between a memorable, significant nursing practice situation and nursing theory. This scholarly learning opportunity allowed for:

- Examination of nursing theory for relevance to practice and research
- Demonstration of role synthesis by analyzing and critiquing methods of concept analysis for relevance to area of research-practice interest
- Understanding wholeness of persons connected with others and the environment through caring by evaluating nursing theory for relevance to a caring philosophy
- Actualization of nursing as nurturing the wholeness of others through caring synthesizing a conceptual definition which is consistent with caring philosophy, emerges from nursing practice and is central to planned research

Gathering evidence to support the family members when a loved one has suffered a Traumatic Brain Injury.

Duangporn Piyakong, Dr. Patricia Liehr

Nursing, doctoral program; Christine E. Lynn College of Nursing

Introduction: Traumatic brain injury (TBI) is a major health problem in Thailand often caused by motor vehicle accidents. TBI results in unconsciousness with physical, cognitive, and emotional consequences. The unconsciousness of patients with severe TBI is an unstable condition where patients might recover, remain unconscious, or end up dying. This uncertainty affects family members’ lives as they seek to support and care for their loved one. The purpose of this study was to identify challenges and approaches for resolving challenges for Thai family members when their loved one is in the state of unconsciousness after severe TBI.

Methods: This theory-guided pilot study used an exploratory descriptive design. Nine Thai family members of severe TBI patients were interviewed at the neurological ICU of a hospital in Thailand. Story-inquiry method guided data collection and analysis. The interview asked about challenges and management approaches used by family members when engaging with their loved one.

Findings: Three challenges themes were identified: facing the uncertainty of their loved one’s illness, dealing with personal sufferings, and changing everyday life patterns. Attending to their loved one and attending to self were two major themes that family members used to manage challenges. Participants talked about their uncertainty regarding how to engage with their loved one.

Discussion: Thai family members are facing extraordinary uncertainty when their loved one has suffered TBI. They tap familiar resources but need help to connect with their unconscious loved one. These results will be useful to guide development of supportive interventions.

Measurement of Basic Knowledge of Alzheimer's Disease in Rural Populations

Lisa Wiese, Dr. Ruth Tappen, Dr. Christine Williams

Nursing; Christine E. Lynn College of Nursing

Instruments currently in use to assess knowledge of Alzheimer's disease (AD) are either outdated or directed to persons of high socioeconomic and educational levels, rendering the items irrelevant or incongruent for high-risk populations. The Basic Knowledge of Alzheimer's Disease assessment tool is a 20-item, closed-ended test designed to measure levels of knowledge of AD in rural populations. The questions address knowledge of risk, onset, treatment, progression, and prevention of the disease, as well as symptoms and behaviors associated with AD. The measure was field tested with twenty older adults attending a rural health care clinic in Fayette County, West Virginia, a low income, non-Hispanic white population.

Preliminary assessment for validity and internal reliability included completion of a content validity index by health professionals currently working among the target population. Lay leaders examined the tool for language, reading level and cultural appropriateness. Nurse researchers with expertise in cognitive screening for AD edited items for appropriateness and clarity. Phase 2 consisted of administration of the revised survey and a qualitative technique using "think aloud" to illuminate reasons for the chosen answers.

Findings included that 90% of those surveyed believed that memory loss is a normal part of aging and 60% thought that persons with AD are unable to understand what they see on television. Eighty percent agreed that earlier detection means earlier treatment. Future research will include further tests of reliability and validity to evaluate worthiness of the tool and administration to a greater and more representative sample of Appalachian residents.

Fluctuation and Correlation effects in a charged surface immersed in an asymmetric electrolyte solution

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Physics; Charles E. Schmidt College of Science

We explore the correlation and fluctuation effects, by constructing the Green's function, for a system consisting of a single homogeneously charged planar surface with divalent counter-ions and univalent co-ions distributed on both sides of the surface. Using a field-theoretic formulation, we compute the one-loop correction to the electrostatic potential. We find that the potential and the ion distributions are substantially different from the mean field approach. From the asymptotic behavior of the electrostatic potential, we obtain an exact expression for the effective surface charge density.

Hippocampal place cell activity influenced by variations of the Novel Object Recognition task in C57BL/6J mice.

Herborg Nanna Asgeirsdottir, Sarah J. Cohen, Gongliang Zhang, Alcira Munchow, Dr. Robert Stackman

Experimental Psychology; Charles E. Schmidt College of Science

Pyramidal neurons in rodent hippocampus discharge according to the animal's spatial location. The firing of these place cells is influenced by distal and local cues, and likely guides spatial memory and navigation. The rodent hippocampus is also critical for the encoding, consolidation and retrieval of non-spatial object memory, as assessed with a novel object recognition (NOR) paradigm. Here, we tested the influence of local 3D object exploration on place field stability by recording hippocampal CA1 neurons from freely moving male C57BL/6J mice in three

NOR task variations. In the first study, place fields were found to be stable when mice explored a sterile open field arena, and after objects were introduced in both sample and test sessions.

Next, place cells were recorded in the same arena containing a polarizing cue card. Place fields did not remap when objects were introduced in either session. In the third study, mice freely explored the sterile arena for 2 min before introducing objects. Here, place fields remained stable throughout all NOR testing stages. Interestingly, on several occasions place fields exhibited in the sterile arena (in the absence of any polarizing cues) were found to rotate in 90° increments but were still considered stable. In contrast, place fields never rotated in the presence of the cue card, or when objects were present from the start of the recording session. Together, these data indicate that presence of objects in a familiar environment does not induce remapping, but they can influence the stability of previously established fields.

Restoration of a Critically Eroded Shoreline: A Case Study of Martin County's Bathtub Beach, Stuart, Florida

Jerilyn Ashworth, Dr. William Louda

Environmental Science; Charles E. Schmidt College of Science

In 2011, the Florida Department of Environmental Protection (FDEP) identified 642 km of Florida's Atlantic coast as Critically Eroded Areas (CEA) and 29 km of the total included Martin County's shoreline. Due to shoreline retreat, Martin County's Bathtub Beach (a CEA in Stuart, Florida) is in danger of eroding away. Hurricane Irene (1999) caused massive erosion and initiated a beach restoration project under an Emergency Order from the State. In 2004, Hurricanes Frances and Jeanne made landfall within a kilometer of Bathtub Beach and caused significant dune retreat. Strong, repetitive northeast storms in 2007 and 2008 reactivated severe erosion. Degradation of the beach-dune system was so severe that Bathtub Beach was closed for two years, until a second restoration project was completed in 2010. Within six months of reopening, renourished beach sand was washed away as the erosion continued unabated. The erosion problem at Bathtub Beach has continued since 2007 and additional efforts to restore the beach need to be implemented. Study of the current erosion problem in view of prior restoration projects provides insight into the nature of the problem and the background for a new, innovative restoration project that will mitigate future erosion events. The proposed restoration includes a multi-pronged approach that incorporates hard and soft engineering techniques that will protect the beach while minimizing maintenance costs.

Removal of *Phymatosorus scolopendria* from Fern Forest Nature Center

Lisa Baig, Dianne Owen

Environmental Sciences; Charles E. Schmidt College of Science

A FLEPPC category 1 invasive plant, *Phymatosorus scolopendria*, has been found in Fern Forest Nature Center, Coconut Creek, FL. While most invasive ferns have been researched, this particular species is lacking in most botanical research areas. This particular family of ferns is known to reproduce through intragametic selfing, but removal in the field also revealed a potential reproduction through fragmentation of the rhizoids. During removal of known locations, a search of the park facilities was conducted to determine if further spread occurred from the initial source. The only known location was along a drainage canal, which runs adjacent to the primary location. Other than canal location, soil characteristics, organic material and other environmental conditions are dissimilar. In the primary site, the ferns grew on rocks and trees in a dense canopy area. In the only known secondary site, the ferns grew in a relatively open area which contained some rocky areas.

In vivo administration of a subtype selective activator of small conductance Ca²⁺-activated K⁺ channels influences hippocampal-dependent spatial memory

Robert Beck, Dr. Robert W. Stackman Jr.

