FIU FLORIDA INTERNATIONAL UNIVERSITY

GPSC GRADUATE & PROFESSIONAL STUDENT COMMITTEE

Graduate Student Appreciation Week

Scholarly Forum

Presentation Abstracts

March 28 – March 29, 2016
Graham Center Ballrooms
9am – 5pm

Dear FIU family,

Graduate Student Appreciation Week Scholarly Forum is in its 5th year here at FIU. It is a collaboration between the Student Government Association's Graduate & Professional Student Committee (GPSC), University Graduate School (UGS), and Graduate Student Advisory Board (GAB). This year we had a record number of 280 student submissions (up from 180 last year) and have 235 graduate & professional students participating in bother oral and poster presentations in 19 categories with almost all disciplines represented. These students will be judged by expert faculty in their field, and the top three winners will be honored at the Provost Awards Ceremony on Friday, April 1st. In addition, the first place winners from each category will represent FIU at the Florida Statewide Graduate Research Symposium.

The GSAW Scholarly Forum is an excellent representation of the high caliber of graduate research that occurs here at FIU leading our institution to be recognized as a top research university in the Carnegie Classification of Institutions of Higher Education.

Sincerely,
Rhett Williamson
Graduate and Professional Committee Chair

Schedule by category

Monday, March 28

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Poster Presentations

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Oral Presentations
Monday, March 28, 2016

9:00 AM - 9:15 AM

Room A

Electrical and Computer Engineering

Deep Learning with MCA-based Instance Selection and Bootstrapping for Imbalanced Data Classification

Sheng Guan

In this paper, we propose an extended deep learning approach that incorporates instance selection and bootstrapping tech-niques for imbalanced data classification. In supervised learn-ing, classification performance often deteriorates when the training set is imbalanced where at least one of the classes has a substantially fewer number of instances than the others. We propose to use adaptive synthetic sampling approach (ADASYN) to generate synthetic instances for the minority class. A data pruning process based on multiple correspond-ence analysis (MCA) is then performed to identify a subset of synthetic instances that are most suitable to supplement the existing minority instances. This results in a relatively more balanced training dataset which is then bootstrapped and fed into the convolutional neural networks (CNNs) for classifica-tion. Furthermore, we propose to use low-level features prepro-cessed by principal component analysis (PCA), instead of the commonly used raw signal data, as the input to CNNs to re-duce the computational time. The experimental results show the effectiveness of our framework in classifying 54 TRECVID concepts with different imbalanced levels by comparing with other state-of-the-art methods.

Oral Presentations
Monday, March 28, 2016

9:15 AM - 9:30 AM

Room A

Electrical and Computer Engineering

Structural Brain Mapping

Muhammad Razib

Brain mapping plays an important role in neuroscience and medical imaging fields, which flattens the convoluted brain cortical surface and exposes the hidden geometry details onto a canonical domain. Existing methods such as conformal mappings didn't consider the anatomical atlas network structure, and the anatomical landmarks, e.g., gyri curves, appear highly curvy on the canonical domains. Using such maps, it is difficult to recognize the connecting pattern and compare the atlases. In this work, we present a novel brain mapping method to efficiently visualize the convoluted and partially invisible cortical surface through a well-structured view, called the structural brain mapping. In computation, the brain atlas network ("node" - the junction of anatomical cortical regions, "edge" - the connecting curve between cortical regions) is first mapped to a planar straight line graph based on Tutte graph embedding, where all the edges are crossing-free and all the faces are convex polygons; the brain surface is then mapped to the convex shape domain based on harmonic map with linear constraints. The mapping is unique and diffeomorphic. All the algorithms solve sparse linear systems and are easy to implement, practical and efficient, and robust to geometry or topology noises. Experiments on two brain MRI databases, including 250 scans with automatic atlases processed by FreeSurfer and 40 scans with manual atlases from LPBA40, demonstrate the efficiency and efficacy of the algorithm and the practicability for visualizing and comparing brain cortical anatomical structures.

Oral Presentations
Monday, March 28, 2016

9:30 AM - 9:45 AM

Room A

Electrical and Computer Engineering

Fully Decentralized Multi-Agent System for Optimal Microgrid Control

Ricardo de Azevedo

In preparation for the influx of renewable energy sources which will be added to the electrical system, flexible and adaptable control schemes are necessary to accommodate the changing infrastructure. Microgrids (MG) have been gaining much attention as the main solution to the challenges of distributed and intermittent generation, but due to their low inertia, MGs need fast acting control systems in order to maintain stability. Droop control is seen as a real solution for MG primary control and Multi-Agent Systems (MAS) have been proposed as dynamic control and communication frameworks. Decentralized arrangements of agents can provide resiliency and the much-desired "plug and play" behavior. This thesis describes a control system which implements droop control and the diffusion communication scheme without the need of a centralized controller to coordinate the MG agents to maintain the frequency and stable operating conditions of the system. Moreover, the inter-agent communication is unaffected by changing network configurations and can achieve optimal economic dispatch through distributed optimization. The system is implemented with the Java Agent Development Framework (JADE) following the Foundation for Intelligent Physical Agents (FIPA) standards, simulated on the IEEE 14-bus system and real-time results are obtained from a smart-grid testbed.

Oral Presentations
Monday, March 28, 2016

9:45 AM - 10:00 AM

Room A

Electrical and Computer Engineering

Multimedia Semantic Concept Detection Using Correlation-based Deep Learning

Haiman Tian

Concept detection from multimedia data is getting more challenging than before due to the significant increasing volume and variety as well as its imbalanced distribution. To better cope with these challenges, a novel framework is proposed to integrate two correlation-based methods, Feature-Correlation Maximum Spanning Tree (FC-MST) and Negative-based Sampling method (NS) with Convolutional Neural Network (CNN), one well-known deep learning algorithm. After the normal dataset preprocessing and low-level feature extraction, the FC-MST is used to select the most relevant features, which decides the input layer dimension of CNN. NS is also proposed to improve the sampling method in the CNN algorithm dealing with the imbalance problem. NUS-WIDE, a well-known web image dataset, is used to validate the proposed framework. The experimental results demonstrate the improvement of the original CNN algorithm as well as other well-known classifiers. Sensitive analysis is further performed to evaluate the contribution of each correlation-based method. The proposed framework adjusts the architecture of CNN, which originally uses the fixed pixel values of the images as input. In the framework discussed, the attention was primarily focused on building a model, which makes the original CNN automatically accept varying dimensions of input data during the process and avoid the effect of the imbalanced data issue.

Oral Presentations
Monday, March 28, 2016

10:15 AM - 10:30 AM

Room A

Electrical and Computer Engineering

Software Defined Networking for Resilient Communications in Smart Grid Active Distribution Networks

Abdullah Aydeger

Emerging Software Defined Networking (SDN) technology provides excellent flexibility to large-scale networks in terms of control, management, security, and maintenance. In this paper, we propose an SDN-based communication infrastructure for Smart Grid distribution networks among substations. A Smart Grid communication infrastructure consists of a large number of heterogenous devices that exchange real-time information for monitoring the status of the grid.We then investigate how SDN-enabled Smart Grid infrastructure can provide resilience to active distribution substations with self-recovery. Specifically, by introducing redundant and wireless communication links that can be used during the emergencies, we show that SDN controllers can be effective for restoring the communication while providing a lot of flexibility. Furthermore, to be able to effectively evaluate the performance of the proposed work in terms of various fine-grained network metrics, we developed a Mininet-based testing framework and integrated it with ns-3 network simulator. Finally, we conducted experiments by using actual Smart Grid communication data to assess the recovery performance of the proposed SDN-based system. The results show that SDN is a viable technology for the Smart Grid communications with almost negligible delays in switching to backup wireless links during the times of link failures in reliable fashion.

Oral Presentations
Monday, March 28, 2016

10:30 AM - 10:45 AM

Room A

Electrical and Computer Engineering

MIM: Role of design and fabrication

Aparajita Singh

The early assumptions have been that thin-film development and contact area the two major issues in defining characteristics of the MIM tunnel diode. Based on this the focus has rigorously been on patterning and various thin-film deposition techniques for MIM formation. Several designs with varied fabrication methods have been considered for fabrication of MIM devices till date for applications like energy-harvesting devices, terahertz electronics, macro electronics, etc. Here we elaborate upon each design and associated fabrication challenges for Ni-NiO based MIM and MIIM diodes. The goal is to optimize the MIM device design for: (1) ease of integration with other circuit devices, and (2) simpler fabrication steps for minimizing alteration in oxide property and inherent device impedance. Fabrication issues such as material selection, metal deposition, oxide growth/deposition, and patterning are discussed. Since ALD is currently the leading way to provide uniform, pinhole free and ultra-thin oxide layers, we present a comparison of oxide properties deposited by sputtering and ALD (the leading techniques) along with their impact on I-V characteristics. Influence of surface preparation on oxide and growth/deposition temperature are also discussed.

Oral Presentations
Monday, March 28, 2016

10:45 AM - 11:00 AM

Room A

Electrical and Computer Engineering

A Reliable Data Aggregation Mechanism with Homomorphic Encryption in Smart Grid AMI Networks

Samet Tonyali

One of the most common methods to preserve consumers' private data is using secure in-network data aggregation. The security can be provided through the emerging fully (FHE) or partial (PHE) homomorphic encryption techniques. However, an FHE aggregation scheme generates significantly big-size data when compared to traditional encryption methods. The overhead is compounded in hierarchical networks such as Smart Grid Advanced Metering Infrastructure (AMI) as data packets are routed towards the core of the AMI networking infrastructure from the smart meters. In this paper, we first investigate the feasibility and performance of FHE aggregation in AMI networks utilizing the reliable data transport protocol, TCP. Then, we introduce the packet reassembly problem. To address this challenge, we propose a novel packet reassembly mechanism for TCP. We evaluated the effectiveness of our proposed mechanism using both PHE and FHE-based aggregation approaches in AMI in terms throughput and end-to-end delay on an 802.11s-based wireless mesh network by using the ns-3 network simulator. The results indicate significant gains in terms of delay and bandwidth usage with the proposed mechanism.

Oral Presentations
Monday, March 28, 2016

11:00 AM - 11:15 AM

Room A

Electrical and Computer Engineering

Energy reduction in modern CPU design

Shi Sha

While multicore CPU platforms, by exploring the thread/process level parallelism, contribute to lower down the energy/thermal barrier and improve system performance over single core, temperature and energy aware design becomes prominent in all aspects of contemporary CPU design. The research seeks to leverage the soaring energy consumption caused by high temperature. We develop a hardware/software codesign approach using DVFS technology to implement real-time schedules. A run-time speed oscillating scheme has been proposed to minimize the average temperature so as to mitigate the high energy consumption. Our proposed m-Oscillating method shows that the average overall energy reduction is 25% in large set of random cases. In addition, the processor maximum temperature could be reduced by up to 7 degrees Celsius. The energy-saving systems in CPU, server and handheld devices outperform others in terms of electricity costs, battery life and reliability concern. It also plays an important role in pursuing an eco-friendly IT industry.

Oral Presentations
Monday, March 28, 2016

11:30 AM - 11:45 AM

Room A

Electrical and Computer Engineering

Design and development of highly sensitive fuel cell alcohol sensor

Ahmed Jalal

The existing fuel cell alcohol sensors suffer severely with humidity interference and signal instability. This interference and instability renders the existing sensors useless for transdermal ethanol detection in non-ideal environment. To address these issues of the fuel cell alcohol sensor, various electrode designs along with the catalysts were explored in this work. The design includes both two and three electrode setups with the Nafion as proton exchange membrane, where the three electrode setup provided stable signal compared to two electrode setup. Considering the development of a potential transdermal ethanol sensor, the ethanol exposed area of the working electrode was optimized to 1cm2 and reference and counter electrode were placed on the other side of the Nafion membrane. For the ethanol measurements in the three electrode system, a fixed potential was applied between working and reference electrode and the change in current due to ethanol concentration was measured between working and counter electrode. To eliminate the interference due to humidity the applied potential for measurement was same as that of the open circuit potential (OCP) of the fuel cell in presence of humidity. Catalysts such as Ni, Cu, Fe and Au were studied, where Ni has better catalytic activity for ethanol oxidation and oxygen reduction providing almost 600, 300 and 3 times greater current response than Fe, Au and Cu respectively. The sensitivity for the sensor was found 0.062 nA/ppm in vapor phase for this Ni catalyst and Ni catalyst based sensor can detect very low concentration such as 1ppm of ethanol.

Oral Presentations
Monday, March 28, 2016

11:45 AM - 12:00 PM

Room A

Electrical and Computer Engineering

Tunable, room temperature THz emitters based on nonlinear photonics

Raju Sinha

The increasing interest in the development of novel terahertz (THz) emitters has stimulated in-depth studies of microscopic mechanisms of THz field generation in conventional semiconductors, electro-optic materials, and an extensive search for new materials and devices to be employed in THz generation. Despite the tremendous research and development efforts, all the available THz emitters suffer from either being large, complex and costly, or operating at low temperatures, lacking tunability, having a very short spectral range and a low output power. Hence, developing a simple, tunable, compact THz emitter operating at room temperature is still a challenging task. We propose a novel approach employing the difference frequency generation (DFG) process in order to achieve efficient and enhanced THz generation in the 0.5-10 THz range with tunability resolution of 0.05 THz. The proposed approach makes use of an optical microring/microdisk resonator with a high value of second order nonlinearity ($\chi(2)$) in order to facilitate the DFG via nonlinear mixing with the choice of two appropriate input infrared optical waves. Enhanced THz generation is ensured by designing the optical resonator in such a way that both the input optical waves get resonated inside the ring. Efficient coupling of infrared waves from bus to the nonlinear resonator is ensured by satisfying the critical coupling condition. Phase matching condition for efficient DFG process is also met by employing modal phase matching technique. We have employed slowly varying amplitude approximation in order to derive analytical model to estimate output THz power. The proposed THz emitters are investigated in detail by performing numerical simulations with the help of a commercial finite difference time domain (FDTD) software, a finite element method (FEM) simulation tool as well as Matlab codes developed in-house. With 1W input pump powers, we achieved 1.1mW and 0.54mW output power at 3 THz with microdisk and microring resonator based sources respectively. The proposed emitters could enable tunable, compact THz sources, on-chip integrated spectrometers, inspire a broader use of THz sources and motivate many important potential THz applications in different fields such as medical imaging, security screening, remote sensing, chemical detection, space research and tactical imaging.

Oral Presentations
Monday, March 28, 2016

12:00 PM - 12:15 PM

Room A

Electrical and Computer Engineering

Modeling and Control of a Low Speed Flywheel Driving System for Pulsed Load Mitigation in DC Distribution Networks

Ahmed Elsayed

This presentation details the modeling and development of an improved controller design for a DC Flywheel Energy Storage System (FESS) driving circuit. The flywheel is a mechanical based system to store energy in a clean way without any chemicals. The Driving system is based on a Bi-directional Buck-Boost converter. The modeling of this converter including the parasitic resistances for all the components was carried out. In this model, the equivalent circuit of the machine was integrated in the converter state space model for improved accuracy and controllability. The system has two operating modes; when the FESS is charging, the converter operates in the buck mode. A controller was designed to regulate the charging rate through controlling the machine's terminal voltage. In the discharging mode, the converter operates in the boost mode. A current controller takes over to control the injected current from the machine to the DC bus. The detailed design of both control loops was identified. Simulation results show the accuracy of the derived model and the enhanced performance of the FESS. Further, it is shown that the reversal of power flow direction was performed seamlessly. A hardware prototype of the converter was implemented and the effectiveness of the developed system was experimentally verified. The experimental results are in excellent agreement with the simulation.