Psychology; Charles E. Schmidt College of Science

Small conductance calcium activated potassium (SK) channels constrain learning and memory in several tasks. Past research found mice overexpressing the SK2 channel, one of three SK subunits expressed in the CNS (SK1, SK2, and SK3), or receiving systemic treatment with broad range positive SK channel modulators express deficits in hippocampal dependent memory tasks. The effects of the more selective SK2/SK3 activator cyclohexyl-[2-(3,5-dimethyl-pyrazol-1-yl)-6-methyl-pyrimidin-4-yl]-amine (CyPPA) were examined in male C57BL/6J mice in a behavioral task battery. Systemic CyPPA produced no significant deficits in the hippocampal dependent Morris water maze task with mice exhibiting equivalent platform search accuracy during a probe test. However, CyPPA disrupted the typical directional responding observed during the water maze probe test. To test the effects of CyPPA on conditioned fear memory, 4 separate cohorts were administered systemic CyPPA or vehicle before pre-exposure to the conditioning chamber, before tone-shock pairing, or before the tone/context tests. Mice administered CyPPA prior to tone/context testing exhibited reduced contextual freezing relative to vehicle-treated control mice and all 3 CyPPA cohorts produced higher percent freezing than the control during the tone test. These data support past evidence of SK channel's role in non-aversive memory and reveal a unique role in aversive memory.

Assessing the Threat of Sea Level Rise to Vulnerable Populations in Southeast Florida

Keren Bolter, Tobin Hindle

Geosciences; Charles E. Schmidt College of Science

Southeast Florida's low-lying topography and highly permeable limestone substrate make sea level rise (SLR) the most threatening local climate change stressor. Coastal populations are particularly at risk due to their increased probabilities for erosion, inundation and storm surge, but interior populations are also susceptible to rising water tables and flooding amplified by SLR. Most SLR vulnerability studies focus only on financial risk and do not consider whether the inhabitants of coastal and interior areas have the means to relocate. This study examines socioeconomic patterns at low elevations in the counties of Palm Beach, Broward, and Miami-Dade. Demographic census block data is combined with LIDAR digital elevation data to create a vulnerability index that incorporates likelihood of inundation with socioeconomic consequences. Results indicate that the most vulnerable populations to SLR are those living near the coast, particularly in Miami Dade County. However, there are significant inland populations in Broward and Miami-Dade counties that have a medium to medium high risk of inundation and flooding due to SLR. Results provide information that is important for incorporating SLR into planning efforts, not just to account for financial risk, but also to identify populations that are most vulnerable to increased flooding and permanent inundation.

Habitat Suitability for White Ibis, Snowy Egret and Great Egret at Lake Okeechobee, Florida

Richard A. Botta, Dale E. Gawlik

Environmental Science; Charles E. Schmidt College of Science

Lake Okeechobee's littoral zone, occupying approximately 450 sq km, provides a large amount of habitat for wetland birds. When aerial surveys of nesting wading birds began in 1957, the lake supported about 10,000 pairs. Subsequent increases to the water-level regimes produced a decrease in nesting effort. Although the hypothesized cause of the nesting drop was due to reduced foraging habitat, previous studies simply infer that the relationship exists based on correlations between nesting effort and lake stage. Here we combined LiDAR based digital elevation data, lake stage, and vegetation data to create functions that were proxies for the vulnerability, abundance, and spatial extent of wading bird prey. Functions were combined to create an envelope of suitable foraging habitat that was available to wading birds before and during the breeding season. We validated the model with independent data on flock occurrence during 2010 and 2011. The model performed moderately well with an area under the curve of 0.8159 for the receiver operating characteristics. From 2006-2012, a significant relationship ($R^2=0.8176$, $p<.0052$) was found between predicted habitat suitability and peak nest effort for the Great Egret (*Ardea Alba*), Snowy Egret (*Egretta thula*), and White Ibis (*Eudocimus albus*). Nest effort ranged from 10,176 pairs in 2006 to 20 pairs in 2008 which coincided with the range of yearly foraging habitat suitability model values (0.61 and 0.08, respectively).

Spatial and temporal distributions of sea turtles within the Florida Current and surrounding waters and their implications for oceanic energy development

Caitlin Boverly, Jeanette Wyneken, Jeanette Wyneken

Environmental Science; Charles E. Schmidt College of Science

An understanding of the spatial and temporal distributions of a species is essential to understanding its basic habitat needs including large-scale movements and seasonal changes in behavior. Such basic information for large pelagic vertebrates is often restricted to satellite tag data or coastal observation. For species that undergo spatially discrete habitat shifts through their various life stages, such information is often incomplete. Sea turtles are migratory throughout their lives. Their habitats range from coastal foraging grounds to pelagic fronts and are linked by migratory corridors. We conducted approximately monthly aerial surveys of the Florida Current between the southeast coast of Florida and the Bahamas banks to establish when and where sea turtles used this fast moving component of the Gulfstream Current. The initial year of surveys identified loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) turtles as the most frequently observed species. Leatherback (*Dermochelys coriacea*) and other sea turtles not identified to species were also observed. Locations of sea turtle sightings suggest presence along the western edge of the Florida Current peaks in the spring and early summer during breeding season. Additionally, few to no sightings in areas farther offshore (20-60nm) suggest either turtles seldom use these waters or water speeds are fast enough to exceed our resolution. These data both expand our understanding of current use by migratory turtles and bolster spatially and temporally explicit conservation strategies that emerge with growing utilization of oceanic resources

Differences in situational perception moderated by presence (absence) of others

Nicolas Brown, David Servass, Ryne Sherman

Psychology; Charles E. Schmidt College of Science

Situations are important in understanding how individuals behave, feel, and think. Much of the limited literature on situations assumes that situations are interpersonal (i.e., they require at least one other person: Fournier, Moskowitz, & Zuroff, 2008; Reis, 2009). However, it is possible that situations are not solely an interpersonal phenomenon: individual experiences of situations while alone may still be psychologically meaningful. In this study, participants described one situation they encountered the previous day and rated that situation on 89 psychological properties. Each situation was later coded for the presence or absence of others. Results indicate that there are meaningful properties in situations whether others were present or not. Further, differences between situations when one is alone or with others emerged: participants felt more hostile, more abused/victimized, but also more enjoyable and emotionally arousing when alone than with others present. Situations should not be classified solely as interpersonal encounters.

An identity-based signature scheme by using pairings.

Parshuram Budhathoki, Dr. Thomas Eisenbarth, Dr. Rainer Steinwandt

Department of Mathematics/ Graduate; Charles E. Schmidt College of Science

Digital signatures are one of the most important security services offered by cryptography with many applications in information security, including authentication, data integrity, and non-repudiation. They are easily transportable, can't be imitated, and can be time-stamped. Software distribution and financial transactions are some of the examples where digital signatures are used. A pair of private/public key is required to sign and verify a digital message or documents. In an identity-based signature scheme, public keys can be avoided and replaced with (arbitrary) user identities. To realize such signature schemes efficiently, a mathematical tool known as pairing can be used. Such pairings can be realized efficiently by means of so-called elliptic curves of finite fields. Building on this algebraic tool, we have developed a new identity-based digital signature with very attractive performance parameters.

A Tidal Inundation Model of Shallow-water Availability (TiMSA)

Leonardo Calle, Dale E. Gawlik, Zhixiao Xie, Brian Johnson, Dale E. Gawlik

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Wading birds are restricted to forage in shallow water because of their leg-length constraint, making them sensitive to small changes in water depth. In coastal systems this sensitivity is pronounced because tidal fluctuations control both the spatial and temporal extent of available foraging habitat. An understanding of tidal dynamics is thus required to assess any potential risk (e.g. sea-level rise) to species relying on the inter-tidal zone for survival. To help make these assessments, we developed a Tidal Inundation Model of Shallow-water Availability (TiMSA). We evaluated the model's ability to predict available foraging habitat using locations of foraging Little Blue Herons, *Egretta caerulea*, (N=125) observed during 14 surveys (Dec 2010 - Jul 2011). We then compared the predictions obtained from the TiMSA to those obtained using a static map of multi-annual water depths estimated at Mean Low Lower Water (MLLW), which is a commonly used method for estimating low-tide habitat. The TiMSA correctly predicted 92% of foraging locations as actual foraging habitat, while the MLLW maps provided similar results (95.2%). The usefulness of MLLW maps for predictions declines rapidly as water levels rise and fall. This is when the TiMSA provides clear advantages with its ability to provide estimates in both space and time. The temporal flexibility of the TiMSA (within tides, days and years) makes it useful for addressing short- and long-term stressors to multiple species relying on the inter-tidal zone. Continuing research now involves applying the TiMSA to wading bird foraging ecology in the Florida Keys.

DNA Fingerprinting of Human Oral Microbiome: A first step towards development of early diagnosis of oral diseases

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Biological Sciences; Charles E. Schmidt College of Science

Recent advances in the study of the human microbiome have revealed the enormous role of bacteria that inhabit the human body. About 700 species are estimated to occur in the oral cavity and some play a key role in the development of oral diseases. The study seeks to evaluate the potential of predicting oral health status by the molecular fingerprints of oral microbiome using 16S rDNA polymorphisms.

Metagenomic and Cultured community DNA obtained from 10 healthy individuals and 5 smokers were obtained from Dr Esiobu's lab . The bacterial 16S rDNA were amplified using universal primers 1492R and 27F. The amplified PCR products were subjected to RFLP using restriction enzymes HaeIII, Alu I, Sau3AI, Bam H1 and the banding patterns will be analyzed using Gel Compare software .

RFLP technique, with restriction enzyme HaeIII, Sau 3AI and AluI showed marked contrast in the fingerprint pattern of direct and plate washed isolates and produced some ubiquitous DNA bands among healthy and smoker subjects. Hae III produced a DNA bands that was uniquely present in two of the smoker samples which warrants further investigation as potential biomarkers for early diagnostics. There seems to be a steady and universal community of bacteria in all the samples tested and specific polymorphisms unique to smokers were apparent; suggesting a stable shift in bacterial community. Detection of bacterial community changes associated with the early stages of less severe to severe oral diseases would allow diagnosis and prompt treatment.

Cascading effects of vegetation on peat soil properties and crayfish survival in the Everglades.

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Biology; Charles E. Schmidt College of Science

Altered hydrology and nutrient pollution in the Florida Everglades have resulted in the replacement of native vegetation by invasive cattails (*Typha* spp.). This change in vegetation may influence the quantity and quality of the underlying organic soils, as well as the faunal populations it supports. *Procambarus fallax* (slough crayfish) is a mid-trophic omnivore that relies on peat as habitat, food source, and dry season refugia. Our goal is to determine whether shifts in the dominant plant community affect peat characteristics or have cascading impacts on the growth and survival of crayfish. We assessed differences in soils from native and cattail-invaded sloughs with three experiments: 1) comparison of the physical properties of the soils 2) comparison of the nutritional value of detritus for juvenile crayfish using a growth assay experiment, and 3) evaluation of the quality of peat as burrowing substrate for *P. fallax* under a simulated water table drawdown. Understanding these indirect linkages between vegetation and crayfish populations in the Everglades can provide insight on the consequences of vegetation shifts away from native plant communities for ecosystem trophic dynamics.

Morphological Variability of *Astarte borealis* (Mollusca, Bivalvia) in the Camden Bay, Northern Alaska

Michelle Chrupa, Dr. Anton Oleinik

Geosciences/Geology; Charles E. Schmidt College of Science

The genus *Astarte* is well known for variable shell morphology and polymorphism within living and fossil species. *Astarte borealis*, the most common living species, has been divided into many subspecies and varieties based on overall shell shape. The *A. borealis* is easily recognizable and common among mid to high latitude North Pacific, Arctic Ocean and North Atlantic waters making determination of species varieties a complex issue. Ascertaining the variability based on shell shape within an *A. borealis* population may reduce use of subjective interpolation of potential subspecies or varieties within the species. A collection of *A. borealis* specimens from the Camden Bay, Alaska yielding 635 specimens with outline intact were used to find shell shape variability. Morphometric analysis of shell outline seeks to determine variants within a population of *A. borealis*. The computer program package SHAPE uses elliptic Fourier descriptor coefficients of *A. borealis* outline to evaluate and visualize the shape variation among the specimens. The principal component analysis of the coefficients showed the majority of the variation was summarized by 5 components; the asymmetrical and symmetrical variations had cumulative contributions of 83.1% and 90.0% respectively. The overall coefficient analysis showed the 1st principal component accounted for 38.3% of variance related to the aspect ratio of the shell, ranging from 1.07:1 to 1.23:1. The 2nd principal component relating to overall shell roundness from trigonal to subrounded explains 15.9% variance and the 3rd principal component relating to convexness of ventral margin explains 9.0% variance.

Unveiling the Involvement of the Rodent Dorsal Hippocampus in Object Recognition Memory & Investigating the Role of Context

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Complex Systems & Brain Science-Ph.D.; Charles E. Schmidt College of Science

The role of the rodent dorsal hippocampus in non-spatial memory has been largely debated. We tested the hypothesis that the dorsal hippocampus of male C57BL/6J mice is vital for non-spatial novel object recognition (NOR) memory. In the NOR task, mice implanted with bilateral dCA1 guide cannulae were exposed to two identical novel toy objects for a sample session. Then, the mice were presented with one familiar and one novel object during the test session, 24 hrs later. Memory was inferred if mice preferentially explored the novel object over the familiar. For the first experiment, a GABAA agonist, muscimol, was microinfused to temporarily block hippocampal function during the sample session. Muscimol eliminated novel object preference 24 hrs later, indicating that the hippocampus is necessary for the encoding of object memory. Secondly, pre-test microinfusion of fluorophore-conjugated muscimol impaired object memory, a behavioral effect induced by the limited spread of the drug within, but not beyond the CA1 region of the dorsal hippocampus. Studies are currently in progress to assess the levels of c-Fos expression in the hippocampus at distinct stages of the NOR task. A modified NOR protocol is being implemented to corroborate previous findings. In the modified task, the to-be-remembered objects were placed into the arena after the mice had explored the arena for 2 minutes in order to further dissociate object memory from context memory. Together, along with previous studies in our lab, these results provide compelling evidence that the rodent hippocampus is essential for non-spatial object memory.

Patterns of Stress Reactivity to a Common Stressor in School-Aged Children: Do differences in Temperament, Anxiety, and Affect Drive HPA Habituation?

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Psychology; Charles E. Schmidt College of Science

The Hypothalamic-pituitary-adrenocortical (HPA) axis is one of two systems activated in humans under conditions of perceived stress or threat including social evaluations (Dickerson & Kemeny, 2004). Overtime, the exposure to the same stressors is followed by adaptive habituation of the axis, however if this does not occur than the individual may be exposed to chronically elevated levels of cortisol. In children, shy / fearful / inhibited or anxious temperament may lower the threshold of activation for the HPA, thereby decreasing habituation (Marshall & Stevenson-Hinde, 2001). Therefore, the current study investigated whether those participants who responded to a mathematically based 'pop-quiz' stressor paradigm with an increase in CORT ('Responders') reported significantly different levels of temperament, anxiety, or negative affect, than those who did not following the stressor ('Non-responders'). A sample of 45 male and 37 female students (N=79, M= 9.66 yrs.) from six 4th and 5th grade classes participated in this study over the course of for approximately 7 weeks. A multivariate analysis of variance (MANOVA) indicated that 'Responders' reported more shyness ($F(1,70) = 6.61$, $p = .012$) and depression ($F(1,70) = 8.67$, $p = .004$), than 'Reducers'. In addition, analyses of the anxiety measures revealed that 'Responders' reported more trait anxiety ($F(1,73) = 13.15$, $p = .001$), state anxiety ($F(1,73) = 4.41$, $p = .039$) and test anxiety ($F(1,73) = 5.66$, $p = .020$), than 'Non-responders'. These findings illustrate that individual differences in HPA axis habituation are connected to differences in temperament and anxiety.

Cardiac patterns during another infant's cry sound for neonates of depressed mothers

Joseph Cotler, Dr. Nancy Aaron Jones

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Past research indicates there is a link between physiological responses and adaptive social responses to another individual's distress. Scholars have theorized that humans may be genetically predisposed, both physiologically and behaviorally to responding to others, especially those who are in distress. Maternal depression has been associated with dysregulated emotional development and may possibly affect the physiological and behavioral responses of a neonate. The present research will examine the relationship between neonates' physiological and behavioral responses to naturally-generated (compared to artificial) stimuli of other neonates, as well as the role of maternal depression in the responses. Newborns born to depressed mothers showed a decrease in heart rate when presented with the cry of another infant, as compared to the heart rates of newborns born to depressed mothers. In addition, mothers who bottle fed their newborns had significantly higher base heart rates than newborns of mothers who breast-fed.