Oral Presentations
Monday, March 28, 2016

12:15 PM - 12:30 PM

Room A

Electrical and Computer Engineering

DC Voltage Ripple Quantification for a Flywheel-Battery Based Hybrid Energy Storage System

Christopher Lashway

Flywheel energy storage has started attracting more attention as an energy storage means, but certain impediments face their deployment such as a high self-discharging rate and power quality issues. A potential solution is to combine flywheels with another energy storage types to form a Hybrid Energy Storage System (HESS). In this paper, a new method is established to perform power quality analysis and DC voltage ripple quantification in an HESS connected solely to a DC bus. Previous efforts have analyzed voltage and current ripple using an AC frequency reference, but these techniques are ineffective when the system does not contain a connection to a traditional AC grid. Extensive laboratory testing and verification is conducted to characterize a flywheel-battery based HESS with different battery contribution levels. A correlation is made between the required battery support and resulting DC voltage ripple. Due to the nature of a flywheel operating at various speeds, a new Machine Speed Multiple (MSM) frequency reference is used as a profiling tool corresponding to the harmonic number in AC systems. Using the MSM in conjunction with the Discrete Fourier Transform, a voltage ripple frequency table is produced to highlight the target frequencies which must be reduced. A quantitative analysis identifies an overall reduction of voltage ripple magnitudes as a result of current injection from the battery. Using a system of this nature, new power and energy applications which plan to include a flywheel energy storage system will be able to transmit cleaner, more efficient energy.

Oral Presentations
Monday, March 28, 2016

12:45 PM - 1:00 PM

Room A

Electrical and Computer Engineering

UWB Radar for Indoor Detection and Ranging of Moving Objects: An Experimental Study

Wahab Ali Gulzar Khawaja

Ultrawideband (UWB) signals, due to their large bandwidth, can capture the fine temporal resolution of multipath propagation channel. This can be used for extracting geometric information related to the surrounding environment.In particular, Time Domain P410 UWB radios are used in our experiments, for channel sounding in bi-static and monostatic modes. In this paper, UWB radio pulses are used to determine the channel impulse response (CIR) in indoor environment. Based on the measured CIR, a statistical model is developed that is used in detection and range estimation of moving objects in indoor line-of-sight environment. The CIR measurements at different distances are used to study and model various channel characteristics in time and frequency domain. Our results show that UWB radar is capable of accurately detecting trajectory and speed of moving objects in indoor environments with minimum post-processing.

Oral Presentations
Monday, March 28, 2016

1:00 PM - 1:15 PM

Room A

Electrical and Computer Engineering

A High-Performance and High-Security System-on-Chip Architecture Design Methodology for Internet-of-Things Embedded Chips

Xiaokun Yang

We propose a configurable and synthesizable Internet-of-Things (IoT) bus architecture (IBUS) for integrating IP blocks from multiple vendors. More precisely, we combine three novel bus transfer modes – linear, block, and AES state, into IBUS protocol to improve bus performance and structural support for the Advanced Encryption Standard (AES) algorithm. We also present an auto-generated method, capable of creating IBUS structure to seamlessly integrate third-party IPs. The results show large reduction in IBUS architecture area and power consumption (87.1% in cipher tests), compared with AXI3-based integration. Moreover, IBUS-based designs achieve higher valid throughput (up to 2×) than AXI3 implementations.

Oral Presentations
Monday, March 28, 2016

1:15 PM - 1:30 PM

Room A

Electrical and Computer Engineering

A Novel Semi-Automatic Method for Accurate Registration of FDG_CT and FLT_CT Image Modalities

Xue Wang

The widely used 18F-fluorodeoxyglucose (18F-FDG) serves as a good imaging tool in Computed Tomography (CT) and is essential for cancer diagnosis as FDG uptake is higher in cancerous lesions and lower in benign lesions, while FLT uptake is closely correlated with cellular proliferation. The registration of both of these tracers, FDG and FLT, compensate one another to increase both sensitivity and specificity for imaging cancer, and accurate registration of both imaging modalities is thus sought for optimizing the results of the diagnosis. This paper describes a novel feature-based registration method which employs affine transformation and linear interpolation for FDG_CT and FLT_CT image modalities. In this study, instead of using one set of affine transformation parameters, three slices have been selected to calculate all of the transformation parameters for CT image registration by linear interpolation. This method has the merits of: a) improving the 3D registration results for CT images; b) avoiding the arbitrary selection of that one slice for calculating the transformation parameters for registration; c) easily to realize and not time consuming. Experimental results proved the soundness of this method in both quantization and visualization.

Oral Presentations
Monday, March 28, 2016

1:30 PM - 1:45 PM

Room A

Electrical and Computer Engineering

Connectivity Maps of different Types of Epileptic Patterns

Hoda Rajaei

Problem statement Epilepsy is a common neurological disorder affecting millions of people around the world. The disease is characterized by recurrent seizures affecting the patient's mental and physical functionality. Epileptic patterns can be identified as general or focal. Ictal events and interictal spikes are significant characteristics of an epileptic electroencephalography (EEG) recording. Different feature characteristics might be seen in spikes during ictal and inter-ictal events. Research objective In this study the connectivity maps, showing the interaction between brain modules, are used for the investigation and comparison of three different types of epileptiform activity. A nonlinear data driven method was used to extract the connectivity maps. Connectivity matrices calculated helped in identifying network synchronization based on the number of connections for all brain regions represented by the EEG electrodes. This quantification based on connectivity maps was used to compare the different spike patterns. Methodology Nineteen scalp EEG channels from two epileptic patients that show different spike types were collected. The EEG signals were recorded with the 10-20 international standard montage with a sampling frequency of 200Hz. The spike patterns, which included single spikes, repetitive and complex, were selected in ten segments of 1 second duration. All segments of the same type were aligned with each other with respect to the spike peak. The connectivity maps were extracted from each epoch using correlation based on the probability of recurrence. This method uses the mutual phase synchronization between electrodes as a measure of connectivity. For each connectivity map, the number of connections for each brain region (frontal, posterior, left hemisphere and right hemisphere) was extracted. The stronger connections were shown by setting different thresholds (70%, 90% and 95%) to each connectivity map. Conclusions Results demonstrated, by comparing connectivity maps for three different spike types, that single spikes showed lower number of connections in both intra-region and inter-regions, while the number of inter-region connections in complex and repetitive spikes was higher. These results validated the brain regions involved in the process since single spike patterns are related to focal epilepsy and complex and repetitive spikes patterns are related to generalized epilepsy.

Oral Presentations
Monday, March 28, 2016

9:00 AM - 9:15 AM

Room B

Civil, Mechanical, and Materials Engineering

Understanding the Mechanical Behavior of Two-Dimensional Boron Nitride Nanoplatelets

Archana Loganathan

Two-dimensional hexagonal boron nitride nanoplatelets (2D-BNNP) analogues to graphene, possess exciting properties and wide range of applications such as functional composites, hydrogen storage, solid lubricants or as lubricant additive. Understanding the mechanical behavior of highly oriented 2D-BNNP will help us to develop materials especially for structural composites. So, the present work focusses on the consolidation of the boron nitride nanoplatelets by spark plasma sintering and further to study effect of anisotropy on the mechanical properties of BNNP. They were sintered at high temperature around ~1650 °C for a pressure of 50 MPa. Structural studies were carried out on the as-received BNNP and sintered compact using X-ray diffraction. Preferred orientation of the BNNP perpendicular to the direction of sintering were observed after consolidation. Also, the layered structure was retained without any damage after the consolidation at high temperature. Additionally, hexagonal boron nitride has good lubrication properties, so the tribological properties were studied at room and high temperature using ball on disk tribometer. Low coefficient of friction (~ 0.145 for 3 N, 2 mm track radius) was obtained for the room temperature test and for high temperature test, the coefficient of friction increased (~0.646 for 3 N, 2 mm track radius). In-situ indentation studies were carried out for the sintered compact in the orthogonal direction and on the top surface. This study provides the real time videos during the test, which helps us to discern the deformation mechanism. Predominant deformation mechanism observed on the top surface indentation of BNNP compact are the compression of the layered sheets, delamination, sliding and material pile up. For the orthogonal direction, the key deformation mechanisms are cracking, kinking, delamination and fracturing of the cross-sectional layers. These results indicate the orientation of BNNP plays a significant role in their mechanical properties and further, this will contribute in designing the BNNP based composite materials in future.

Oral Presentations
Monday, March 28, 2016

9:15 AM - 9:30 AM

Room B

Civil, Mechanical, and Materials Engineering

Micro and nanoscale mechanical properties of magnesium and its alloys

Pranjal Nautiyal

Magnesium and its alloys are promising light weight metal candidates for aerospace and automotive applications. However, deformation behavior of magnesium is complex due to limited available slip systems in HCP metals at room temperature. The objective of this study is to examine micro and nano scale creep and scratch deformation in magnesium and its alloys, so as to enhance the overall understanding of plasticity mechanisms exhibited by them. Creep or time dependent plastic deformation occurs when material is subjected to load for prolonged duration of time, ultimately leading to failure. Penetrative or scratch abrasions can act as sites of stress concentration, and make the material vulnerable to fatigue failure when subjected to cyclic loading-unloading. This research is focused on nanoindentation-based mechanical characterization of creep and scratch deformation in commercially popular Mg-Al alloy system. Influence of crystallographic texture and microstructure on creep flow is investigated by indentation testing on wrought AZ61 magnesium alloy for varying loading paths, and for solution-treated as well as aged conditions. Scratch deformation in AZ80 magnesium alloy is probed by indentation scratch technique, and influence of precipitate phase on wear mechanism was studied. Post deformation Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM) was performed to determine plasticity mechanisms as a function of microstructural variables. Precipitation was found to enhance the creep as well as scratch resistance of Mg-Al alloys. Different deformation mechanisms were detected for varying crystallographic texture with respect to loading path. Twinning as well as slip mechanisms were found to induce creep in solution-treated alloy, whereas twinning activity was suppressed in aged condition due to precipitate particles. Ductile ploughing was the prominent scratch induced wear mechanism in Mg-Al alloy, along with extensive mechanical twinning and microcutting in solution treated alloy, and crack generation in aged alloy.

Oral Presentations
Monday, March 28, 2016

9:30 AM - 9:45 AM

Room B

Civil, Mechanical, and Materials Engineering

Hydrogen Recharge on Fuel cells

Praveen Sundaram Pasupathy

Hydrogen fuel cell is becoming the most trending and emerging field in the whole chapter of Automobile and Mechanical world at this moment. This effort is to add the boost to the same technology .The concept of fuel cell is actually the opposite of the electrolysis concept due to which electricity is produced which is eventually used to propel an Automobile. The products of combustion would be water vapor. This idea will make United States less fuel dependent to any fuel producing country. In addition to the above technology, we would like to add an additional setup which boosts the energy developed manifold and gives out a furthermore pure form of combustion and combustion byproducts. The idea is to introduce an electrolysis chamber to the combustion outlet which provides hydrogen and oxygen from the water vapor yielded. The produced hydrogen will be again fed back to the hydrogen fuel cell to recharge itself and finally it releases only oxygen and the amount of oxygen in the environment also ultimately increases.

Oral Presentations
Monday, March 28, 2016

9:45 AM - 10:00 AM

Room B

Civil, Mechanical, and Materials Engineering

Numerical Simulation of a Reciprocating-Mechanism Driven Heat Loop (RMDHL)

Olubunmi Popoola

A bellows-type Reciprocating-Mechanism Driven Heat Loops (RMDHL) is a novel heat transfer device that could attain a high heat transfer rate through a reciprocating flow of the working fluid inside the heat transfer device. Although the device has been tested and validated experimentally, analytical or numerical study has not been undertaken to understand its working mechanism and provide guidance for the device design. The objective of this paper is to numerically simulate the RMDHL to predict its operational performance under different working conditions. The numerical results are also compared with relevant experimental data with good agreement. The numerical results indicate that the RMDHL can meaningfully reduce the peak temperature of an electronic device and result in significantly more uniform temperature across the electronic device. Considering the other advantages of coolant leakage free and the absence of cavitation problems for aerospace related applications, the single phase RMDHL could be an alternative of a conventional Liquid Cooling System (LCS) for electronic cooling applications.

Oral Presentations
Monday, March 28, 2016

10:15 AM - 10:30 AM

Room B

Civil, Mechanical, and Materials Engineering

Utilization of the HCM Urban Facility Procedures for the Estimation and Real-Time Prediction of Travel Time with Consideration of Rain Impacts

Homa Fartash

Estimation and prediction of travel times under different operational and environmental conditions are critical to both the operation and planning of transportation systems. This study focuses on determining the accuracy of using the Highway Capacity Manual (HCM) urban street procedures to estimate and predict travel times under rainy conditions by adjusting the saturation flow (SF) and free flow speed (FFS) inputs to the procedure. The study found that, under normal (no rain) conditions, using SF of 1900 vphgpl produces the best correspondence between the HCM model results and real-world measurements of travel times. For light rain conditions, the adjustments to the SF and FFS do not improve model estimation compared to real-world estimates. Thus, such adjustments are not recommended for light rain conditions. Adjustments to the SF and FFS for medium rain conditions utilizing the procedure and parameters provided in the SHRP2 L08 project produce the best match to real-word measurements of travel times compared to other tested values of SF and FFS. However, heavy rain impacts on travel times are overestimated when the SF and FFS adjustment parameters from the SHRP 2 L08 projects for these conditions are used. These adjustments had to be modified to constrain the impacts of heavy rains on SF and FFS to maximum values, resulting in a good matching to real-world conditions. This paper also investigates real-time travel time prediction with rainfall consideration using the HCM urban street procedures for applications at traffic management center. Predictions for the next 15, 30, 45 and 60 minutes are tested and goodness of fit measures are assessed for each case. The study demonstrates that the utilized method is able to produce a good travel time prediction.

Oral Presentations
Monday, March 28, 2016

10:30 AM - 10:45 AM

Room B

Civil, Mechanical, and Materials Engineering

Impact of Incentive/Disincentive Values on the Time/Cost Trade-off for Pavement Rehabilitation Projects

Mohamed Ibrahim

The current deteriorating state of the highway system in the Unites States led to a surge in the number of highway maintenance and rehabilitation projects. This created a new challenge for the state highway agencies (SHAs) as they try to complete these projects while minimizing the impact on the road users. Consequently, SHAs are currently adopting alternative contracting methods in order to reduce the duration of such projects; specifically, the Incentive/Disincentive (I/D) method. Nevertheless, setting the appropriate incentive level (ID) for each project is the cornerstone for the success of this contracting method as any error can result in either a waste of the public's money in case of overestimation or longer project durations in case of underestimation. Therefore, this research study presents a new model aimed at quantifying the impact of the different ID levels on the trade-off between time and cost of pavement rehabilitation projects. The model assigns the appropriate ID values based on the desired level of reduction in the project's duration and estimates the additional cost, incurred by the owner, associated with each of these levels. Finally, a risk analysis is performed to determine the likelihood of achieving these desired levels of duration reduction.

Oral Presentations
Monday, March 28, 2016

10:45 AM - 11:00 AM

Room B

Civil, Mechanical, and Materials Engineering

Exploring the Potential of Mobile Phone Data in Travel Pattern Analysis

Eazaz Sadeghvaziri

To support the increasingly complex planning activities, many agencies are facing the challenges of obtaining highly nuanced travel behavior data while managing shrinking financial resources. Recent advancements in smart phones and Global Positioning System (GPS) technologies present new opportunities to track travelers' trips. Many studies have applied GPS-Based data in planning and demand analysis but cellphone GPS data has not received much attention. Google Location History (GLH) data represent an opportunity to explore the potential of these data. This paper presents a study using GLH data, including the data processing algorithm in deriving travel information and the potential applications in understanding travel patterns. GLH data are obtained from 25 participants in a one-month period for the pilot study. It shows that GLH provides sufficient high resolution data that can be used to study people's movement without respondent burden. The developed algorithms in this study work well with the pilot data. However, due to the limitations of the pilot data, in terms of sample size and sample representation, the analysis conducted in the study cannot be used to draw any conclusions. Nevertheless, this pilot study shows the potential of utilizing mobile phone GPS data as a supplement or complement to conventional data. Given the high penetration of smartphones and the low respondent burden, these data provide the opportunity to facilitate the investigation of various issues, such as less frequent long-distance travel, daily variations in travel behavior, and human mobility pattern in large spatio-temporal scale.