Immobilization Devices in High Dose Rate Brachytherapy

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Physics/Medical Physics(MSMP); Charles E. Schmidt College of Science

High dose rate (HDR) brachytherapy is a highly localized mode of radiation therapy that also has a very sharp dose fall-off. Thus one of the most important parts of the treatment is the immobilization. The smallest movement of the patient can result in a miss of a large part of the tumor to be treated.

The purpose of this study is to revise most of the HDR types of treatments with their applicators and their localization challenges. Since every millimeter of misplacement counts the study will look into the necessity of increasing the immobilization for each type of applicator.

The study took over 200 treatment plans generated by the treatment planning system (TPS) looking into the applicator's placement in regard to the organs at risk (OR) and analyzed all possibilities of motion for each applicator trying several accessories to improve the localization and prevent motion before and during the treatment delivery.

Many of the present immobilization devices produced for external radiotherapy can be used to improve the localization of HDR applicators during transportation of the patient and during treatment.

This study data suggest that an improvement of the immobilization devices for HDR is absolutely necessary. Developing new immobilization devices for the applicators like Miami or Leipzig is recommended.

Diet and foraging ecology of diamondback terrapins (*Malaclemys terrapin*) in Everglades National Park, FL.

Mathew Denton, Amanda Demopoulos, Kristen Hart, Anton Oleinik, John Baldwin, Dr. John Baldwin

Environmental Sciences; Charles E. Schmidt College of Science

Diamondback terrapins (*Malaclemys terrapins*) are found in salt marshes and mangroves along the Atlantic and Gulf coasts from Massachusetts to Texas. Unique amongst turtles as the only estuarine species, they face many threats that impact coastal landscapes, including habitat loss, climate change, and pollution. These stressors could potentially affect the distribution and abundance of their prey species; thus it is important to understand their foraging ecology. Whereas previous diet studies have elucidated terrapins' role in temperate salt marsh food webs, food resources for subtropical mangrove terrapins have not been studied.

We are currently examining the role of this reptile predator in the subtropical mangrove food web. Specifically we are investigating how spatial and temporal variation influence terrapin diets by sampling terrapins and potential food items in sub tidal mudflat creeks and Keys within the boundary of Everglades National Park, Florida. A secondary focus is to characterize long-term foraging ecology through stable isotope analysis. Incorporating stable isotope analysis of terrapin blood and scutes, along with their potential prey, will allow us to discern diet information over varying time scales. Thus far fecal samples have shown mangrove terrapins to be dietary generalists consuming prey such as crabs, snails, barnacles, and fish. Preliminary ¹³C analysis shows differences between terrapins' by site, and ¹⁵N analysis indicates males likely consume a variety of prey in different trophic levels, while females are more constant across individuals. This study will allow us to document how terrapins are potentially changing their resource use in a changing landscape.

Optimization Algorithms for Intensity Modulated Radiation Treatment

Brian Doozan, Dr. Leventouri

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Radiation treatment currently is planned by dosimetrists. To optimize a treatment plan, a guess and check method is currently used. To better treat a patient, algorithms can be implemented to be able to automatically create beam angles and optimize the treatment based on predefined conditions.

Expressions of emotion in bilingual mothers' child directed speech

Katherine Filippi, Martha Shiro, Erika Hoff

Psychology; Charles E. Schmidt College of Science

Research suggests that bilingual speakers feel that they express emotions differently when they change languages (Pavlenko, 2005) and that mother-child interactions play a fundamental role in the socialization of children (Chen, Kennedy, & Zhou, 2012). The current study examines the emotional expressions bilingual mothers use when speaking to their children in each language to discover how socialization might be affected for children raised in bilingual homes. Spanish-English bilingual and monolingual English mothers were observed during video-taped play sessions with their children (Hoff, et al, 2012). Maternal utterances were coded for explicit expressions of emotion (e.g. fear, liking), volition (e.g. want, desire), and epistemic stance (e.g. think, believe) to evaluate the nature and frequency of these expressions when speaking in each language. Bilingual mothers' expressivity was then compared to monolingual English mothers' expressivity. Results showed that bilingual mothers used more expressions of volition when they were speaking English than when speaking Spanish, and in comparison to native English speakers. When speaking English, bilingual mothers used more emotional expressions than did the monolingual mothers, but did not differ in use of epistemic language. When speaking their native languages, the monolingual mothers used more epistemic language than the bilingual mothers, but they did not differ in their use of emotion language. These results suggest that bilingual mothers may adjust their emotional expressions according to the cultural norms of the language they are speaking. Further study is needed to clarify the reasons for these variations in expression.

Neurodynamic Predictions of Musical Tonality

Nicole Flaig, Ji Chul Kim, Carol Krumhansl, Edward Large

Center for Complex Systems and Brain Sciences; Charles E. Schmidt College of Science

Music, like language, is universal to human culture, and different musical languages are learned through enculturation. A defining aspect of a musical language is its tonality, which includes choices of musical pitches and perceptions of their relative stability. In a melody, for example, a subset of possible pitches is used, and some pitches are perceived as more stable than others. Within a tonal system, stability relationships are generally thought to be idiosyncratic, and learned based on statistical regularities within that system. This approach does not explain invariant patterns of perceived stability that have been observed cross-culturally, however. We test the predictions of a dynamical model of central auditory physiology, in which mode-locking results from nonlinear interactions between stimulus frequencies and intrinsic oscillatory neural dynamics. Mode-locked states are stable over resonance regions known as Arnol'd tongues, which depend on frequency relationships. Here we used the stability of mode-locked states to predict perceived stability of musical frequencies within North Indian tonal contexts. We compared the model's predictions to ratings of stability for ten ragas by both Indian and Western listeners. The neurodynamic model was able to predict the behavioral ratings for listeners of both cultures, and provided a significantly better fit to the ratings than duration statistics. These findings show that oscillatory auditory dynamics predict observed invariant patterns of perceived pitch organization across cultures.

Histopathologic study of the stomach mucosa in Atlantic bottlenose dolphins (*Tursiops truncatus*): An investigation of the role of *Helicobacter cetorum* in the development of gastritis.

Christie Gonzalez, C. Edward Proffitt

Biological sciences; Charles E. Schmidt College of Science

Helicobacter cetorum is a gram-negative bacterium that has been isolated from the lower gastrointestinal tracts of a variety of dolphins and whales.¹ It shares high homology with *Helicobacter pylori*, a gram-negative bacterium associated with gastritis, peptic ulcers, and adenocarcinomas in humans.² Little is known about the etiology of *Helicobacter cetorum* in cetaceans, however, it has been suggested that colonization of glandular regions of the stomach lining may be involved in development of gastritis in Atlantic bottlenose dolphins (*Tursiops truncatus*). Research over the last twenty years has focused on identification of *H. cetorum* in individual case studies from stranded and captive cetaceans to establish similarities between *H. cetorum* and *H. pylori*.^{1,3} This proposed study will investigate the possible role that *H. cetorum* plays in the development of gastritis in cetaceans using a large sample set of archived tissues collected at the HBOI Marine Mammal Research & Conservation Center. Analysis of gastric tissues collected between 2001 and 2012 from dead stranded Atlantic bottlenose dolphins will be analyzed to investigate the relationship between inflammation of the stomach mucosa and the presence of *Helicobacter cetorum*. Diagnostic techniques shall include histopathology, light microscopy, and imaging using Transmission Electron Microscopy. Results from this study will help to establish the relationship between inflammation of the stomach mucosa and *H. cetorum* infection; show trends in prevalence of gastric ulcer disease in bottlenose dolphin populations in the Southeastern U.S. over the last decade; and will support further research of *Helicobacter* infections as they pertain to marine ecosystem health.

Reduced Path Systems and Super-Edge-Graceful Trees

Chenchu Gottipati, Stephen Locke

Department of Mathematics; Charles E. Schmidt College of Science

We describe an algorithm to reduce a labeled path system to a smaller labeled path system of a different type. First, we investigate the cases $(m; k) = (3; 5)$ and $(m; k) = (4; 7)$, where m is the number of paths and $2k$ is the length of each path, and then we give a generalization for any $k; m = 3$ and $m = 4$. We also describe a procedure to construct super-edge-graceful trees with any number of edges.

White Matter Networks Indicative of Alzheimer's Disease Constructed from Diffusion MRI

William Hahn, Dr. Armin Fuchs

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Diffusion Tensor imaging (DTI) is a noninvasive MRI technique that measures the spatial distribution of water diffusion in living tissue. Here we use DTI to detect differences in the structural white matter network of elderly humans with Alzheimer's disease (AD), an age-matched control group, and a group of adults 40-50 years old. In the brain, DTI provides rich contrast between gray matter, where diffusion is largely isotropic, and the relatively anisotropic white matter where water movement is more constrained. Water tends to diffuse along axons rather than perpendicular to axonal membranes, thus allowing DTI mapping of white matter microstructure in vivo. By constructing a three-dimensional diffusion tensor at each volume element and following along the principal diffusion direction, white matter can be mapped from voxel to voxel to create a streamline that is representative of long-range connections in the brain. Combining diffusion tractography and high-resolution structural scans together allows the creation of a graph representation of the white matter connectivity map that serves as structural fingerprint of the brain. Cortical and sub-cortical parcellations become graph nodes and tractography streamlines form the edges between regions. Such a network represents a reduction in the dimensionality of the dataset and allows for graph theoretic analysis. These structural networks provide a new metric which can be used both as a biomarker for AD and as a tool for understanding the cognitive deficits associated with dementia.

Dyadic Instruction for Middle School Students: Liking Promotes Learning

Amy C. Hartl, Dawn DeLay, Brett Laursen

Psychology; Charles E. Schmidt College of Science

This study examines whether friendship facilitates or hinders learning in a dyadic instructional setting. Working in 80 same-sex pairs, 160 (60 girls, 100 boys) middle school students ($M = 12.13$ years old) were taught a new computer programming language and programmed a game. Students spent 14 to 30 ($M=22.7$) hours in a programming class. At the beginning and the end of the project, each participant separately completed (a) computer programming knowledge assessments and (b) questionnaires rating perceived friendship with the partner. Results support the proposition that friendship promotes learning: Higher levels of initial friendship predicted greater subsequent increases in computer programming knowledge for both partners. One partner's initial programming knowledge also predicted the other partner's subsequent perceptions of friendship: The greatest declines were found for students who, at the outset, were close to partners with little computer programming knowledge; the greatest increases were found for students who, at the outset, were not close to partners with considerable computer programming knowledge.

Effects of the Msr system in *Drosophila Melanogaster* cell cultures; on dopamine levels in the organism as a whole, and the localization of MsrA and MsrB isoforms

Caesar Hernandez, Dr. David Binninger

Biology; Charles E. Schmidt College of Science

All organisms rely on protective mechanisms in response to cellular oxidation due to free radical reactions. Methionine sulfoxide reductase and superoxide dismutase (SOD) are two enzymes that protect the cell from oxidative damage by a reversal of the damaging reaction via a redox reaction. Oxidative damage ages the organism due to the reaction of oxygen with key cellular components such as proteins.

The overall goal is to investigate the role of the Msr proteins in cells damaged due to oxidative stress. There is, therefore, a pressing need for conducting a study on an embryonic mutant cell culture for in vitro investigation of how the Msr system works in Msr null mutants. In addition to biochemical cell studies, a preliminary analysis of dopamine levels has shown that it is possible that the Msr system could play an important role in maintaining dopamine levels at a necessary physiological range. Finally, the cellular locations of the various isoforms are currently unconfirmed. Four isoforms have been subcloned into an expression vector and will be used to visualize the protein's respective location.

Conserved toxin framework between cone snail and violet plant

Mickelene F. Hoggard, Frank Mari

Chemistry and Biochemistry; Charles E. Schmidt College of Science

Conotoxins are disulfide rich peptides present in the venom of cone snails, a genus of marine mollusks that prey upon fish, other mollusks and worms. Conotoxins are promising drugs leads with great prospects in the treatment of diseases and disorders such as chronic pain, multiple sclerosis and Parkinson's and Alzheimer's disease. Similar compounds can be found in plants; for example, cyclotides are cyclic peptides isolated from the Violaceae (violet), Rubiaceae (coffee), and Cucurbitaceae (cucurbit) families and they have a wide range of biological activities, such as anti-HIV, uterotonic, and antimicrobial. Cyclotides have cystine arrangement similar to the conotoxin framework IX (C-C-C-CXC-C). We have found specific conotoxins from the venom of *Conus brunneus* with the same cystine framework and similar 3D structure to cyclotides. We will present details on the isolation and characterization of these conotoxins and compare them with a cyclotide from *Viola tricolor*.

Effect of Preparation Temperature on Crystal Structure and Magnetic Properties of Nanophase Fe-Substituted Hydroxyapatite

Vindu Kathriarachchi, Th. Leventouri and K. Sorge

Physics; Charles E. Schmidt College of Science

Hydroxyapatite (HAp), $\text{Ca}_5(\text{PO}_4)_3\text{OH}$, is the main mineral phase in physiological apatite (~70 wt% in bones and dentin, and ~96 wt% in enamel) is used in orthopedic and dentistry. Physical properties of HAp can be improved by introducing ionic substitutions in its structure. Fe is one of the minor substitution elements (0.01-0.1 wt% in bone, 0.003 wt% in enamel) replacing Ca in the HAp structure. It reduces the solubility of HAp therefore it functions as a cavities preventive agent. However, Fe overload may lead to a decreased mechanical strength and osteoporosis.

Two sets of $\text{Ca}_5\text{-xFe}_x(\text{PO}_4)_3\text{OH}$ samples ($x=0,0.05,0.1,0.2,0.3$) were synthesized by a chemical precipitation method at physiological temperature (37C) and 80C. The samples were calcinated at 650C and deuterated at 600C. The samples were characterized by powder x-ray diffraction (XRD) and SQUID Magnetometry. The Rietveld refinement method was used to analyze the crystallographic properties of the samples.

HAp was identified as the main phase in all samples while maghemite ($\gamma\text{-Fe}_2\text{O}_3$) was identified as secondary phase. Crystal structure parameters vary with the Fe content as well as with the preparation temperature. According to the magnetic measurements, sample with $x=0$ showed diamagnetic behavior while samples with Fe showed paramagnetic behavior. Preparation conditions considerably affect the crystal structure properties and magnetic properties of iron substituted HAp.

Evaluation of Surface Dose Outside the Treatment Area for Breast Cancer Irradiation Modalities using Thermoluminescence Dosimeters (TLDs).

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Physics/MSMP; Charles E. Schmidt College of Science

The purpose of this research is to compare the surface dose outside the treatment area for different breast cancer irradiation modalities using Thermoluminescence Dosimeters (TLDs). Five different modalities are included in this study: Accuboot, Photon boost, Electron boost, Strut-Adjusted Volume Implant (SAVI), and Mommosite Multi-lumen (ML). Six different points of interest (POI) on the breast cancer patients had been selected for the TLDs placement. Data from 15 breast cancer patients at Lynn Cancer Institute of the Boca Raton Regional Hospital were included in the study. Following range of averaged doses in percentage has been observed for all modalities at different Points of Interest (POI): For Sternum: 0.26% - 3.51%, For Shoulder: 0.25% - 3.41%, For Eye: 0.22% - 1.25%, For Thyroid: 0.23% - 2.84%, For Contralateral Breast (CLB): 0.15% - 5.48%, For Lower Abdomen: 0.21% - 3.04%.

Molecular Comparison of Zooxanthellae Communities in Hermatypic Corals Proximal to St. Lucie Inlet, Florida

Courtney Klepac, Dr. Joshua D. Voss

Biological Sciences; Charles E. Schmidt College of Science

Coral reef ecosystems adjacent to coastal human populations are subject to increased environmental fluctuations compared to remote reef locations. Environmental variability is further exacerbated for corals existing at their northernmost regional limits. This presents a significant implication to the longevity of coral-algal symbioses, as the endosymbiotic community composition is determined by species-specific environmental optima. Phototrophic dinoflagellates from the genus *Symbiodinium* translocate a large proportion of energy to the coral host necessary for calcification and reproduction. Therefore, the identity and composition of *Symbiodinium* populations (along with other symbiont taxa) directly contributes to the holobiont's capabilities. Gathering baseline community ecology of corals at their latitudinal limit is necessary to elucidate potential resilience to abiotic shifts including climate change.