Oral Presentations
Monday, March 28, 2016

11:00 AM - 11:15 AM

Room B

Civil, Mechanical, and Materials Engineering

Dynamic Meta-Network Modeling for Integrated Project Performance Assessment under Uncertainty

Jin Zhu

This paper presents a dynamic meta-network modeling framework for integrated project performance assessment under uncertainty. In the proposed framework, construction projects are conceptualized as meta-networks composed of different types of nodes (i.e., agents, information, resources, and tasks) and links representing interdependencies between these node entities. The impacts of uncertain events on construction projects are translated as perturbations in different nodes and/or links in project meta-networks. The uncertainty-induced perturbations cause decreases in project meta-network efficiency, and ultimately cause project performance deviation. The ultimate performance deviation is investigated based on two project properties: (1) project vulnerability (i.e., the decrease in meta-network efficiency under uncertainty-induced perturbations); and (2) project adaptive capacity (i.e., speed and capability to recover from uncertainty-induced perturbations). Then, project planning strategies are evaluated based on their effectiveness in mitigating the negative impacts of uncertainty by reducing project vulnerability or enhancing project adaptive capacity. The application of the proposed framework is demonstrated in a case study of a complex commercial building project. Different scenarios related to uncertain events and planning strategies are simulated in the case project. The results of the case study show the capability of the proposed dynamic meta-network modeling framework in: (1) quantitative predictive evaluation of the impacts of uncertainty on project performance; (2) ex-ante evaluation of the effectiveness of planning strategies in mitigating the negative impacts of uncertainty on project performance; and (3) capturing the complex interactions between various tasks, agents, information, and resources in evaluation of project performance under uncertainty.

Oral Presentations
Monday, March 28, 2016

11:30 AM - 11:45 AM

Room B

Civil, Mechanical, and Materials Engineering

A Framework for Alternative Assessment in Front-end Phase of Mega Transportation Projects

Nahid Vesali Mahmoud

Identifying the best project alternative is a critical challenge facing the mega transportation projects (MTPs) at the front-end phase. The increasing complexity and dynamism of MTPs have imposed substantial uncertainties and subjectivities in the decision-making process. Despite the efforts made in previous studies, an integrated theory of alternative assessment is still missing, mainly due to the lack of a stochastic framework to facilitate the comprehensive assessment. Currently the predominant approach used in front-end phase of MTPs to assess different alternatives is cost-benefit analysis, which is a deterministic method. The objective of current research is to establish a conceptual stochastic decision support framework to cope with the considerable uncertainties in MTPs. The features of the proposed decision support framework are achieved by using the Bayesian belief network modeling technique to provide a comprehensive registry of the relevant decision factors, establish the interrelationships between these decision factors, and consequently quantify uncertainties and predict trade-offs between various user-defined decision criteria to facilitate prioritization of MTP alternatives. The proposed framework is used in a preliminary alternative assessment for case study related to Miami Port of Miami Tunnel Project. The case study investigates the decision-making of key stakeholders related to prioritization of alternative projects for vehicular access to Miami Port of Miami. The proposed framework and the case study highlight the significance of identification of a stochastic project alternative assessment method. The proposed framework provides decision-makers with a decision support tool to facilitate front-end phase of MTPs.

Oral Presentations
Monday, March 28, 2016

11:45 AM - 12:00 PM

Room B

Civil, Mechanical, and Materials Engineering

Resource Management in Sustainable Cloud Data Centers

A S M Hasan Mahmud

Problem Statement: To meet the surging demand for online computing, data centers are continuously growing in both numbers and sizes, increasing their electricity consumption and carbon footprints worldwide. Today's large data center hosts hundreds of thousands of servers and its peak power rating exceeds 100MW. Currently, the data centers consume 3% of global electricity production and would rank 5th in the world if they were a country. A significant portion of this electricity is produced form carbon-intensive sources (e.g., coal and oil), often called “brown energy". Due to the brown energy consumption, data centers are accountable for emitting 200 million metric tons of carbon dioxide per year. Many IT organizations (e.g., Facebook and Google) are consistently looking for new approaches to reduce their energy consumption and carbon footprints without incurring additional operational cost. In this work, we will address how to reduce the carbon emission of a hybrid data center infrastructure while satisfying the performance requirements and without incurring significant additional operational cost. Research objective: Our proposed solution needs to address the inherent trade-off among carbon footprint, energy consumption and operational costs, such that optimizing one does not significantly affect the others. For example, scheduling more workloads to a green data center will reduce carbon emission but may increase the electricity cost significantly because of higher unit electricity price. While maintaining the trade-off, we will also address the fundamental challenge of data center resource management: maintaining quality of service (QoS) within service level agreements (SLAs). Furthermore, our solution will consider both delay-sensitive interactive (e.g., web search) workload and delay-tolerant batch (e.g., video processing) workload. Broader Impacts: Our proposed work focuses on the unexplored yet increasingly adopted hybrid data center infrastructure used by many organizations (e.g., Apple, Facebook and Google). These are continuously looking forward to reduce their energy consumption and carbon emission to mitigate the pressure from utility company, qualify for government incentives, and improve their public image. Our work has a potential to reduce carbon emission by thousands of tons and save millions of dollars by reducing the energy consumption of an IT organization.

Oral Presentations
Monday, March 28, 2016

12:00 PM - 12:15 PM

Room B

Civil, Mechanical, and Materials Engineering

Contract-based Emergency Demand Response Participation of Multi-tenant Colocation Data Center

Kishwar Ahmed

Problem statement: Through reducing electricity use during peak period, demand response programs maintain transmission stability in power grid, making grid more sustainable in the process. In this proposal, we consider one such demand response program, emergency demand response (EDR), which is critical to ensure reliability during emergency situations. We propose a contract-based mechanism that offers financial incentives to tenants of a multi-tenant colocation data center to shed energy during emergency situations, (partially) substituting the cost-ineffective and environmentally-unfriendly diesel generation. Research Objectives: To propose a method for energy reduction in multi-tenant data center during emergency demand response period. The method should be easily-implementable in practice. Tenants in the data center should be benefited from the scheme. Research Methodology: We performed theoretical analysis to prove different properties of the proposed method. We collected real-life trace data from different sources for simulation study. Finally, we performed simulation study to show effectiveness of our proposed method. The simulation was performed using Matlab simulation tool. Results/Conclusions: Results show that our proposed solution offers a "win-win" situation to all the participants involved, through: (1) offering financial incentives to the tenants for participating in emergency demand response, (2) ensuring grid reliability during emergency hours, (3) reducing energy consumption for colocation. Moreover, the energy reduction ensures achieving sustainability for the colocation (earning renewable energy credits in the process). Contribution/Significance: Colocation is responsible for more than 37% of energy consumption by all the data centers at U.S. However, this section of major energy-consumer has largely been unexplored. In our research, we attempt to explore this type of data center and contribute towards ensuring sustainability through reducing energy consumption by colocation. Our proposed contract-based approach is simple and easily-implementable in practice. Broader Impacts: Through reducing energy in colocation data center, our approach ensures achieving sustainability for this type of data center. Moreover, due to the criticality of "emergency" demand response time-period, our proposed approach contributes significantly towards smooth operation of national grid during such hours.

Oral Presentations
Monday, March 28, 2016

9:00 AM - 9:15 AM

Room C

Biology and Biochemistry

Mortal Kombat between ants and the federally endangered Schaus swallowtail butterfly in Biscayne National Park, Florida

Jaeson Clayborn

The imperiled butterfly, Heraclides aristodemus ponceanus, has reached critically low numbers in the Florida Keys. Exotic ants such as Solenopsis invicta, Pseudomyrmex gracilis, and Wasmannia auropunctata are potentially notorious agents in the decline of H. a. ponceanus and other rare butterflies in south Florida. Sites in Biscayne National Park (Florida) have been restored and replanted with host plants (Amyris elemifera and Zanthoxylum fagara) for H. a. ponceanus. The restored sites in Biscayne National Park are quite exposed, with minimal canopy cover and numerous small saplings. This habitat structural contrast with surrounding forested areas invites colonization by ants that prefer disturbed habitats, such as exotic ants. Ant surveys were conducted in restored sites and intact subtropical dry forest to record ant species and activity at each location. A. elemifera, Z. fagara, and adjacent non-host plants in the forests were surveyed from their base to canopy for ants. A separate ant-caterpillar interaction study was performed with Heraclides cresphontes (H. a. ponceanus surrogate) in the restored sites. S. invicta and W. auropunctata were scarce in the restored sites and notably absent in the forest. Ant activity was significantly lower in the canopy and trunk than the ground. The three most common arboreal ant species were Camponotus floridanus, Pseudomyrmex gracilis, and Camponotus planatus. The ant-caterpillar interaction study revealed S. invicta, C. floridanus, and P. gracilis were aggressive towards caterpillars compared to other ant species. S. invicta is a significant threat to caterpillars (all instar stages) if they encounter them; however, the paucity of interactions between S. invicta and Heraclides spp. appears negligible even in the restored sites. P. gracilis is ubiquitous in Biscayne National Park and a major threat to Heraclides spp. during their earliest life stages. Continued research should investigate interactions between Heraclides spp. and other invertebrate predators and quantify their impacts.

Oral Presentations
Monday, March 28, 2016

9:15 AM - 9:30 AM

Room C

Biology and Biochemistry

A Global Analysis of Factors Driving Amphibian Diversity in Plantations

Lilly Eluvathingal

Anthropogenic conversions of natural areas to agriculture and monoculture plantations are a large threat to flora and fauna, especially in biodiversity hotspots which harbor large numbers of endemic species. Plantations in the tropics are established in areas which are characterized by high species richness and they tend to support subsets of species with narrow distribution ranges found in the surrounding "natural areas". Papers published on amphibian diversity in plantations are reviewed and we examine the factors affecting number of species with a focus on tropical plantation systems. Preliminary data on anurans in an active tea plantation from Kerala, India is presented in relation to the other published papers. We compare our field data from a large tea plantation in Munnar, Kerala, India to those obtained from the literature. Tea is a globally popular beverage whose flavor is dependent on the elevation at which it is grown. This plantation is nestled in the Western Ghats and Sri Lanka biodiversity hotspot, a center of radiation for amphibians, spiders, orchids, balsams, and several other phyla. We report on known species of amphibians from a 350 square km area of heterogeneous, actively managed tea plantations with a large number of cryptic species expected to be described in the coming years. Of the reported 22 species, all but one is endemic to the Western Ghats, reinforcing the need to educate plantation managers about conservation practices that can be implemented without affecting production, including selective protection of breeding micro-habitats and reduced pruning, in turn increasing the attractiveness of the product to an increasingly socially conscious, international market.

Oral Presentations
Monday, March 28, 2016

9:30 AM - 9:45 AM

Room C

Biology and Biochemistry

Herbivory and benthic dynamics of coral reefs of the Florida Keys

Alain Duran

Herbivory plays an important role shaping benthic communities of coral reefs. Parrotfish and surgeonfish are the most abundant families of herbivorous fish in the Caribbean. They have broad feeding habits and distinct morphological characteristics that complement each other and allow them to control macroalgal communities at multiple successional stages with consequent impact on ecosystem resilience. In this consumer-resource system, multiple factors such as species competition, diet breath of consumers (herbivores) as well as resource availability and habitat characteristics likely influence the overall impact of herbivores on macroalgal communities. My research focuses on potential factors affecting the grazing activity and interactions within herbivorous species and with macroalgal communities to better understand coral reef functioning and propose conservation management strategies. In the last three years I've carried out experimental manipulations and field observations in the distinct reefs of the Upper Florida Keys to assess the impact of herbivores on macroalgae community at different spatial scales. My findings evidence that herbivory on coral is a determinant process at any spatial scale, from clearing microhabitat allowing coral larvae to settle thus controlling algae-coral competition and finally as a unique trophic link between lower to higher trophic levels. However, herbivore-algae interactions are species-specific and can be modified by a series of factors that include sedimentation, habitat characteristics and spatiotemporal variations of resource availability. For instance, higher structural complexity provides more shelter and benthic diversity which enhance not only herbivore biomass but also grazing rate. Contrarily, flatter reefs are usually homogeneously covered by turf algae associated with sediment with reduced shelter availability, food diversity and therefore overall less herbivory pressure. In addition, the seasonal variation of algal community composition across sites is also driving feeding behavior of herbivore with same species selecting different resources as they become seasonally available. In the Florida Keys the results of this research gives us new insights about the fundamental dynamics of herbivory on coral reefs as well as potential implications for important management decisions to help conserve and promote herbivory on reefs.

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Monday, March 28, 2016

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Room C

Biology and Biochemistry

Changing Light Conditions in Pine Rockland Habitats Affect the Outcome of Ant-Plant Interactions

Ian Jones

Problem Statement: Extrafloral nectar (EFN) mediates food-for-protection mutualisms between plants and ants. Such mutualisms exist within a complex web of biotic interactions, and in a framework provided by the abiotic environment. Both biotic and abiotic factors, therefore, affect the outcome of ant-plant interactions. Research Objectives: We conducted an experiment to determine the effects of ant activity, and light intensity, on herbivory rates, growth, and reproductive fitness in Senna mexicana var. chapmanii, a perennial legume native to south Florida's pine rockland habitats. Research Methodology: Forty plants were divided among four treatments in a factorial experimental design with two independent variables: ant activity and light intensity. Plants were divided equally between sunny and shady habitats, and ants were excluded from half of the plants in each habitat type. Results: In shaded habitats, the presence of ants had no effect on herbivory rates, seed set, or plant size. In sunny habitats, however, plants with ants suffered less herbivore damage, produced more seeds, and grew larger over the duration of the one year study. Conclusions and Significance: Ants represent an important biotic defense against herbivores in S. chapmanii; however, their effects on plant fitness are dependent on light conditions. Pine rockland habitats in south Florida have been widely destroyed or mismanaged. In fragments that remain, disruption of fire regimes has led to increased canopy closure and shading of the understory. These changes will likely negatively impact ant-plant interactions. We highlight the importance of conservation efforts to preserve the pine rocklands and their many native plant species. Broader Impacts: The project provided extensive research opportunities for three undergraduate students, all of whom are listed as authors. Key findings from the study have been turned into a series of educational cartoons, intended as learning tools for students, and to promote enthusiasm for botany and entomology.

Oral Presentations
Monday, March 28, 2016

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Room C

Biology and Biochemistry

Can tiger sharks help coastal ecosystems recover from climactic disturbances?

Robert Nowicki

Earth's habitats continue to be exposed to anthropogenic stressors including habitat loss, eutrophication, and climate change. In the face of such stress, there is a critical need to understand what makes ecosystems resilient to disturbances. Apex predators may be important to resilience in part because of their ability to generate widespread risk effects. Indeed, predation risk can alter prey behavior and generate cascading effects to primary producers, which may play an important role in the disturbance recovery of primary producers. It is therefore important to test whether predation risk generated by large sharks can increase coastal ecosystem resilience, especially as loss of these predators continues and as climactic disturbances become more frequent. Here I present a 16 month field experiment to determine whether a dominant apex predator, the tiger shark (Galeocerdo cuvier), contributes to the resilience and recovery of the recently disturbed seagrass community of Shark Bay, Australia. The experiment was established following a climate-driven heat wave (2011) and subsequent catastrophic seagrass loss (70- 90%). We mimicked shark loss by simulating shifts in the risk-sensitive foraging patterns of dugong mega-grazers to create "risk-free" grazing regimes. We used mixed effects modeling to determine the importance of grazing treatments to the change in percent cover of the dominant climax seagrass (Amphibolis antarctica) and a herbivore-preferred pioneer seagrass (Halodule uninervis). A. antarctica cover declined with increased grazing treatments, though the effects were site-dependent. Surprisingly, H. uninervis cover did not increase in response to grazing as pioneer seagrasses have been recorded to do elsewhere. Results indicate the fragile current state of Shark Bay and the likelihood for a phase shift to an
A. antarctica depauperate ecosystem if tiger sharks were removed. Such a change would also result in a loss of ecosystem functions unique to A. antarctica. This work highlights the contribution apex predators can make to the resilience of marine ecosystems, which are likely to be exposed to more frequent and intense disturbances as climate change continues.