Anthropogenic and storm runoff from Lake Okeechobee and St. Lucie River could be an abiotic perturbation affecting corals at St. Lucie Reef, Stuart, Florida. If so, will differences in *Symbiodinium* types, abundance, and physiologies be evident along a water quality gradient? Through amplification of the internal transcribed spacer region 2 (ITS-2), this study will examine potential differences in *Symbiodinium* assemblages within the coral host over time and space, relative to the St. Lucie Inlet. Additionally, these northern reefs of Florida may have an evolutionary advantage to changing climate and could reflect future compositions of colonies at southern reefs. Data supporting diverse symbiotic assemblages at St. Lucie Reef will be of utmost importance in runoff management at St. Lucie Inlet.

Effects of Habitat Structure and Local Predators on Dragonfly Oviposition and Success

Natalie E. Knorp, Dr. Nathan J. Dorn

Biological Sciences; Charles E. Schmidt College of Science

Animal population success is a combination of local factors influencing both habitat use as well as mortality and growth rates. For species with two-part life histories like dragonflies, the wetland conditions producing high dragonfly emergence are largely unknown, but previous work suggests egg-laying decisions by adult females as well as local predators and habitat structure may limit naiad distributions and emergence patterns. In 24 mesocosms we varied the presence and absence of small-bodied fish (*Gambusia holbrooki*) and submerged aquatic vegetation (SAV; *Utricularia* spp.) and examined oviposition events and emergence over 9 months. Total adult oviposition (# times observed/mesocosm) and total naiad success (# exuvia/mesocosm) were analyzed with ANOVA. Total oviposition by adults (all species combined) was similar across treatments. Species-specific oviposition patterns were also similar across treatments, except *Tamea* spp., which preferentially laid eggs in mesocosms with SAV. Total dragonfly emergence (all species) was highest in fishless habitat without SAV and there was no emergence in the treatment with mosquitofish that lacked SAV. In several cases, mosquitofish were observed consuming dragonfly eggs following oviposition. The assemblage of emerging dragonflies varied by treatment for the other three treatment combinations with the three most abundant species producing the highest number of successful naiads in three distinct habitat combinations. Dragonflies show no ability to discriminate between fish and fishless habitats, and most of these species did not discriminate between habitats with and without SAV. However, both small fish and SAV can affect total emergence patterns as well as the composition emerging from freshwaters.

Association Between BMI and Executive Functioning

Laxmi N. Lalwani, Monica Rosselli

Psychology; Charles E. Schmidt College of Science

The dorsolateral prefrontal cortex (DLPFC) has been shown to guide behavioral goals within working memory and inhibition in reward and motivation contexts (e.g. food intake) (Appelhans, 2009). Working memory and inhibition are categorized as executive functions, or cognitive control mechanisms of the DLPFC used to carry out goal-directed behaviors (Volkow, et al, 2008). Previous research has found correlations between excessive body weight and decreased executive functioning (Stingl, et al., 2011). The current study aimed to experimentally assess whether obesity impeded performance on behavioral measures of inhibition and working memory in young adults. It was predicted that participants with overweight and obese BMIs would be hindered on working memory and inhibition tasks when compared to participants with BMIs in the normal range. Sixty-six normal BMI (18.5- 24.9), 27 overweight BMI (25.0- 29.9) and 16 obese BMI (30.0 +) participants were tested to explore disadvantages associated with increased BMI. Participants with normal range BMI significantly outperformed those with obese range BMI on a working memory task and experienced less inhibition on a task requiring both inhibition and working memory. Impairments such as those detected in the current sample on working memory and inhibition functioning may underlie both overeating and inability to perceive long-term detriments of poor eating behaviors leading to obesity.

Invasion-Mediated Recovery Following Managed Disturbance in the Northern Everglades

James J Lange, Brian Benschoter

Env Sci; Charles E. Schmidt College of Science

Invasive species can have profound impacts on native wetland plant communities and their ecology. The extent of these impacts can affect the capacity of communities to respond successfully to management practices. In the Everglades, *Melaleuca quinquenervia* is an aggressive, invasive tree that can displace native vegetation, often forming dense, closed canopy stands that have very little value to native wetland wildlife. Negative impacts of *Melaleuca* can increase with time through increased shading, altered hydrology, and substrate changes from massive litter production. The impacts of removal practices on the long-term recovery potential of native wetland plant communities are not well quantified. We assessed the impact of management treatments (aerial herbicide application) on native vegetation recovery trajectories along gradients of *Melaleuca* invasion severity (stand density, area, and litter depth) at the A.R.M. Loxahatchee National Wildlife Refuge to assess if management practices can have a detrimental effect on ecosystem resilience when thresholds of invasion are exceeded. We compared current plant community composition of both native and invasive species to baseline target data of native habitat composition from prior surveys to assess native community recovery under different management practices and levels of invasion. Understanding synergistic effects of invasion and treatment practices on ecosystem resilience will add insight into the immediate and legacy impacts of invasive species on wetlands, and provide tools for evaluating the benefits and risks of land management practices for native vegetation recovery.

New paternity analyses may confound current population models for loggerhead sea turtles (*Caretta caretta*)

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Biology; Charles E. Schmidt College of Science

Mating systems play an important role in shaping life history evolution and population dynamics of a species and should be considered when planning conservation efforts. Polyandry, a single female mating with multiple males, may result in the multiple paternity of progeny arrays. Recent studies have suggested that multiple paternity occurs in most species of reptiles but within the Testudines there is a high degree of variation. Previous studies on the loggerhead sea turtle (*Caretta caretta*) have shown that within large rookeries, the occurrence of multiple paternity within nests ranges from 30% (Florida) to 95% (Greece). Our study is the first to study nests from the smaller and more threatened Northern Management Unit for the presence of multiple paternal contributions. On a small beach on Wassaw Island, GA, nesting mothers and up to 20 offspring were sampled from 90 nests (19.5% of nests laid) over three nesting seasons (2008 – 2010). Our study determined that 75% of nests sampled had multiple fathers with an average of 2.65 fathers contributing to each nest; the number of fathers per nest did not change over the three year loggerhead nesting cycle. There was a positive relationship between the number of fathers per nest and female size (SCL), but there was no relationship between number of fathers and hatching success. Finally, 195 individual paternal genotypes were identified over the three years, but each individual only contributed to one nest throughout the three year nesting cycle. We compare our findings with current population models.

Variation of Soil Properties Across Different Habitats in an Ecological Preserve in Boca Raton, Florida Using Ground Penetrating Radar

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Geology; Charles E. Schmidt College of Science

The FAU Ecological Preserve, located in Boca Raton, Florida, is a unique environment characterized by three Florida native habitats: tropical hardwood hammock, upland scrub, and dry prairie. These three habitats provide a sanctuary for two species of conservation concern: the burrowing owl and gopher tortoise. Although these habitats are well characterized from an ecological perspective, little is known about how soil characteristics below the surface influence habitat distribution. This study presents preliminary results of soil characterization survey to better understand the role of subsurface physical properties on habitat occurrence. Non-invasive geophysical surveys using ground penetrating radar (GPR) combined with direct coring and soil analysis were conducted in each habitat to characterize subsurface properties. GPR was used to estimate changes in the vertical distribution of electromagnetic (EM) velocity at each site and its potential correspondence to changes in soil physical properties. Common midpoint surveys were used to estimate one dimensional distributions of velocity with depth, while common offset surveys were used to investigate the lateral extent of subsurface stratigraphy across habitats. An array of 50, 100, 200, 250 and 500 MHz antenna frequencies were used to investigate resolution and depth of penetration at each habitat. Direct corings were used to confirm stratigraphic interfaces. Soil samples were collected at each habitat to determine physical properties (e.g., porosity, moisture content, etc.). The results of this study have implications for better understanding the relationship between soil properties and the distribution of native plant species; therefore, assist with efforts for protecting and restoring these important habitats.