Oral Presentations
Monday, March 28, 2016

10:30 AM - 10:45 AM

Room C

Biology and Biochemistry

Evaluation of premetastatic niche formation in a mouse model of spontaneous melanoma lung metastasis

Juliano Freitas

The deadliest trait of cancer cells is their capacity to colonize other sites of the body during a complex process called metastasis. Metastasis is the ultimate cause of death in 90% of patients with cancer, and there are still many remaining gaps in our understanding of metastasis formation. A number of studies have proposed the existence of an intricate crosstalk between primary tumors and future sites of metastases in order to transform the environment of these organs into a suitable microenvironment. This microenvironment is called the premetastatic niche, and is established to receive disseminating cancer cells, and support the growth of the metastatic colony. Melanoma is a highly metastatic cancer and preferentially establishes secondary lesions in lungs and brain. We have created a mouse model of melanoma (Dct-Grm1/K5-Edn3) that spontaneously develops melanoma tumors and metastasizes to the lung. In order to describe the premetastatic niche formation in the mouse model of melanoma metastasis we monitored the appearance of bone marrow derived cells (BMDCs) clusters and metastatic cells during tumor progression by immunofluorescence and flow cytometry. We detected both BMDCs and tumors cells in the earliest stage of tumor progression suggesting that the lung melanoma metastasis in the Dct-Grm1/K5-Edn3 mouse model is independent of premetastatic niche formation. We also found tumorigenic cells staining positive for both melanocytic and hematopoietic markers in higher numbers early during primary tumor formation. The appearance of Melanoma-BMDC hybrids in the lung suggest they might be the metastasis initiating cells, which might explain why the premetastatic niche formation is not required in the Dct-Grm1/K5-Edn3 mouse model. Furthermore our findings implicate that Melanoma-BMDC hybrids are potential targets for melanoma treatment.

Oral Presentations
Monday, March 28, 2016

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Room C

Biology and Biochemistry

Correlation Between Regional Amyloid-Beta Deposition and Cortical Thickness at Early Stage of Mild Cognitive Impairment

chunfei li

This study aims to evaluate the correlation of amyloid deposits and cortical thinning during early stage of mild cognitive impairment (EMCI). MRI and [18F]AV45-PET (florbetapir) were obtained for 134 healthy elderly subjects (CN), 90 patients with EMCI and 107 patients with Alzheimer's disease (AD). Analysis of covariance (ANCOVA) adjusted for age, was used to assess the role of AV45 target-to- cerebellum uptake ratio and surface-averaged cortical thickness. The relationship between them was then studied using partial Pearson's correlation in terms of the 11 predetermined regions of interest (ROI). Results indicate that there is a strong negative correlation between β-amyloid deposition and cortical thickness in the posterior cingulate and the medial temporal region, although only the β amyloid load shows significant difference between the CN and EMCI groups. In addition, at AD stage, a positive correlation between amyloid deposits and cortical thickness in the middle and anterior frontal regions was found, which strongly suggests that, at AD stage, amyloid deposits in these two regions starts to decrease with ongoing cortical thinning.

Oral Presentations
Monday, March 28, 2016

11:00 AM - 11:15 AM

Room C

Biology and Biochemistry

Structural Conversion in Ebola Virus Protein VP40.

Jeevan GC

VP40 is one of the seven proteins encoded by Ebola virus genome. It has an extraordinary ability to transform between various structures. It's butterfly shaped dimer is useful in membrane trafficking, hexamer form the viral matrix, and octamer preserves the RNA material. We used molecular dynamics simulation study and elucidated some important interactions that are important in its structural transformation. The high fatality of Ebola virus with low number of genes is associated with theses conformational changes and are also labelled as "Transformer Proteins". Computational simulations is a very useful tool in understanding biological molecules. Many of the important thermodynamic and statistical properties studied using simulations will help experimentalist to focus on specific part of protein molecules. We were able to identify some major salt bridges in between domain of Ebola monomer. These salt bridge identified played a major role in formation of virus like particles and membrane localization, which were verified experimentally.

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Room C

Biology and Biochemistry

Scanning Ion Conductance Microscopy for living cell membrane potential measurement

Namuna Panday

Recently, the existence of multiple micro-domains of extracellular potential around individual cells have been revealed by voltage reporter dye using fluorescence microscopy. One hypothesis is that these long lasting potential patterns play a vital role in regulating important cell activities such as embryonic patterning, regenerative repair and reduction of cancerous disorganization. We used multifunctional Scanning Ion Conductance Microscopy (SICM) to study these extracellular potential patterns of single cell with higher spatial resolution. To validate this novel technique, we compared the extracellular potential distribution on the fixed HeLa cell surface and Polydimethylsiloxane (PDMS) surface and found significant difference. We then measured the extracellular potential distributions of living melanocytes and melanoma cells and found both the mean magnitude and spatial variation of extracellular potential of the melanoma cells are bigger than those of melanocytes. As compared to the voltage reporter dye based fluorescence microscope method, SICM can achieve quantitative potential measurements of non-labeled living cell membranes with higher spatial resolution.

Oral Presentations
Monday, March 28, 2016

11:45 AM - 12:00 PM

Room C

Biology and Biochemistry

High Resolution Melt analysis of DNA methylation to discriminate semen in biological stains

Joana Antunes

In forensic sciences there has been an increase in research that focuses on determining new methods capable of accurately discriminate body fluids. Our research aims to use differences in DNA methylation patterns to discriminate body fluids. DNA methylation is a natural process in the mammalian genome which involves the addition of a methyl group to the 5'carbon of cytosines in a dinucleotide cytosine-guanine (CpG) and regulates gene activation/ silencing. (1) Bisulfite PCR is a useful method used to determine relative levels of DNA methylation. In this procedure unmethylated cytosines are chemically converted to uracil which are copied as thymines during amplification while the methylated cytosines are protected from conversion. The resulting PCR product will be high in GC content and therefore will have higher melting temperature for a methylated locus when compared to unmethylated locus. (8-10) The differences in melt temperatures can be analyzed using high resolution melt (HRM). (11) Blood, buccal swabs and semen samples were collected from volunteers according to IRB-13-0555 from FIU. DNA was extracted using the BioRobot® EZ1 automated workstation (Qiagen, CA) according to the manufacturer's specifications. Fifty nanograms of DNA were bisulfite modified using the EpiTect® Fast DNA Bisulfite Kit (Qiagen, CA) according to manufacturer's instructions. Samples were diluted pre- and post- bisulfite modification for sensitivity studies and the ability to amplify only bisulfite-modified samples was tested. Reactions were performed using the Epitect® HRM kit (Qiagen, CA) with primers specific for ZC3H12D (12) on a Rotor Gene 6000 real time machine (Qiagen, CA). Our results show that the melt curve for semen show t a lower TM (75.5 ± 0.2 ºC) when compared to blood and saliva (78.2 ± 0.4 ºC and 78.1 ± 0.3 ºC, respectively) using only 1 ng of DNA. Moreover when DNA is not No amplification was observed when non-bisulfite modified DNA was used, attesting the primer's specificity for bisulfite-modified templates. In conclusion, the use of high-resolution melt analysis can allow forensic laboratories to identify semen from other body fluids. Our work presents a cost effective and reliable method to discriminate semen from blood and saliva using low amounts of DNA.

Oral Presentations
Monday, March 28, 2016

12:00 PM - 12:15 PM

Room C

Biology and Biochemistry

Enzyme Functionalized Pt Nanowires for Enhanced Electrochemical Sensing of Lactate

Sohini RoyChoudhury

Lactate is an integral molecule in the anaerobic energy system of humans, chiefly considered as a biomarker for tissue oxidative stress. Heavy workout, sepsis, trauma, and cancer cause excess production of lactate in bio-fluids including sweat. Hence, monitoring of lactate levels in the body is integral part in clinical emergencies, sports field and general medicine. An enzymatic electrochemical biosensor comprising lactate oxidase immobilized with self-assembled monolayer on metal nanostructures has been developed in this work for continuous monitoring of lactate. As the enzymatic oxidation of lactate proceeds through hydrogen peroxide formation, platinum (Pt) nanowires were tested for electrochemical oxidation/reduction of hydrogen peroxide. Results show that the Pt nanowires has high sensitivity and low detection limit for hydrogen peroxide detection. Due to the remarkable analytical advantages of Pt nanowires, it was used as a suitable platform to construct the lactate biosensor using the enzyme lactate oxidase.

Oral Presentations
Monday, March 28, 2016

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Room C

Biology and Biochemistry

DNA base lesions and base excision repair modulate the epigenetic stability of breast cancer 1 (BRCA1) gene

Zhongliang Jiang

DNA methylation and demethylation play crucial roles in regulating gene expression. Recent studies have indicated that methylation at the 5-position of a cytosine in CpG islands in gene promoter regions may be altered by DNA damage. However, the mechanisms underlying the epigenetic instability caused by DNA damage remains unknown. In this study, we explored the effects of the oxidative DNA damaging agent chromate on the DNA methylation pattern in the promoter and transcribed region of a tumor suppressor gene, breast cancer 1 (BRCA1) gene. We discovered that chromate disrupted the normal DNA methylation pattern of BRCA1 gene by inducing new methylation sites at some CpGs, while removing methylation at the other CpGs. Interestingly, chromate also induced point mutations at CpGs including G:G and A:G mismatch mutations. We found that DNA polymerase β (pol β), the key enzyme of DNA base excision repair, was involved in the production of the mutations by binding to the BRCA1 gene promoter and transcribed regions. Further characterization of pol β DNA synthesis in the region of the BRCA1 promoter indicated that the polymerase misincorporated nucleotides during BER in the context of CpGs, thereby leading to G:G and A:G mismatches. Our results demonstrate that chromate induces mutations at CpG clusters in the BRCA1 promoter and transcribed region through pol β nucleotide misinsertion. We further suggest that a crosstalk between BER and DNA methylation mediates disruption of DNA methylation induced by oxidative DNA damage.

Oral Presentations
Monday, March 28, 2016

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Room C

Biology and Biochemistry

Folding pathways of the DNA binding protein HMGA2: AT-hook peptide-DNA complexes

Alyssa Garabedian

The mammalian high mobility group A2 protein, HMGA2, houses three motifs that preferentially bind short stretches of AT-rich DNA regions. These DNA binding domains, known as "AT-hooks", are traditionally characterized as being unstructured. Upon binding to substrates they form ordered assemblies. It is this disordered-to-ordered transition that has implicated HMGA2 as a protein actively involved in many biological processes. Additionally, it is the abnormal expression of HMGA2 which has been linked to a wide variety of health problems including diabetes, obesity and oncogenesis. By studying the interaction between the AT-Hook domains and DNA, it is possible to gain a better understanding of the interactions that define the kinetic intermediates and the guiding factors that influence the folding pathway of the DNA-protein complex formation. In the present work, we evaluated the conformational changes and DNA-complex formation of the three AT-hook peptides of HMGA2. Studies were performed using Trapped Ion Mobility Mass Spectrometry coupled to Mass Spectrometry (TIMS-MS). This method is used as a gas-phase, structural characterization technique, which allows for high-resolution measurement (R = 100-250) of ion-neutral collisional cross-sections (CCS) of conformational/kinetic intermediates based on size, charge, and mass as a function of the time after desolvation. In combination with molecular dynamic (MD) simulations candidate structures are proposed for the AT-hook peptide conformational motif and AT-hook – DNA complexes observed. This methodology allows, for the first time, the prediction of the kinetically trapped intermediates that define the folding pathways of the AT-hook DNA binding peptides.

Oral Presentations
Monday, March 28, 2016

1:00 PM - 1:15 PM

Room C

Biology and Biochemistry

Proliferating Cell Nuclear Antigen Prevents Trinucleotide Repeat Expansion by Promoting Hairpin Removal

Beaver Jill

Endogenous and environmental stress lead to the formation of DNA base lesions, which are repaired in cells through DNA base excision repair (BER). BER within trinucleotide repeat (TNR) tracts can result in repeat expansions, which are linked to over 40 human neurodegenerative diseases. This instability results from the formation of non-B form DNA secondary structures and the resulting loss of coordination between BER enzymes. Inefficient flap endonuclease 1 (FEN1) 5'-flap cleavage during BER causes TNR expansions, and repeated cycles of inefficient BER result in cumulative expansions and onset of disease. However, the molecular mechanisms underlying TNR instability and mechanisms by which cells prevent TNR expansion remain to be elucidated. Proliferating cell nuclear antigen (PCNA) is a cofactor that plays a crucial role during DNA replication and BER by stimulating the activity of FEN1. However, it is unknown whether PCNA has any stimulatory effects on FEN1 cleavage of a TNR-containing flap to prevent TNR expansion during BER. In this study, we explored the effects of PCNA on CAG repeat stability and FEN1 cleavage activity during BER of a lesion located within a duplex CAG-repeat tract, as well as within the loop region of a CAG-repeat hairpin, through reconstitution of BER and in vitro enzymatic assays using synthesized DNA oligonucleotides. We found that PCNA stimulated FEN1 flap cleavage during BER of a lesion located in a hairpin loop, but failed to affect FEN1 activity during BER in a TNR duplex. This indicated that PCNA promoted efficient BER and the formation of unexpanded products during BER in a hairpin loop by facilitating removal of the hairpin. We conclude that the effects of PCNA on TNR stability are dependent on the location of a lesion, with the structure of a TNR tract governing the outcome of the PCNA-FEN1 interaction. Thus, we show that PCNA stimulates TNR hairpin removal during BER in the hairpin loop, preventing the TNR expansions associated with the onset of neurodegenerative disease. Determining the role of BER proteins and cofactors in modulating TNR instability can aid in the identification of novel targets for the therapeutic treatment of this family of diseases.

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Room C

Biology and Biochemistry

Drug Candidate Discovery: Targeting Bacterial Topoisomerase I Enzymes for Novel Antibiotic Leads

Shayna Sandhaus

The global community is facing a crisis—antibiotics are often ineffective due to the emergence of multi-drug resistant bacterial pathogens. The need for new antibiotics acting against novel bacterial cell targets is dire. Bacterial topoisomerase I (TopoI) is an attractive target for new antibiotics, since it should be vulnerable to bactericidal topoisomerase poison inhibitors in every bacterium, and its function is known to be required for the survival of certain bacterial pathogens including Mycobacterium tuberculosis. Selective and potent inhibitors of bacterial TopoI can be useful as new antibiotic leads. Bacterial TopoI relaxes supercoiled DNA by using its active-site tyrosine residue to attack the phosphodiester backbone of the DNA, forming a covalent intermediate and cleaving one strand of the DNA. It then passes the other strand through the break and rejoins the DNA to increase the DNA linking number by one. Catalytic inhibitors of topoisomerase I may prevent the enzyme from binding or cleaving the DNA, while poison inhibitors can stabilize the DNA-enzyme covalent intermediate, thus causing the accumulation of DNA breaks, leading to bacterial cell death. This project seeks novel inhibitors of bacterial topoisomerase I in various bacterial strains such as E. coli, M. tuberculosis, and Y. pestis. Two main assays are used to find antibacterial compounds that target TopoI—an enzyme inhibition assay (a gel-based assay that monitors the formation of relaxed DNA in the presence of inhibiting compounds), and a growth inhibition assay (an assay that monitors the growth of bacteria in the presence of topoisomerase inhibitors). Several promising compounds have been found from various screens—an in silico study has uncovered several small molecule inhibitors, and a mixture-based compound screen has revealed several polyamine inhibitors—that inhibit bacterial TopoI well, and are able to prevent bacterial cell growth as well. Specifically, many of the discovered compounds are effective against M. tuberculosis topoisomerase I, and can prevent the growth of M. smegmatis, a non-pathogenic homolog of M. tuberculosis. From our results, we can conclude that the use of diverse approaches such as in silico docking studies and mixture-based compound screening is effective at finding novel inhibitors of bacterial topoisomerase I, and may bring us one step closer to new and effective antibiotics.