Defeating p-attack in non-abelian DLP

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Non-abelian Discrete Logarithm Problem (DLP) can be solved efficiently in the group $PSL(2,p)$ [Projective Special Linear group] by a method called p-attack, if the p-depth of generators is minimum. But as we increase p, we can find generators whose p-depth is higher. As a result, p-attack can be defeated.

Keywords: Discrete log, Non-abelian group, p-attack, p-depth.

Socio-Emotional Regulation and Physiological Regulation in Preschoolers during Emotionally-Evocative Stories

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The purpose of the study is to examine physiological and behavioral components of emotional regulation and the development of empathy in preschoolers. It also examines how the parents play a role in their child's development of socio-emotional competence. 65 preschool children (M age = 4.16, SD= 0.60) and both of their parents participated. Behavioral and physiological activities were assessed for the children during stories chosen for emotional content (one happy and one sad story).

A repeated-measures MANOVA was performed. There was a significant difference in emotion-type with more empathetic behavior from the child occurring during the happy conditions compared to the sad conditions, $p < .01$. However, there were no significant differences in child responses when interacting with their mother versus their father during these emotionally-laden stories. Another MANOVA was run to examine the effects of parents and emotion-type on the child's IBI during the baseline, happy, and sad story, $F(3,29)=4.0$, $p < .05$. IBIs of the children differed during the mother-read stories (happy and sad) and the baseline, but did not show differences during the father-read stories. Another MANOVA was conducted to examine whether the emotionally-evocative story tasks would result in lower HPV than the baseline condition. A significant difference was found between HPV and story type for mother-read stories, $F(2,43)=6.78$, $p < .01$, but not father-read stories, with HPV lowest during the mother-read sad story. Although the parental effects on the child's empathetic behavior were not as strong as predicted, the child's HRV did differ for parents during the emotionally-laden stories.

Infants' Sensitivity to Synesthetic Relationships

Nicholas Minar, David Lewkowicz

Psychology; Charles E. Schmidt College of Science

Integrative perception of multisensory stimulation is essential for the acquisition of a coherent and meaningful concept of the world. Walker et al. (2010) reported that 4-month old infants looked more at rising/falling objects accompanied by congruent sounds (rising/falling pitch) than at objects accompanied by incongruent sounds and argued that this reflects an innate ability to perceive synesthesia. We attempted to replicate the Walker et al. study using 4-, 6-, and 12-month-olds and, thus, in Experiment 1 presented a single bouncing object accompanied either by a congruent or incongruent sound (as in Walker et al. 2010) across different trials and recorded visual fixations. We failed to find the previously reported preference for the congruent object/sound in 4-month-old infants and, in addition, we found a preference for the incongruent object/sound in 6-month-olds. In Experiment 2 we presented identical side-by-side objects bouncing out of phase with each other accompanied by a sound that was congruent with one of the objects and recorded fixations. We found a preference for the congruent object/sound pairs but only at 12 months of age. Taken together, our findings indicate that the ability to match visuospatial height with rising/falling pitch does not emerge until the end of the first year of life. In addition, they challenge Walker et al.'s (2010) claim that such abilities reflect an innate form of multisensory perception.

Bilingualism and Arithmetic – A Pilot Study

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Psychology; Charles E. Schmidt College of Science

It has been widely hypothesized that while doing arithmetic individuals use two distinct routes for phonological output. A direct route requires exact arithmetic which is thought to have been linked to language dependent areas of the brain. In addition, an indirect route thought to be language independent is active during arithmetic approximation that relies on visuo-spatial skills. The arithmetic double route has been incorporated on the triple code model that consists of Visual Arabic code for identifying string of digits, magnitude code for knowledge in numeral quantities, and verbal code for rote arithmetic fact. Our goal is to investigate whether language experience has an effect on the processing of exact/approximation math using bilingual participants who have access to two languages. We will measure the 2 groups (monolinguals/bilingual) processing speed to complete the 2 tasks (Exact/Approximation) in 2 codes (Arabic digit/Verbal). We hypothesized a faster reaction time in exact arithmetic task in comparison to approximation due to it being language dependent. We expect larger RTs in bilinguals when exact sums are presented in the verbal code. We also expect a main effect for the task (Exact vs. Approximation) independent of the input code when the stimulus was presented in either Arabic digit and/or verbal codes. Results from this study have implications in understanding the importance of the input code when processing numbers. Further neuroimaging studies need to be compiled to investigate brain activation during simple arithmetic when bilinguals use verbal or Arabic digit coding.

Determining the sensitive period for magnetic imprinting in Loggerhead turtles

Jessica Pate, Auriel Franquiz, Mike Salmon

Biological Sciences; Charles E. Schmidt College of Science

It is hypothesized that sea turtles imprint to the Earth's magnetic field as hatchlings and use this information to return to their natal beaches as adults. If sea turtles do imprint to their natal magnetic field, then there should be some critical period during development for this process to take place. In order to test this hypothesis, magnets were placed around incubating eggs at different times during development. Previous studies have shown that incubating eggs in a disturbed magnetic field (i.e. with magnets) will disrupt a hatchling's ability to orient using the Earth's magnetic field. Preliminary results from this study were inconclusive. Changes in the experimental design will be implemented for the upcoming field season in order to circumvent past problems with sample size.

Cognitive Performance Predicted by Recreational Drug Use

A. Paz, Keara Jones, Monica Rosselli

Psychology; Charles E. Schmidt College of Science

Do recreational drug habits result in deleterious cognitive performance? The goal of this study is to determine if the severity of use of common recreational drugs predicts performance on a subset of tests from the CANTAB neuropsychological battery among a young adult population. Forty-eight participants (25 male) were recruited from local bars and clubs from the Central and South Florida area. All participants were polysubstance users, in which none were previously diagnosed or treated for a substance use disorder. Using regression analysis, the lifetime number of drug using occasions was correlated to performance on four neuropsychological tests: Intra-Extra Dimensional Set Shifting (IED), Delayed Matching to Sample (DMS), Paired Associates Learning (PAL), and Spatial Span (SSP). Results revealed that lifetime prescription narcotic consumption significantly predicted performance in the number of errors taken to successfully complete the IED task, $\beta=.381$, $F(1,46)=7.816$, $P<.01$, and in the average speed of response in DMS trials where stimulus and distracters were presented after various delays (0ms, 4000ms, 12000ms), $\beta=.360$, $F(1,46)=6.829$, $P<.05$. As hypothesized, increased consumption of prescription narcotics significantly predicts poorer performance on measures of attentional set shifting (IED) and delayed perceptual matching of non-verbal stimuli (DMS). However, it must be noted that the use of prescription narcotics within the sample tested was in conjunction with other licit and illicit substances; therefore prescription narcotics cannot be isolated as the sole factor of reduced performance.

Object-Based Urban Land Cover Classification using LiDAR and Aerial Photography

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GeoScience; Charles E. Schmidt College of Science

Classification of urban land cover is important in many areas of science including green space analysis, mapping urban growth, city planning and economic development. While aerial photography is typically used for such analysis due to its high spatial resolution, it provides clues to the land use / land cover with respect only to visual clues. LiDAR data contains elevation data that is useful in differentiating spectrally similar vegetation and impervious features which have distinctly different elevations. However, LiDAR contains no scene information. Therefore the fusion of LiDAR data with aerial photography is beneficial providing more accurate classification analysis. By combining the two types of remotely sensed imagery most of the disadvantages associated with either data is atoned. This study revealed that overall accuracy from urban land cover classification improved using fused imagery over using aerial photographs alone showing how LiDAR data can improve classification analysis.

Improved Methods in Collecting and Modeling Beam Data for Commissioning

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Physics/Medical Physics; Charles E. Schmidt College of Science

Commissioning very small fields in any treatment planning system (TPS) is a challenge. The TPS may not require data for fields smaller than 3 cm x 3 cm. Another concern are measuring devices. Some will be very well fitted for large fields but not for small ones and vice versa.

Our research is focused on optimal procedures to collect small field beam data for commissioning a TPS, and to provide a protocol to collect output factors for fields < 4 cm x 4 cm.

The goal is to determine the correct beam configuration methods in TPS planning intensity modulated radiation therapy (IMRT), and stereotactic radiosurgery (SRS) using mini multileaf collimation (mMLC).