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Room A

Chemistry

Decomposition Pathways during Explosive Analysis using TIMS-MS and molecular dynamics

Alan McKenzie Coe

In both ion-mobility and mass spectrometry the capability to measure the ion of interest can be directly related to their reactivity and stability. Recently our group has shown the ability to monitor the relative lifetimes of adduct complexes in the gas phase utilizing trapped ion mobility spectrometry. In trapped ion mobility-mass spectrometry (TIMS-MS), ion stability can be studied as a function of time and the local molecular environment. Interestingly the lifetimes of adduct complexes undergo exponential losses due to their reactivity with the residual gas composition. In the present work we investigate possible pathways of these neutralizing reactions. The workflow of this experiment is based on the use of TIMS-MS as a spatiotemporal "petri-dish" for the investigation of events that the ions will undergo. Theoretical calculations will also be used to determine which events are more likely to occur. Using TIMS-MS, mobility (Ko) of the complex were measured as a function of the bath gas composition and compared with theoretical candidate structures. The theoretical CCS is then compared to the experimental CCS in order to select the most likely structure. Theoretical calculations were used to probe the neutralizing reactions that are taking place within the TIMS-MS instrument. An energy profile of the reactions was calculated using the energy of the reactants, transition state, and products. Results show that the complexes formed with explosives and the anion of ammonium salts will exponentially decay when trapped within the TIMS-MS instrument as a function of the time after desolvation. The normal environment within the TIMS-MS composes of air with residual amounts of water. In order to evaluate interactions that the complex undergoes we calculate the energy of possible reactions with the complex and the molecules found in the TIMS-MS device such as adduct transfer and proton transfer. Interestingly preliminary data shows that the energy profile of some reaction pathways follows an "attachment-detachment" mechanism. In this "attachment-detachment" scheme the transition state is lower in energy than the reactants and products. We report in this work the capability to monitor the relative ion stability of a complex and evaluate reaction pathways.

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Room A

Chemistry

Localization, Identification and Quantification of Biomarkers During Cell Development

Kendra Adams

The complexity of biological matrices adds significant challenges for the mass spectrometric detection of biomarkers. Using a combination of techniques, the analysis of Dicyostelium discoideum lipid composition throughout cell development is achieved. Mass spectrometry techniques utilized include: time-of-flight secondary ion mass spectrometry (TOF-SIMS), which provides high spatial resolution and matrix assisted laser desorption ionization Fourier transform ion cyclotron resonance mass spectrometry (MALDI FT-ICR-MS) which offers high mass accuracy. In addition to traditional mass spectrometry techniques, trapped ion mobility spectrometry-mass spectrometry (TIMS-MS) affords orthogonal separation of isomeric lipid species. In addition, liquid chromatography-tandem mass spectrometry (LC-MS/MS) adds a level of quantification and confirmation. Results showed the identification of 7 different lipid sub-classes in negative ionization mode and up to 8 classes in positive ionization mode. Following a series of starvation times, small trends corresponding to changes in secondary ion (SI) yield within lipid sub-classes were observed. Isomer separation was performed using TIMS-MS and isomeric lipids were separated and subsequently identified. The present work provides necessary workflow for spatial mapping and chemical characterization the lipid content of single cells.

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Room A

Chemistry

Optimizing analytical tools for the structural characterization of bio-molecules using High resolution IMS and FT-ICR MS

Paolo Benigni

Over the last years there has been an increase in the use of ion mobility spectrometry - mass spectrometry based tools for the structural characterization of biological molecules, (eg. Peptides, proteins). The analytical platform developed in our lab enables high resolution ion mobility measurements in tandem with ultra-high mass resolution analysis of biomolecules. This allows the multiple approaches to better understand the folding pathways of proteins, by looking at hydrogen-deuterium exchange, top-down analysis, and sequencing. When fast-gas phase separation is coupled to slower MS detectors discrete sampling is required in order to achieve tandem analysis. With the rise in use of protein therapeutics is it important to understand the structures of engineered proteins and their interactions with molecules. In the study of Cytochrome C distinct folding intermediates are observed which show dependence on the charge state of the protein. In order to generate accurate ion mobility distributions, the width of the discrete IMS window was altered as well as the increment moved for every step. Results show that a sampling window of 0.5V and an increment of 0.1V allowed the highest resolution analysis of the observed distributions. Then by selecting specific ion mobility bands these were then analyzed by ECD fragmentation. This work highlights a novel methodology in the characterization of proteins.

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Room A

Chemistry

Colorimetric-Based Paper Microfluidic Devices for the Presumptive Determination of Seized Drugs

Ling Wang

A paper microfluidic device has been developed for the presumptive testing of seized drugs. The procedure involves creating hydrophilic channels on chromatographic paper using wax printing and thermal lamination. A different colorimetric reaction occurs within each channel, permitting the multiplexed detection of a variety of different compounds, including cocaine, opiates, ketamine, and various phenethyl amines. Furthermore, the linear orientation of the lanes permits a series of reactants to be isolated in a sequential fashion, enhancing shelf life. The reagents are activated through interaction with the analyte as the solvent front moves up each channel. The resultant device was characterized for sensitivity and tested with a variety of common interferences and drug diluents. Due to its low cost and convenience, it should prove a useful tool for screening seized drugs.

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Room A

Chemistry

Characterization of kinetically trapped intermediates of Microperoxidase-11 using TIMS-MS/MS and molecular modeling

Jacob Porter

High Resolution Mass Spectrometry and collisional cross-section analysis using Trapped Ion Mass Spectrometry (TIMS) can be used to investigate the folding dynamics and fragmentation of Microperoxidase-11, a heme-bound peptide derived from cytochrome C. Structural changes influence the binding of the imidazole ligand to the central iron of the heme, which gives insight into the mechanism of ferriheme proteins. Altering the pH value can influence both the charge state of the molecular ion as well as the conformation. Ion neutral CCS values were obtained from a custom- built nanoESI source coupled to a Maxis Impact TIMS-quadrupole time-of-flight instrument (TIMS-Q-TOF). Singly, doubly and triply-charged molecular ions were isolated at various pH values. Protonation sited were proposed for each charge state. 16 distinct bands were seen, and candidate structures were proposed for each. These bands changed in intensity over time at different pH values, indicative of conformational pathways. Root mean square deviation (RMSD) values between conformations were calculated with molecular dynamic modelling to assess these conformational pathways as a function of time after desolvation. High resolution mass spectrometry information was obtained on a custom-made Bruker Solarix 7.0 Fourier Transform Ion Cyclotron Resonance-Mass Spectrometer (FTICR-MS). MS/MS data were obtained using collision-induced dissociation (CID). Singly and doubly charged ions were seen, and fragmented to give daughter ions. These were assigned to the heme group and charged amino acid species. Confirmation of several of these fragments was obtained in the TIMS-Q-TOF. This is the first time that TIMS-MS/MS, high resolution mass spectrometry and molecular modelling have been used to investigate the folding dynamics of microperoxidase-11 as a function of solvent conditions.

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Room A

Chemistry

A Cooperative-Binding Split Aptamer Assay for Rapid, Specific and Ultra-Sensitive Fluorescence Detection of Cocaine in Saliva

Haixiang Yu

Background: Cocaine is one of the most abused drugs in the world. The identification and detection of cocaine is an urgent task for the guarding of social justice, public health and safety. Sensors employing split aptamers that reassemble in the presence of a target can achieve excellent specificity, but the accompanying reduction of target affinity mitigates any overall gains in sensitivity. Objective: To perform inexpensive, one-step, rapid and ultra-sensitive detection of cocaine in oral fluid samples, we here engineer a split aptamer and use this aptamer to perform cooperative binding based fluorescence for the detection of cocaine in oral fluid within 10 min at room temperature. Methods and Results: In this work, we for the first time have developed a split aptamer that achieves considerably enhanced affinity through cooperative target binding. Two binding domains are incorporated into a split cocaine-binding aptamer, such that target recognition at one domain greatly increases the affinity of the second domain. We experimentally demonstrate that the resulting cooperative binding split aptamer (CBSA) exhibits higher target binding affinity and is far more responsive in terms of target-induced aptamer assembly compared to split aptamers containing a single binding domain. Using this CBSA, we develop a novel assay that achieves specific, ultra-sensitive, one-step fluorescence detection of cocaine within ten minutes at concentrations as low as 50 nM in 10% saliva without signal amplification. Conclusion: This limit of detection of the CBSA based assay is 200-fold better than a reported single-domain, split aptamer assay based on the similar sensing platform. Importantly, our CBSA-based assay demonstrates sensitive and reproducible cocaine detection in actual clinical samples, with a limit of detection of 50 nM in 10% saliva—mirroring the cut-off value recommended for such assays by the European Union's Driving under the Influence of Drugs, Alcohol and Medicines program. Significance and Broader Impacts: Our results clearly demonstrate the potential of CBSA-based assay for on-site detection of cocaine. The aptamer based assay has advantages compared with current immunoassays including less costly, better stability and minimal batch-to-batch variation. As a general platform, new CBSA-based assays can be easily developed from other aptamers.

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Room A

Chemistry

A Label-Free Aptamer-Fluorophore Assembly for Highly Sensitive and Specific Detection of Cocaine

Daniel Roncancio

We have developed a rapid and specific aptamer-based method for one-step cocaine detection utilizing the cocaine-mediated displacement of the fluorophore ATMND from the anti-cocaine aptamer 38-GC. We obtained a linear range of 0–8 uM and a limit of detection (LOD) of 200 nM within 20 s. The LOD was 50-fold better than most existing aptamer-based systems and comparable to sensitive assays that require enzymatic amplification. Upon the successful demonstration of the sensor platform, we validated the assay using different sample matrices including different beverages (tea, soda, Gaterade, and various alcoholic drinks) and biofluids (urine, serum and saliva). The results showed that the assay obtained LODs of 460, 900 and 520 nM in 2.5% urine, 2.5% serum and 5% saliva, respectively. The LODs are equivalent to 18.4, 36 and 10.4 ?M in undiluted urine, serum and saliva, respectively. The assay also demonstrated high target specificity against the major cocaine metabolite, benzoylecgonine.

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Room A

Chemistry

Ambient Filtration Method to Rapidly Prepare Highly Conductive, Paper-Based Porous Gold Films for Electrochemical Biosensing

Bhargav Guntupalli

Thin gold films offer intriguing material properties for potential applications including fuel cells, supercapacitors, electronic and photonic devices. We describe here an ambient filtration method that provides a simple and novel way to rapidly generate porous and thin gold films without the need for sophisticated instruments, clean-room environments, any post-growth process or sintering steps. Using this approach, we can fabricate highly conductive gold films composed of gold nanoparticles layered atop a matrix of metallic single-walled carbon nanotubes on mixed cellulose ester filter paper within 20 minutes. These hybrid films (thickness ~40 nm) exhibit fast electron transfer and excellent electrocatalytic properties that are similar to purchased gold films, but with a larger electroactive surface that lends itself to more sensitive analyte detection. We used the neurotransmitters dopamine and serotonin as benchmark analytes to demonstrate that our hybrid gold films can clearly discriminate the presence of both molecules in a mixture with resolution that greatly exceeds that of either purchased gold slides or electrodeposited gold films. Importantly, we believe that this new approach could readily be generalized for the rapid fabrication of films from various other metals under ambient conditions, and could also be used as a prelude to transferring the resulting films onto glass or other flexible substrates.

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Room A

Chemistry

Scalar toq quark search with CMS detector

Yagya Joshi

We present our latest results on squarks production in fully hadronic final states using proton-proton collision data corresponding to 2.1fb^-1 Run II at 13 TeV collected with the CMS detector at the LHC. We search for squarks that decay directly to neutralinos and top quarks in multi-jet events with large missing momentum. Sensitivity to the potential signal, over a range of scalar-top and neutralino masses is obtained by selecting events into bins with large missing momentum, MT2, the number of bottom quark and all-hadronic top quark selected with a top-quark tagger.

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Room A

Chemistry

Phase diagram for a nano-yttria-stabilized zirconia system

Mohammad Asadikiya

Due to the attractive properties of nanoparticles because of their effective surface area, they have been studied widely. Nano-yttria-stabilized zirconia (n-YSZ) is a ceramic which has been scrutinized extensively in past years. Because of the different stability behavior of n-YSZ in comparison with bulk YSZ, a new phase diagram is needed for the n-YSZ system in order to identify stable phases under various conditions. In this study, a phase diagram for the n-YSZ system was provided to determine phase stability ranges at room temperature with respect to particle size and composition. The calculation of phase diagrams (CALPHAD) approach was applied to calculate the Gibbs energy of bulk YSZ. It was combined with the surface energy of each phase in the n-YSZ system, i.e. monoclinic, tetragonal, cubic, and amorphous, to produce the total Gibbs energy of each individual phase of the n-YSZ system. By applying the CALPHAD approach, a 3-D phase diagram for the n-YSZ system was established in which the stability range of each individual phase can be predicted based on the particle size, composition, and temperature.

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Room A

Chemistry

H I Structure and Kinematics in the LITTLE THINGS Dwarf Galaxies

Nau Raj Pokhrel

We present a catalog and analysis of the properties of neutral hydrogen gas (H I) holes/shells in the LITTLE THINGS (Local Irregulars That Trace Luminosity Extremes, The H I Nearby Galaxy Survey) galaxies. LITTLE THINGS uses high angular resolution (~6''), high spectral resolution (≤ 2.6 km s–1), and high sensitivity (≤ 1.1 mJy beam–1 channel–1) H I observations of 41 nearby (≤ 10.3 Mpc) gas-rich dwarf galaxies. We are interested in dwarf galaxies because they are the most common types of galaxies in the local universe and they are believed to be the first galaxies to form in the universe. Here we study the interaction between star formation evolution and the interstellar medium from which stars form. In the sample, we detected 306 holes with sizes ranging from about 38 pc to 2.3 kpc, the expansion rates varying from 5 to 30 km s–1, and the estimated kinetic age varying from 1 Myr to 127 Myr. The distribution of the holes per unit area is found nearly constant both inside (51%) and outside (49%) of the V-band break radius. We derived surface and volume porosity and found that porosity doesn't correlate with star formation rate (SFR) for the LITTLE THINGS sample. Assuming that the holes are formed from the stellar feedback, we calculated the supernova rate (SNR) and the SFR. The relation between the SFR from the holes shows consistency with Hα star formation tracer. The relation between the estimated kinetic ages of the holes with the SNR gives the indication of the star formation history.

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Room B

Earth and Environmental Sciences

Assessment of the severe weather preparedness in the construction sites

Michelle Chávez

Civil infrastructure construction sites including incomplete structures and unsecured resources (e.g., materials, equipment, and temporary facilities) are among the most vulnerable environments to severe weather conditions. Inclement weather (e.g., heavy wind, storms, hurricanes, or tornadoes) driven damages cause disruption of construction sites and considerable schedule delays, and thus negatively impact the efficiency of the construction projects. For example, 2012 Hurricane Sandy caused over $185 million worth of damage to the World Trade Center construction site in New York City. This research aims to study current best practices on securing construction sites from severe weather conditions and evaluate the performance of the preparedness plan. To do that, first, a survey will be conducted with key project personnel from multiple construction companies to understand current operational protocols and best practices at construction sites. Then, the collected data will be statistically analyzed to create a tool or method that measures and controls the preparedness performance of construction companies. For further analysis, a Balanced Scorecard will be used to evaluate each company's preparedness plans in terms of the following four perspectives: (1) the Business Process Perspective, (2) the Learning & Growth Perspective, (3) the Customer Perspective, and (4) the Financial Perspective. This will enable practitioners to integrate the construction companies' experiences as factors that finally allow monitoring their future performance on disaster preparedness. The findings from this research have potential to help better understand the extent to how the as-is construction sites are vulnerable to severe weather conditions. This will improve the process of construction site disaster preparedness, which ultimately enhance construction site disaster resilience by generating new and highly specific knowledge on disaster mitigation and preparedness guidelines.

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Room B

Earth and Environmental Sciences

Assessment of Sea-Level Rise Adaptation in Coastal Infrastructure Systems: Robust Decision-Making under Uncertainty

Mostafa Batouli

Sea-level rise is one of the most concerning and costly effects of climate change. Resulting sea-level rise impacts may include failure or destruction of infrastructure, immobilization due to transportation system breakdown, and catastrophic saltwater contamination of water supplies. The problem of sea-level rise adaptation is characterized by deep uncertainty that makes it complex to evaluate the economic value of adaptation investments. The key element to evaluate the effectiveness of adaptation strategies is to quantify the long-term cost of physical networks under uncertain sea-level rise scenarios. In this paper, a simulation framework is created and tested to investigate the long-term impacts of sea-level rise on infrastructure systems in order to evaluate the effectiveness of various adaptation strategies. To this end, the transformation of infrastructure systems under various scenarios of sea-level rise and adaptation strategies is modeled using the proposed simulation framework. Then, the impacts of sea-level rise are determined in terms of the life cycle costs of infrastructure networks. These estimated costs are used for evaluating the feasibility of various adaptation strategies under future uncertain sea-level rise scenarios. The application of the proposed simulation framework is shown in a case study of a road network using the sea-level rise scenarios in Southeast Florida. The results of the analysis are threefold: (1) prioritization of infrastructure assets for adaptation investment; (2) identification of the right timing of adaptation investments for different links in an infrastructure network; and (3) evaluation of the present value of adaptation investments for the entire network. The results enable more informed decision-making in order to implement robust adaptation under uncertain sea-level rise scenarios.

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Room B

Earth and Environmental Sciences

Investigating the effect of hurricane shutters on wind induced loads on window surfaces and the wind driven rain through experimental studies

Mohammadtaghi Moravej

In the event of a storm that normally includes high wind speeds and rain, damage to a window can occur if the wind loads exceed the design loads of the window. This damage can result in increased internal wind induced pressure that can increase the uplift forces on the building roof, besides wind driven rain (WDR) intrusion into the building causing damage to the building interior. For many years, shutters fixed to a window have been thought to reduce wind induced loads on the window and protect them from wind borne debris. The present paper focuses on an experimental investigation of these issues through large scale testing at the Wall of Wind (WOW) experimental facility at Florida International University (FIU), USA. Two types of shutters, namely: shutters with bracket and shutters without bracket were considered for wind directions varying from 0 to 90 degrees. For each of these cases, the mean and peak pressure coefficients were measured on the exterior and interior surfaces of the window and surrounding wall, as well as the volume of water that accumulated inside the building. Results show that the peak pressure coefficients on the window do not change markedly for cases with and without the shutter. However, the shutter greatly helps in preventing WDR intrusion into the building for all the cases tested. Future research in this area devoted to the effect of window size and multiple wall openings is needed.

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Room B

Earth and Environmental Sciences

Innovative Hurricane-Resistant Roof System

Ehssan Amir Sayyafi

Flat roofs experience high wind suction due to the flow separation taking place at the corner. As wind blows across the roof, corners are subjected to higher suction. Roofs are the most vulnerable building components that often get damaged during extreme wind events, cause extensive interior damage and lead to noteworthy disturbance of services. An innovative wind-resistant composite roof structure is engineered for commercial, industrial, and multistory residential buildings to withstand high wind uplift pressures during hurricanes and other windstorms, based on the most stringent wind design code provisions in the United States, namely the High Velocity Hurricane Zones provisions in the Florida Building Code (FBC). A finite elements (FE) model was developed to determine the shape and ascertain the size of the roofing system with the purpose of maximizing the structural performance against high- wind pressures while minimizing the weight of the system. FE analyses resulted in an optimal, balanced and strong lightweight multicell panel made of Ultra High Performance Concrete (UHPC) reinforced with high strength steel (HSS). This study will make significant contributions towards enhancing the hurricane resistance of buildings in vulnerable coastal communities. The implementation of this modern system would potentially reduce the risks to buildings during natural disasters, and subsequently mitigate the social impacts of insurance industry on residents of the hurricane prone US regions. This presentation reports on the experimental results of flexural tests of box-cell and multicell specimens under positive and negative bending. A set of box-cell and multicell specimens were fabricated and tested in four-point positive and negative bending to assess the flexural behavior, deformation, ductility and shear capacity. During the tests, strains, deformations, and crack propagation were monitored, and results were compared at both the ultimate and service limit states. Test results clearly showed that the proposed roofing system successfully met the expectations and code requirements for a 20-ft long span, under both downward and uplift pressures.

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Earth and Environmental Sciences

Multi-scale testing to evaluate the performance of standing seam metal roofs under simulated wind loading

Filmon Habte

The current methods for evaluating the adequacy of metal roofs in withstanding wind-induced loads involve undertaking uniform uplift pressure tests (such as the ASTM E1592 test). These methods may not be truly representative of real conditions, and might set higher minimum design requirements than necessary in some cases, and in others they could underestimate effects of localized peak pressures. This research work presents results of a multi-scale experimental study conducted under more realistic wind loading in Florida International University (FIU) Wall of Wind (WOW) facility. The research objectives were to (i) measure and compare the uplift roof pressure experience by different types of mono-sloped standing seam metal roofs, and (ii) evaluate their performances under high winds, and compare the deflections and failure modes observed under more realistic wind loading to uniform loading tests. Two types of standing seam metal roofs, namely trapezoidal and vertical leg were studied. Significantly higher pressures and deflections were recorded on the trapezoidal roof. In a follow-up large scale experiment on a trapezoidal standing seam roof model showed that roof panel profile and perimeter eave attachments can significantly affect uplift pressures. The ASTM E1592 test protocol was observed to produce higher deflections and more conservative failure wind speeds than those experienced in the current tests. However, entirely different failure modes were observed between the uniform and dynamic tests. This was attributed to wind-induced vibrations that were observed in the current tests that are not present in the ASTM E1592 test, which is entirely static. The current research results may suggest future directions to enhance the existing testing standards.

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Earth and Environmental Sciences

Maximizing Environmental Sustainability and Public Benefits of Highway Construction Programs

Charinee Limsawasd

The recently-issued regulations and laws passed in the United States put a very intense effort on state highway agencies to promote the environmental sustainability in highway rehabilitation decision making. This leads a pressingly need to add a new paradigm in the existing ad-hoc and need-based practice of highway rehabilitation programming and optimization. Accordingly, decision makers are stimulated to implement both cost-effective and environmental-friendly rehabilitation treatment programs. This paper presents the development of a new model for planning highway rehabilitation efforts in order to minimize environmental impact in terms of CO2 emissions and simultaneously maximize net public benefits under budget constraints. The developed model provides the capabilities of: (1) identifying candidate rehabilitation treatment alternatives to aging pavement; (2) forecasting the impact of treatment implementation on pavement performance; (3) evaluating the impact of rehabilitation decisions on the environmental impact; (4) estimating the cost of travel delay due to the construction operations; (5) measuring the expected savings in road user costs as a result of highway rehabilitation implementation; and (6) optimizing rehabilitation decisions to identify optimal rehabilitation program(s) that is capable of minimizing environmental impact while maximizing net public benefits. The model is applied to an application example to evaluate the performance and capabilities in generating optimal tradeoffs between CO2 emissions and net public benefits of highway rehabilitation efforts. This enables planners and decision makers in selecting and implementing the programs that serve both cost-effective and environmental sustainability goals.

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Room B

Earth and Environmental Sciences

A Numerical Model Approach to Assess Saline Water Intrusion in a Hypothetical Coastal Aquifer

Amirmasoud Hamedi

Needs for freshwater supplies has commonly brought much stress on aquifers due to saline intrusion around the world and due to excessive pumping of precious groundwater to provide safe drinking water to growing population in communities around the world. Also, sea level rise aggravates the problem as oceanic water encroaches in fresh groundwater. Salt water intrusion affects water quality making the water unsuitable for consumption or forcing costly treatment that communities may not be able to afford. The purpose of this study was to demonstrate the capability of advanced numerical modeling to estimate salt water intrusion in confined coastal aquifers that are actively pumped. The study shows the opportunity to assess ways to control saltwater intrusion in support of decision-making. A complex numerical model, SEAWAT in GMS that includes MODFLOW and MT3DMS models, is then herein used in mathematical simulations. A setting whereby impermeable wall(s) and injecting well(s) interact to reduce intrusion is developed with dimensionless parameters. Results suggest that, for instance, depending on site characteristics and conditions, a barrier established by an impermeable wall and an injecting well (working together) can perform as an effective hydraulic control of saline intrusion and, consequentially, protect the quality of a freshwater aquifer.

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Room B

Earth and Environmental Sciences

Corrosion Behavior of Steel in Deficient Grout with Enhanced Sulfate Ion Concentrations

Kondakrishnamurthy Krishnavigneshwaran

Severe corrosion of post-tensioned tendons in Florida bridges utilizing pre-packaged thixotropic grout products were documented. In those cases, conventional causes of steel corrosion in tendons were not consistent with corrosion development. Good correlation between the presence of deficient grout, corrosion development, and enhanced sulfate ion concentrations was observed. An update on laboratory testing of steel wire in sulfate solutions representative of deficient grout pore water is presented. The test setup was made to determine if sulfates in alkaline solutions can depassivate steel or if the early presence of sulfates in alkaline solution may provide conditions that would adversely affect stable passive film formation. In the open circuit potential condition for pH 12.5 and 13 solutions, sodium sulfate concentrations as high as 65,000 ppm did not show the ability to depassivate steel. Sodium sulfate concentrations as high as 20,000 ppm in pH 13 solution did not show indication to destabilize passive film growth, but destabilization of passive film growth resulting in severe corrosion occurred in the presence of 20,000 ppm sodium sulfate in pH 12.5 solution. Tests in pH 12.5 sulfate solution resulted in active corrosion or localized pitting corrosion. Sulfate levels associated with corrosion development was consistent to ranges reported in the literature.

Keywords: Post-Tension, Grout, Sulfate, Deficient, Corrosion

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Room B

Earth and Environmental Sciences

Assessment of CBPC coating in wet exposure

Md Ahsan Sabbir

Coating systems for corrosion mitigation of structural steel in marine bridge applications have been widely used. Durability, cost, and environmental issues remain important and new coating technologies are available for possible application for marine bridges. Assessment of the performance and condition of the coating in aggressive environments provide bridge owners information to determine appropriate maintenance for the structures. The presented work focuses on the performance evaluation of chemically bonded phosphate ceramic (CBPC) coatings in neutral pH solutions (with and without chloride) which provided an aggressive bridge environments analogous to coatings exposed to wet environments (e.g. pooled runoff water). Earlier outdoor exposure tests of CBPC in high humid conditions indicated degradation of the coating that allowed sufficient oxygen and moisture penetration. Indeed, enhanced undercoating surface oxidation, which increased with time, was apparent. To justify the degradation mechanism of the coating system in wet conditions, electrochemical tests including open circuit potential, linear polarization resistance (LPR) and electrochemical impedance spectroscopy (EIS) were performed. CBPC coated steel coupons in as-received and scribed conditions were tested. The conventional interpretation of the impedance response of a coated metal interface was assumed as a first approach to evaluate possible degradation, and an equivalent circuit analog was used to fit the impedance data to the physico-electrochemical parameters associated with that system. The parameters (solution resistance, pore resistance, polarization resistance and capacitance) resolved from the impedance spectroscopy for samples immersed in solution were correlated to system parameters associated with coating degradation and corrosion.

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Room B

Earth and Environmental Sciences

Evaporation and Emulsification of oil spills over Florida Coast

Yueqian Cao

Meteorology and Sea Surface Temperature (SST) data, along with 2 numerical models, were utilized to study the evaporation and emulsification processes of oil spills, based on their organic chemical properties, over Florida Coast. The results showed that SST promotes spilled oil evaporation obviously and organic chemical properties have significant impact on the relationship between evaporation rate and SST, which becomes more and more nonlinear as carbon atoms increase at which boiling points rise too, but evaporation rates decrease. Besides, both at day and night, spilled oil's emulsification slows with time linearly; however, at night, because of the larger wind speed, more water fraction will result in less emulsification. As for the coastal special conditions, due to the interaction of sea current and wind, the spread of oil is uncertain and random, which becomes a difficulty of research field where main research method is still numerical modeling.

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Room B

Earth and Environmental Sciences

Assessing environmental drivers of DOC fluxes in the Shark River estuary: Modeling the effects of climate, hydrology and water management

Peter Regier

Urban and agricultural development of the South Florida peninsula has disrupted freshwater flow in the Everglades, a hydrologically connected ecosystem stretching from central Florida to the Gulf of Mexico. Current system-scale restoration efforts aim to restore natural hydrologic regimes to reestablish pre-drainage ecosystem functioning through increased water availability, quality and timing. However, it is uncertain how hydrologic restoration combined with climate change will affect the downstream section of the system, including the mangrove estuaries of Everglades National Park. Aquatic transport of carbon, primarily as dissolved organic carbon (DOC), plays a critical role in biogeochemical cycling and food-web dynamics, and will be affected both by water management policies and climate change. To better understand DOC dynamics in these estuaries and how hydrology, climate and water management may affect them, 14 years of monthly data collected in the Shark River estuary were used to build a DOC flux model. Multi-variate methods were applied to long-term data-sets for hydrology, water quality and climate to untangle the interconnected environmental drivers that control DOC export at intra and inter- annual scales. DOC fluxes were determined to be primarily controlled by hydrology but also by seasonality and long-term climate patterns. Next, a 4-component model (salinity, inflow, rainfall, Atlantic Multidecadal Oscillation) capable of predicting DOC fluxes ($R2=0.78$, $p<0.0001$, $n=161$) was established. Finally, potential climate change scenarios for the Everglades were applied to this model to assess DOC flux variations in response to climate and restoration variables. Although global predictions anticipate that DOC export will generally increase in the future, the majority of scenario runs indicated that DOC export from the Everglades is expected to decrease due to changes in rainfall, evapotranspiration, inflows and sea-level rise.

Oral Presentations
Monday, March 28, 2016

3:45 PM - 4:00 PM

Room B

Earth and Environmental Sciences

Vertical Distribution of Living (Stained) Benthic Foraminifera in the Everglades, South Florida, USA

Zoe Verlaak

This study quantifies the influence of deep-dwelling benthic foraminifera on down-core foraminiferal samples for their use in reconstructing paleoenvironments of the Everglades, a habitat threatened by sea-level rise and saltwater intrusion. Inferring environmental preferences of subfossil foraminiferal assemblages entails making the assumption of similarity to modern distributions. Studying modern distributions commonly involves sampling the upper 1 cm of sediment. However, infaunal species can live at greater depths, which can form issues when abundances are large or when different species assemblages occur at these depths compared to the surface sediment. Deeper infaunal individuals will eventually also end up in the subfossil record, but will be overlooked when collecting recent samples that contain only the upper 1 cm of sediment. Therefore, one needs to have a thorough understanding of the vertical distribution and abundances of living (stained) benthic foraminifera before making interpretations based on modern foraminiferal surface assemblages. To study the vertical distribution, we collected eight 30-cm-long surface cores using a 5-cm-in-diameter Russian corer from four sites along the Shark River (west coast) and a 13-cm-long core at Garfield Bight (south coast). The Garfield Bight core was sampled every 1 cm, the other cores were sampled every 1 cm down to 10 cm, then with intervals of 2, 4, or 5 cm, and preserved in an 85% buffered alcohol solution. Each sample was stained overnight with rose Bengal, rinsed over nested screens of 2.80 mm and 63 µm, and split into subsamples using a wet splitter. Live (stained) individuals were picked and sorted onto slides for identification, while dead individuals were counted according to wall type. Preliminary results show that for Garfield Bight, the top 1 cm of sediment contains 0.94% of live foraminifera. Deep infaunal live foraminifera occur sparsely at greater depths, e.g., at 12-13 cm and 11-12 cm, where they make up <0.2% of the total (live + dead) assemblage. The final results will determine if large abundances of live individuals occur at greater depths, as well as which species occur alive at different depths, to improve accuracy in interpreting Everglades paleoenvironments.