Data has been collected for a mMLC linear accelerator (linac), Novalis, from 0.5 cm x 0.5 cm to 10 cm x 10 cm (it's maximum field size). The TPS chosen is Eclipse. Multidata scanner was used for our profiles and depth doses, and the TG51 watertank was used for output factors. The collected beam data were modeled and imported in the TPS. Verification plans were generated in solid water to confirm data is valid. 3D and IMRT plans on regular CT scans were generated and verified using Mapcheck. All 3D plans with field sizes above 4 cm x 4 cm were verified as excellent by using a distance agreement of 2 mm and a 2% tolerance. IMRT plans gave an error of -8%. This prompted the present research. Data with new detectors and configurations are being collected.

Fluoride Accumulation in Aquatic Snail Species

Benjamin Sollins, Dr. Michelle Ivey, Dr. James Wetterer

Environmental Sciences; Charles E. Schmidt College of Science

Anthropogenic inputs into the environment are a growing concern; not only do they change the physical landscape before our eyes but they also impact many of the flora and fauna that live in these ecosystems. Fluorine is a common element that we add to our water for potential health benefits such as stronger teeth, but the ionic form (fluoride) is known to accumulate in structures that are comprised of calcium carbonate. In this investigation, ion chromatography techniques are utilized in order to detect and quantify fluoride in juvenile and adult aquatic snail shells. Water samples taken from the Palm Beach Gardens and Wellington areas are also analyzed. Shell samples were cleaned, dried and weighed, dissolved in hydrochloric acid, treated to remove chloride, and then analyzed using ion chromatography. Water samples were treated to remove chloride, and then analyzed using the ion chromatograph. Ten adult snail shells were collected and analyzed, 2 out of the ten contained 3.1 ± 1.5 mg/kg shell or less of fluoride, 6 were below the limit of detection and 2 were below the limit of quantification. Juvenile snail shells collected from tap water contained 24 ± 2 mg/kg shell of fluoride and shells collected from tap water plus fluoride contained 222 ± 25 mg/kg shell of fluoride. Tap water in Palm Beach Gardens contained 0.19 ± 0.1 mg/L of fluoride and tap water plus fluoride contained 4.1 ± 0.1 mg/L of fluoride. Lastly, lake water from Wellington contained 0.060 ± 0.006 mg/L of fluoride.

Ecological correlates of the abundance of juvenile green sea turtles (*Chelonia mydas*) on nearshore reefs in southeast Florida

Melanie Stadler, Dr Charles Roberts, Dr Michael Salmon

Biological Sciences; Charles E. Schmidt College of Science

Nearshore reefs in southeast Florida function as important developmental habitats for juvenile green sea turtles (*Chelonia mydas*). Turtles recruit to these habitats after spending the first years of their lives as oceanic omnivores. A gradual dietary shift occurs when juveniles return to coastal waters and begin feeding as herbivores on the reef. Nearshore reefs provide turtles with algae to sustain growth, as well as shelter from predators. Differences exist in turtle abundance among reef locations. However, little is known about the characteristics turtles use to select nearshore habitats.

Our study had two objectives: to quantify differences in green turtle abundance on nearshore reefs and to determine the ecological factors most closely correlated with those differences. We conducted quarterly in-water turtle surveys on nearshore reef locations in Palm Beach and Broward Counties and found consistently higher turtle abundance in specific areas. We compared sites showing differences in turtle abundance with respect to (i) water depth, (ii) algal abundance and composition, and (iii) length and width of exposed reef in both space and time. We found that correlations do exist between these variables and turtle abundance. Turtles were most abundant on reefs at depths < 5 meters and in areas that contained algal species that have been previously documented as preferred food sources for green turtles. Our results suggest that a pattern may exist between overall reef stability and turtle abundance. Turtle abundance appeared to be consistently higher in sites that exhibited little change in available reef area over time.

The Role of Voice and Motion Cues in Infants' Shifting Patterns of Selective Attention to Talking Faces

Amy Tift, Nicolas Minar, David Lewkowicz

Psychology; Charles E. Schmidt College of Science

Previously, we found that 4-month-old infants look more at the eyes of a talking face but that 8- and 10-month-old infants look more at the mouth (Lewkowicz & Hansen-Tift, 2012). Here, we investigated the role of the voice and facial motion in infant selective attention to talking faces at different ages. To do that, we used an eye tracker to measure 4-, 8-, and 10-month-old infants' selective attention to silently talking faces or to still pictures of silent female faces and recorded fixation of the eyes and mouth. We found that infants shifted attention from the eyes at 4 months to the mouth by 10 months when exposed to silently talking faces but that they maintained their attention on the eyes when exposed to silent static faces. The shift to the mouth suggests that when infants first start babbling and begin to acquire speech production capacity they find the mouth to be especially interesting even when no vocalizations can be heard. The failure to shift to the mouth in the absence of motion suggests that older infants normally look at the mouth because of visible motion and/or because the mouth is the source of speech. In other words, the shift of selective attention to the mouth in older infants reflects their emerging interest in speech production. By shifting attention to the mouth, older infants can begin imitating the sounds that their social partners produce and, thus, can improve their speech production skills.

Pulse Induction In Pseudorandom Sequences Measured With Pulse Attribution and Tapping Rate

Marc Velasco, Edward Large

Complex Systems and Brain Sciences; Charles E. Schmidt College of Science

The question of pulse perception involves asking, for any given rhythmic sequence, whether the sequence has a pulse, and if so what is its frequency. Experimentally, these issues are usually addressed separately, by asking participants to provide judgments of isochrony for jittered sequences (pulse attribution) or by asking participants to tap at a perceived pulse rate for rhythmic patterns (pulse finding). In this experiment, the stimuli were isochronous sequences modified with varying levels of Kolakoski jitter. Levels of jitter ranged from small to large and were roved randomly. In separate blocks, participants were asked to provide pulse attribution judgments and to tap at the pulse rate. For small levels of jitter, pulse attribution ratings were high and participants tapped periodically at the mean sequence rate. For intermediate levels of jitter, pulse attribution ratings dropped and tapping variance increased. At certain high levels of jitter, pulse attribution ratings increased and participants entrained at a new tapping rate. Thus, by smoothly varying a single parameter, the percept changed from that of jittered isochrony to that of rhythmic patterning. Moreover, spectral energy peaks predicted mean tapping rate and stronger peaks corresponded to higher pulse attribution ratings, consistent with a neural resonance model of pulse perception. These results may lead to a better understanding of pulse perception in irregular or randomized sequences.

Feeding Behavior of Loggerhead and Leatherback Turtles: a study to understand longline bycatch.

T. Natasha Warraich, Jeanette Wyneken

Environmental Science; Charles E. Schmidt College of Science

Loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) turtles are two species of sea turtle caught frequently as bycatch in longline fisheries, which use many hooks baited with fish or squid (1). The leatherback feeds primarily on gelatinous zooplankton while the loggerhead is a carnivore. Hence, the attraction and capture of loggerheads is not surprising but the attraction and capture of leatherbacks is somewhat unexpected (2). We investigated the responses of these two species to bait odors in controlled laboratory experiments to better understand releasers of feeding behavior. We measured and compared the responses to olfactory cues. Previous studies quantified and compared feeding responses including increased diving, snapping, gaping, accelerated or diminished swimming speed, and altered swimming behavior (3). The two species share some behavioral components but others were species-specific. Our comparative study highlights the differences in the two species, unexpected similarities, and suggests aspects of their behavior that may predispose them to accidental capture in fisheries.

Approximate Isometries as an Eigenvalue Problem and Angular Momentum

Shawn Wilder, Chris Beetle

Physics; Charles E. Schmidt College of Science

In relativistic physics, a precise definition of a black hole's angular momentum is possible only when its horizon possesses an axial symmetry. Unfortunately most black hole horizons have no such symmetry. However, it is possible to pose an eigenvalue problem that has solutions corresponding to any manifold's "approximate Killing fields." This allows one to generalize formulae requiring symmetry to cases where no symmetry is present and thus define, for example, the spin of an arbitrary black hole. This talk will discuss work using perturbation theory of a horizon to quantify the stability of quantities generalized in this way. We will present precise conditions for the stability of solutions to the eigenvalue problem, and discuss potential applications to numerical relativity.

Notes

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