Oral Presentations
Monday, March 28, 2016

4:00 PM - 4:15 PM

Room B

Earth and Environmental Sciences

Production of Omega-7 from Lake Okeechobee Alkaliphilic Algae

David Erwin Berthold

Incorporating renewable fuels into practice is a promising approach of reducing fossil fuel dependency. A major component of renewable energies are biofuel derived from microalgae feedstock. Microalgae are an exceptional feedstock since they have abundant biomass and oils that can be converted and used in the current fuel production infrastructure. Achieving goals of producing algae fuels at large scale involves developing a better control over microalgae cultivation. Manipulating cultivation conditions in order to promote growth and lipid storage while preventing contamination is desired. Contamination of algal cultures in the open systems is the major impediment in algal biotechnology, however this can be overcome by choosing an extremophile microalgae. This work was aiming at isolation of alkaliphilic microalgae native to the South Florida with characteristics suitable for biodiesel production. Water samples from Lake Okeechobee were inoculated into Zarrouk's medium (pH 9-12) and incubated for 35 days. This resulted in isolation of three algal strains that were screened for biomass yield and lipid accumulation. One of the isolates, Navicula sp., was identified as a high-lipid accumulating organism with the optimal growth at pH 10 and lipid productivity of 30 mg L-1 day-1. Lipid analysis showed that the most abundant fatty acid in the biomass of Navicula sp. was palmitoleic acid, also known as omega-7, followed by palmitic acid. Omega-7 fatty acids are high value compounds in the treatment of patients with metabolic syndrome while palmitic acid serves as biofuel.

Oral Presentations
Monday, March 28, 2016

4:15 PM - 4:30 PM

Room B

Earth and Environmental Sciences

Efficient removal of toxic arsenic from water by using environment friendly humic acid coated magnetite nanoparticles

Mohammad Mamunur Rashid

Groundwater contamination by highly toxic and poisonous chemical named arsenic has already affected the lives of around 100 million people worldwide including USA, China and Bangladesh. Long term intake of arsenic contained water lead to skin cancer, lung cancer, kidney damage, cardiovascular disease, diabetes, birth defects etc. My research objective is to remove the toxic species of arsenic from water by using an environment friendly and cost effective material as a removing agent. For this purpose, I have synthesized iron oxide nanoparticles with a coating of natural organic matter (NOM) on the surface. The nanoparticles provide greater surface area to the material which is crucial to remove large amount of arsenic from the water system. The strong magnetic property of the synthesized iron oxide (magnetite) helps to separate the material right after the treatment process by using a simple hand held magnet. The grafting of humic acid (one type of NOM) on iron oxide surface ensures the efficient binding of arsenic with the material and significantly reduces the toxicity associated with bare nanoparticles. I already carried out several arsenic removal experiments using this synthesized humic acid coated magnetite nanoparticles (HA-MNP) and got very encouraging results. More than 98% of 200 ppb (microgram/liter) arsenite (a toxic form of arsenic) has been removed from water in less than 30 minutes which is faster compared to most of the existing removal techniques. The solution pH (acidic or basic) in the range of 4 to 9 did not influence the adsorption (removal) process. The effect of co-existing ions (sulfate, phosphate, carbonate, nitrate) on arsenite removal were also investigated and the result showed that phosphate is the greatest competitor of arsenite for the binding sites. Analysis of different kinetic and thermodynamic parameters suggested that the total process is highly favorable. The synthesized materials did not show any noticeable decrease in its removal property/efficiency even after aging for one year. The simple, economical preparation, strong removal properties and environmental compatibility made the humic acid coated magnetite nanoparticles (HA-MNP) a promising adsorbent (agent) for addressing the long standing water contamination issue caused by arsenic.

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

9:00 AM - 10:00 AM

Hallway

Benthic Foraminifera of a Tropical Mangrove-Seagrass-Coral Reef Ecosystem, Caribbean Panama

Maria Sider

Increasing coastal development and other human activities along coastlines have deleterious effects on marine ecosystems. Polluted waters and turbidity are caused by runoff, habitat is lost through deforestation, and reduced size and occurrence of species result from overfishing. Given that species diversity is more pronounced in the tropics, particularly in the Caribbean because of smaller populations per species and very high diversity, extinctions are likely to have a larger impact on global biodiversity. This study examines modern communities of benthic foraminifera from mangrove, seagrass and coral reef habitats of Bocas del Toro, Panama, an ideal study site because natural disturbances such as hurricanes and earthquakes are rare and its rainforests make it a popular tourist destination. Data from this study will form the baseline for future comparison to samples from a "pristine" mid-Holocene reef to determine if there have been significant changes in the ecology of these habitats as a result of anthropogenic disturbance, which has implications for the preservation and conservation of marine habitats along tropical coastlines. In this study we analyze the relative abundance and diversity of benthic foraminifera in 56 shallow-water (<10m) sediment samples collected in December 2014 from mangrove, seagrass and coral reef communities along Bocas del Toro coastlines by a ponar-type grab sampler. Samples were washed through a 63µm sieve and dried, and the benthic foraminifera were picked and taxonomically sorted. Preliminary data show mangrove samples having a lower diversity than seagrass samples, which is common. Mangrove samples have <30 species per sample, with a dominance of Rotaliina, particularly Ammonia sp., a nearshore indicator. Seagrass samples have >50 species per sample, with near even proportions of Miliolina to Rotaliina. The prediction, based on preliminary data and previous research, is that species distributions and diversity are correlated with habitat type. Cluster analysis and Fisher's alpha diversity index will be used to compare distributions of the benthic foraminifera across habitats and identify environmental indicator species within habitats.

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

9:00 AM - 10:00 AM

Hallway

Assessing Alternative Agro-ecosystems of South Florida: finding multi-functional solutions for Sustainable Urban Landscapes.

Thais Thiesen

Creating sustainable urban landscapes in light of growing population pressures will require interdisciplinary multi-functional solutions. Alternative agro-ecoystems described as food forests, permaculture gardens, edible landscapes or perennial polycultures among others offer potential ways to address the social, economic and ecological goals of various stakeholders simultaneously. The proposed research will create a unique rubric, the Permaculture and Agro-ecosystem Sustainability Scorecard (PASS) that combines existing agricultural and landscape sustainability measurements to assess alternative agro-ecosytems. The rubric will evaluate provisioning, regulating, supporting and cultural ecosystem services such as the attraction of pollinators, quality of soil, creation of habitat, use of space and biodiversity, yield, plant health, use of pesticides and fertilizers, carbon sequestration and human interactions. This rubric will then be used to score fourteen sites in the South Florida region that meet specific criteria. The results will be evaluated and a set of best practice guidelines will be compiled to be used by planners, designers and other stakeholders.

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

9:00 AM - 10:00 AM

Hallway

Simple Aquifer-free Models for Underdamped Slug Tests in High Permeability Aquifers

Maria Marquez

Slug tests are a rapid and cost effective aquifer testing method that provide insight into aquifer characteristics such as hydraulic conductivity. Accurate hydraulic conductivity values are essential for understanding the flow of water, and are a key component in understanding and modeling the effects of sea level rise on salt water intrusion in coastal aquifers. Large discrepancies exist among reported values of hydraulic conductivity based on different test methods for the Biscayne Aquifer, and attest to a need for reevaluation of test methods when applied to highly permeable systems. To determine the validity of slug tests that display underdamped oscillations in highly permeable aquifers, development of two models for cases with oscillating responses are considered and applied to actual well tests, and to an end-member (aquifer-free) laboratory case. Preliminary results of the models show that the proposed Poiseuille-equation-based models agree well with data from one real slug test and from an end-member laboratory test. However the Darcy-Weisbach-based model does not agree as well in both the well tests and end-member case, necessitating further examination of the parameters, the force balance equations that define the models, and the experimental design. The resulting models should demonstrate if the behavior of some slug tests in highly permeable material can be predicted by a damped spring mass model, and thus help to determine when the estimation of true hydraulic conductivity values in highly permeable aquifers is possible with slug tests.

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

9:00 AM - 10:00 AM

Hallway

Implication of geochemical variation in volcanic glass and minerals from volcanic sediments of DSDP site 296, Kyushu Palau Ridge

Eshita Samajpati

Kyushu Palau ridge (KPR), a remnant arc in the Philippine basin is the first stage of arc evolution of the active Izu Bonin Mariana (IBM). Volcaniclastic sediments and sedimentary rocks from DSDP Site 296, lying within a basin at the crest of the northern KPR, records the latter part of this initial stage until the cessation of volcanism due to arc rifting and opening of Shikoku basin. The lower section consists of early to late Oligocene coarse volcaniclastic sedimentary rocks, and is overlain by late Oligocene to Pleistocene nannofossil chalks and oozes with volcanic sand and ash-rich layers. Chemical composition of pyroxene, feldspar and glass grains separated from the coarse volcaniclastic rocks at depths from 435 to 1082 meters below sea floor, and of glass shards in layers in the overlying sediments of late Oligocene to early Miocene age were studied. The overall composition of feldspars and pyroxenes doesn't show much systematic variation with depth, although for pyroxenes the highest Al2O3 contents are seen around Mg# 80-85 at 600-900 bsf. An content in feldspar shows a bimodal distribution throughout the core with most values > 90 or in the range 60-70, with more abundant intermediate compositions in the 600-900 meter interval. Compositions of glass shards vary widely, from basalt to rhyolite, and from low K, light rare earth (LREE)-depleted to high K, strongly LREE-enriched character, without systematic variation with depth in the core. However, all cores sampled from early Oligocene to early Miocene contain relatively low K basalt and basaltic andesite glass. The Site 296 sequence overlaps in age with the uppermost sedimentary section of recently drilled IODP Site 1438, located 230 km to the southwest in the Amami Sankaku basin, thus the two sites may contain volcanic debris shed from contemporaneous sections of the KPR.

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Monday, March 28, 2016

Earth and Environmental Sciences

9:00 AM - 10:00 AM

Hallway

Corrosion Behavior of Steel in Alkaline Sulfate Solution

Samanbar Permeh

Severe corrosion of post-tensioned tendons in Florida bridges utilizing pre-packaged thixotropic grout products were documented. In those cases, conventional causes of steel corrosion in tendons were not consistent with corrosion development. Good correlation between the presence of deficient grout, corrosion development, and enhanced sulfate ion concentrations was observed. An update on laboratory testing of steel wire in sulfate solutions representative of deficient grout pore water is presented. The test setup was made to determine if sulfates in alkaline solutions can depassivate steel or if early presence of sulfates in alkaline solution may provide conditions that would adversely affect stable passive film formation. In the open circuit potential condition for pH 12.5 and 13 solutions, sodium sulfate concentrations as high as 65,000 ppm did not show ability to depassivate steel. Sodium sulfate concentrations as high as 20,000 ppm in pH 13 solution did not show indication to destabilize passive film growth, but destabilization of passive film growth resulting in severe corrosion occurred in the presence of 20,000 ppm sodium sulfate in pH 12.5 solution. Tests in pH 12.5 sulfate solution resulted in active corrosion or localized pitting corrosion. Sulfate levels associated with corrosion development was consistent to ranges reported in the literature.

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

9:00 AM - 10:00 AM

Hallway

Effect of Holiday Size on the Coating Disbondment of Polymer Coatings with Zinc-Rich Primer

Saiada Fuadi Fancy

Corrosion is a durability concern for steel in aggressive environments. Various types of barrier coatings are used for corrosion mitigation; however, no coating system is flawless and coating failure can be prevalent due to various reasons. A complete coating failure may initiate from cathodic disbondment due to small damage during construction, transportation and presence of vestigial holidays in the coating. Additional protection of the steel can also be applied by cathodic protection as use of zinc in coating primer. This work focused on the effect of holiday sizes on the disbondment process of multi-layer zinc rich coating system. The zinc coating is composed of epoxy zinc rich primer, an epoxy intermediate layer and a polyurethane top coat. The test samples (3'' x 5'' steel coupon) were evaluated in neutral pH solution with and without chlorides. Three different mechanically induced defect sizes (1/16 in, 1/8 in and 7/32 in) were introduced and compared with coated samples in the as-received condition. To accelerate the disbondment process, cathodic polarization (-1VSCE) was applied for one week. The effect of holiday sizes on disbondment process was investigated by electrochemical techniques as open circuit potential, linear polarization resistance (LPR) and electrochemical impedance spectroscopy (EIS). Finally the findings from the electrochemical analysis were correlated to the physical examination (i.e. radial cut and adhesion measurements).

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

10:00 AM - 11:00 AM

Hallway

Evaluating Dynamic Effects of Wind Loads on Solar Panels

Mohammadtaghi Moravej

Reliable wind loading information on Photovoltaic (PV) systems is essential for a safe and optimized design procedure. Having a robust and straight design method helps toward the large scale deployment of solar technologies. Currently limited research has been published on the comparison of full-scale and small-scale model studies on PV systems. In the current study, full-scale testing of a single PV system mounted on flat roof building was conducted with the 6-fan Wall of Wind (WOW) hurricane simulator. Model scale testing of similar configurations was conducted in a boundary layer wind tunnel (BLWT) at a scale of 1:12. The purpose of the research was to investigate the key differences between small-scale and full-scale testing of PV systems. The study shows the importance of capturing dynamic effects of small structures such as PV systems. The commonly used 1 Hz criteria as an indicator of the dynamic sensitivity, while useful for larger structures, is not such a useful guideline for smaller structures such as PV systems. Broader Impacts Developing the application of sustainable energy sources such as solar energy is the key step for a robust approach toward a more green and sustainable design, which itself is an essential factor to fight the climate change and its adverse effects such as sea level rise and extended dry seasons. Helping engineers and city officials to come up with a straightforward design approach for solar panel systems will greatly facilitates the development process for these systems.

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

10:00 AM - 11:00 AM

Hallway

Application of Single Polarimetric RADARSAT2 Images in Estimating Water Stage and Vegetation in the Everglades

Anupama John

Understanding the dynamics of hydrological regimes and their effects on Everglades ecosystems requires high resolution, spatially explicit time series data of water stages across those ecosystems. Daily water stages are currently measured using a network of gages, but their density is not sufficient to model local responses within the ecosystems. High resolution, spatially continuous datasets can be derived from remotely sensed data. While multi-spectral data can detect open water with high accuracy, it cannot detect standing water underneath the vegetation canopy. Synthetic Aperture Radar (SAR) systems, like RADARSAT-2 (RSAT2), are unaffected by cloud cover, and can detect hydrological conditions under vegetation canopies. This study investigated the relationship between radar backscatter from RSAT2, NDVI calculated from WorldView 2 (WV2) multi-spectral data, and water stages for different vegetation types using EDEN water level gages. Linear regression models for backscatter with ground condition were developed for five different vegetation classes: Cladium jamaicense, dense Cladium, sparse Cladium, graminoid prairie, and wet prairie. Results yielded higher R2 values for individual models of backscatter with NDVI compared to backscatter with water stage. In all the cases considered, additive models (Graminoid Prairie, R2=0.92; dense Cladium, R2=0.62; and sparse Cladium, R2=0.69) explained the variation of backscatter with ground conditions better than individual models. Hence, this study suggests that the interactive effects of the radar wave with ground (dry or wet) and vegetation control radar backscatter, showing their importance and potential to enhance the collection of high resolution, spatially continuous data within Everglades ecosystems.

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

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Hallway

Entrapment of Fresh Crude Oil with Pulverized Tires

Daria Boglaienko

For small oil spills near the shorelines and such areas as mangroves, an effective and quick capture method is needed. We developed an effective oil entrapment method for floating oils utilizing pulverized rubber (obtained from used tires), which can be subsequently recovered as a floating carpet. Our objective was to estimate effective rubber-to-oil ratio and compare it with powdered activated carbon (one of the commonly used materials in adsorption studies). A series of experiments utilized pulverized rubber of four different particle sizes, activated carbon with mesh size 50-200, and South Louisiana crude. The effective ratio of rubber-to-oil (w/w) was obtained as 0.24 (rubber with the smallest particle size), which, if compared to activated carbon (0.20 g/g), revealed high performance of the pulverized rubber. Effective rubber-to-oil ratios increased with the material's particle size and bulk density. Average time for full sorption of crude oil was estimated to be 30 min. Pulverized rubber can be an efficient and cheap method to capture floating fresh oil spills in the coastal areas. The floating layer can easily be removed from the surface as it forms a stable floating aggregate.

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

10:00 AM - 11:00 AM

Hallway

Simulated saltwater intrusion decreases net ecosystem exchange in coastal marshes, dampening their capacity to store carbon

Benjamin Wilson

Coastal wetlands, which have immense potential to store carbon (C) in vegetation and sediments, are a vital part of the global C cycle. How C storage in coastal wetlands will be affected by accelerated sea level rise as a result of climate climate, however, is uncertain. It is hypothesized that shifts in stressors (i.e. salinity) and subsidies (i.e. nutrients) can shift the soil carbon balance from a net C sink to a C source, stimulating peat collapse, which will, in turn, accelerate the effects of sea level rise. The objective of this study is to investigate how simulated saltwater intrusion into fresh and brackish water wetlands will change net ecosystem productivity and affect the soil C balance. Using mesocosm experiments, we are examining how plant gross primary production, plant respiration, ecosystem respiration, microbial C processing, and net ecosystem exchange in brackish wetlands will change when exposed to saltwater. Preliminary results show that control cores took up more C than saltwater treated plots (-2045 vs -172 g m-2 y-1, respectively), showing that increased saltwater exposure significantly decreases the ability of a brackish marsh to store C. While ecosystem CO2 respiration decreased by 28% in the elevated saltwater cores, gross ecosystem exchange, a proxy for plant productivity, decreased by 71%. Coupled with no significant change in soil respiration, this suggests that the biggest effect elevated salinity has on coastal marshes is the capacity to reduce plant productivity and therefore C inputs into the soil. This is of critical importance when considering that coastal marshes need C inputs into their soil to accrete with rising seas. If marshes lose the ability to store C, peat collapse and loss of habitat to open water is a serious concern.

Poster Presentations
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Earth and Environmental Sciences

10:00 AM - 11:00 AM

Hallway

Water Quality Assesment Using Multivariate Statistical Analysis in South Florida

Mohammad Haji Gholizadeh

The surface water quality has become a serious concern for urban planners and managers. In this study, cluster analysis (CA), principal component analysis (PCA), factor analysis (FA), and discriminant analysis (DA) were applied to evaluate temporal and spatial variations and to interpret a large and complex water quality data sets collected from three main rivers of South Florida (Kissimmee River, Caloosahatchee River, and Miami Canal) for the period, 2004–2014. Data monitored from sixteen different sites for twelve parameters, in two dry and wet seasons, and about 35,000 observations were used. Three significant sampling groups (low pollution sites, moderate pollution, and high pollution regions) were detected by CA method, and five latent factors (point source pollution discharges, physicochemical and biological non-point sources of pollution, non-point sources of nutrients, organic pollutants, and seasonal) were identified by PCA and FA methods. The stepwise DA showed only five parameters (chl-a, dissolved oxygen, total kjendahl nitrogen, total phosphorus and water temperature), and seven parameters (chl-a, dissolved oxygen, total kjendahl nitrogen, total phosphorus, magnesium, chloride, and sodium) as the most important discriminating variables in temporal and spatial variations analysis, respectively. Furthermore, this study revealed the major causes of water quality deterioration were related to point source pollution discharges from domestic and industrial wastewater disposal.

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

10:00 AM - 11:00 AM

Hallway

A Streamlined "Imaging-to-Simulation" Framework for Granular Materials

Sumana Bhattacharya

Granular materials are widely encountered in various aspects of human lives. Robust modeling and simulation of granular materials, particularly soils and aggregates are of significant importance in a number of areas including construction, transportation, foundation on granular soil, retaining structures, landslides and erosion. The objective of this research focuses on the development of a streamlined "imaging-to-simulation" framework to facilitate the fundamental understanding of its complex behavior and enhance the predictive capabilities. The first part focuses on smartphone based in-situ image analysis, targeted at railway ballast aggregates which are subjected to repeated train loadings. Size distribution and morphological characteristics of ballast aggregates are crucial parameters for determining the overall performance of ballast track in terms of strength and durability. This study presents a non-intrusive ballast inspection method which involves smart-phone technology. This method enables engineers to capture images using smart-phone and send them to cloud computing servers for detailed image segmentation and morphological analysis of each and every particle. This analysis results are then sent back to the mobile device which are further used to obtain grain size distribution and the particle shapes are used for discrete element modeling. The second part focuses on physics-based simulation of the aggregates. While finite element method and discrete element method are two of the widely used methods for modeling granular material, finite element method has the disadvantage of working on continuum scale whereas aggregates are discontinuous materials. On the other hand, discrete element method is computationally far more expensive. In this study we explore the capabilities of position-based dynamics for its potential application in geomechanics area, which by far gives plausible realism in the simulation.

Poster Presentations
Monday, March 28, 2016

Earth and Environmental Sciences

10:00 AM - 11:00 AM

Hallway

Adaptive Capacity under Chronic Stressors: A Case Study of Water Infrastructure Resilience in 2015 Nepalese Earthquake using a System Approach

Hadi Nazarnia

The objective of the study presented in this paper is to investigate the determinants of resilience in water infrastructure systems in developing countries using the case study of the 2015 Nepalese Earthquake. While the body of knowledge on infrastructure resilience is growing, the majority of the existing studies investigate resilience in the context of developed countries. Due to difference in social, economic, technological, and political contexts, the characteristics of resilient systems in developing countries are different from those of the developed countries. Unfortunately, however, the understanding of various factors and phenomena influencing infrastructure resilience in developing countries is rather limited. To address this knowledge gap, this study investigated the water infrastructure of Kathmandu Valley in the 2015 Nepalese earthquake through the use of a systems approach. The data collected from different sources ranging from agency interviews to post disaster assessment reports were analyzed using a system resilience framework as well as qualitative information analysis using the NVivo software. The results of the analysis then were used to create a system model that captures various factors and their interactions influencing the resilience of water system. The analysis highlighted various phenomena, such as scarcity induced negligence, human infrastructure coupling, emergence of new dependencies, and adaptive capacity developed under chronic stressors, that led to the resilience performance of the water system in Kathmandu Valley. The results highlight the importance of better understanding of human infrastructure coupling, adaptive capacity, and systems transformation under chronic stressors for resilience analysis of infrastructure systems. The findings also have important implications for policy makers in developing and developed countries by identifying strategies that can bolster the resilience of infrastructure systems.

Poster Presentations
Monday, March 28, 2016

Chemistry

11:15 AM - 12:15 PM

Hallway

Expanded Compound Database and High Resolution MS/MS Spectral Library for the Detection of Designer Drugs by LC-QTOF-MS

Melanie Eckberg

Background: High resolution, high mass accuracy (HRMS) techniques combined with chromatographic methods are powerful tools for the screening of novel psychoactive substances ("designer drugs"), especially in toxicology and forensic science settings. The LC-QTOF-MS approach offers MS/MS capabilities, which allows for greater sensitivity and higher confidence in targeted and untargeted screening of compounds, such as designer drugs, in complex biological matrices. In addition, QTOF HRMS data can be used to identify novel, previously unknown substances and can be retroactively screened, thus eliminating the requirement for sample reanalysis. Objective: The purpose of this project was to expand a previously developed compound database and high resolution MS/MS spectral library using LC-QTOF-MS to include 750+ designer drugs and metabolites from multiple drug classes. Methods: An Agilent 1290 Infinity UHPLC system with a 6530 Accurate-Mass QTOF-MS with a Jet Stream Technology electrospray ion source (ESI) was used for this project. Drug standards were directly injected via flow injection analysis in ESI at a concentration of 1 µg/mL with a mobile phase that consisted of 50:50 5 mM ammonium formate with 0.1% formic acid in water and 0.1% formic acid in methanol. MS/MS spectral library data were collected for the entire dataset at three different collision energies (10 eV, 20 eV, and 40 eV). Each entry in the database included the following information: compound name, chemical formula, monoisotopic mass, chemical structure, and IUPAC name. ChemSpider and CAS numbers were also included when available. Results: This project added data for 499 designer drug standards and 76 deuterated internal standards to existing data from this research group. The additional database includes >150 stimulant compounds, >270 cannabinoids, and includes more than 100 metabolites and related compounds. The spectral library and database can be used to help aid in the identification of designer drugs in various HRMS data collection modes. Conclusion: An expanded high resolution MS/MS designer drug spectral library and compound database were created to improve the screening potential of the LC-QTOF-MS. The developed MS/MS library and compound database will be added to the existing library, bringing its size to 750+ designer drugs and related compounds.

Poster Presentations
Monday, March 28, 2016

Chemistry

11:15 AM - 12:15 PM

Hallway

Occurrence of methylmercury in rice-base infant cereals and estimation of daily dietary intake of methylmercury for infants

Wenbin Cui

Bioaccumulated methylmercury (MeHg) in marine and freshwater fish and shellfish has long been considered the major source of MeHg exposure to human. However, recent studies on mercury (Hg) in rice suggest that rice consumption could also be a main pathway of MeHg exposure to human in Hg mining areas as well as in certain inland areas, e.g., in Southwestern China. As a result of elevated levels of MeHg in rice, MeHg in rice may be introduced into rice products, such as infant rice cereal, during manufacture process, resulting in rice cereals acting as a potential pathway of infant exposure to MeHg. In this study, concentrations of both total mercury (THg) and MeHg in 119 infant cereal samples marketed in U.S. and China were determined using cold vapor atomic fluorescence spectrometry (CVAFS) and gas chromatography coupled to CVAFS, respectively. Concentrations of THg and MeHg in cereal samples ranged from 0.35 to 15.9 ng/g and from 0.07 to 13.9 ng/g with means being 2.86 and 1.61 ng/g, respectively. Statistical analysis of Hg concentrations in cereal samples revealed that THg and MeHg concentrations in rice-base cereal samples were significantly higher than those in cereals containing no rice. The results suggest that rice cereals for infant do contain considerable levels of MeHg and rice is the main source of MeHg in infant cereals. Estimation of daily intake suggests that MeHg daily intake for infants through consumption of rice cereals may count to 4-122% of MeHg reference dose (RfD) set by United State Environmental Protection agency (USEPA). Once combined the consumption of rice cereal with breastmilk which is considered as another MeHg exposure pathway for infants, the daily intake of MeHg through diet cannot be ignored, and further studies are needed to address the health risks of infant diet MeHg exposure and potential implications on regulation of MeHg levels in infant rice products.

Poster Presentations
Monday, March 28, 2016

Chemistry

11:15 AM - 12:15 PM

Hallway

Detection of Volatile Organic Markers in Exhaled Breath from Smokers using CMV-GC-MS

D'Nisha Hamblin

The analysis of breath has become an attractive technique for the medicinal screening of diseases, and has recently been considered as a potential tool in drug testing and drug detection. Its noninvasive approach to sample collection in comparison to conventional sampling methods of blood and urine has made it an attractive matrix. As the concentration of volatile organic compounds (VOCs) in breath are expected to be low, it is important to have efficient sampling methodologies for their collection. One such technique, pre-concentration, operates on the bases of adsorption processes. The scientific acceptance of pre-concentration sample collection methods in volatile research using Tenax® tubes and SPME fibers have paved the way for recognition of other novel technologies. This study describes a novel technology, the capillary micro-extraction of volatiles (CMV) device. The CMV device, based on planar SPME technology, was used for the first time to demonstrate its potential as a sampling device to detect and identify VOCs in the exhaled breath of 13 self-reported smokers and 7 nonsmokers. The CMV offers dynamic sampling of VOCs with its simple coupling to a GC inlet for GC-MS analysis, avoiding expensive thermal desorption instrumentation needed for sorbent tubes, as well as an increased surface area over a single SPME fiber. A collective total of 119 compounds from the 20 exhaled breath profiles were identified. Nicotine, the addictive substance in tobacco products, was chosen as the target compound to access the sensitivity and capacity of the CMV device. Nicotine was detected in 9 of 13 smokers. Principal Component Analysis (PCA) of the integrated peak area of the 119 compounds revealed distinctive groups between smokers and non-smokers. Successful demonstration of the CMV device for the detection of Nicotine in breath samples from smokers is a proof of concept for future forensic breath applications of the CMV to distinguish marijuana smokers from non-smokers. The portability and sensitivity of the CMV could aid law enforcement agencies during traffic patrols of drug impaired drivers, especially with the imminent concern of wide spread marijuana legalization.

Poster Presentations
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Chemistry

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Hallway

Chemical and Canine Analysis as Complimentary Techniques for the Identification of Active Odors in a Biothreat Agent

Alison Simon

Canines have served an integral part of forensic science for over a century, yet there is little science to support their ability to distinguish volatile organic compounds (VOCs) of illegal or controlled substances. By identifying the odors to which canines alert, it is possible to create safer, longer lasting training aids, and provide scientific support in legal proceedings. In the case of the invasive biothreat agent Raffaelea lauricola, canines are currently the only method of early detection. R. lauricola is a fungus that causes the laurel wilt disease that kills trees within six weeks. Once a biothreat or other banned agricultural item has entered the country, there is no established, uniform method of eradication. The current study used solid phase microextraction-gas chromatography-mass spectrometry (SPME-GC-MS) to identify the odors present in avocado trees infected with the pathogen. Twenty-eight compounds were identified using this method; however, most of these compounds were not commercially available. In order to create training aids for canines trained to detect R. lauricola, the compounds the canines are alerting to had to be identified. To this end, two separate canine trials were completed. First, four canines were run on controlled odor mimic permeation systems (COMPS) made of infected tree wood, uninfected tree wood and fungus cultures. All canines successfully alerted to infected tree wood and fungus cultures, but not uninfected tree wood, proving that the canines are alerting to fungal odors present in infected trees with a positive predictive value of 98.3%. The second trial was designed to identify these odors without the assistance of pure compounds since they are not commercially available. By venting a gas chromatography column to the atmosphere, fractions of the chromatograph were collected. These fractions were presented to the canines in a series of trials, resulting in the identification of a portion of chromatogram that the canines alert to as active odors for the biothreat R. lauricola. Using the fraction identified by the canines, an environmentally safe and longer lasting training aid will be created. Additionally, a new method of odor identification was created for future use in the field of forensic canines.

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Drug delivery quantitation and localization at the single cell level

Anthony Castellanos

Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS) is emerging as an imaging tool for biomedical studies on the sub-micrometer scale. Recent advances in the technology have enabled the acquisition of a larger amount of relevant chemical information of low concentration chemical species from small regions of interest with high spatial resolution. More specifically, the localization of drugs intracellularly is becoming increasingly realized. In this study, the semi-quantitation of select drugs within individual cells is attempted. Cell culture samples of various strains were grown on Indium tin oxide coated conductive glass slides until about <50% confluency is obtained. Treatment of samples with therapeutic agents in a range of concentrations including high and less than cytotoxic levels was carried out. Samples were prepared for TOF-SIMS analysis by washing in mass spectrometry friendly solution followed by freeze-drying. Following brief surface sputtering with an argon gas cluster ion beam (GCIB), 2D scans were carried out. A Bi3+ cluster selected primary ion beam operated within the static SIMS limit was used for observations. High mass resolution 'high current bunched mode' and high spatial resolution 'burst alignment' analyses were performed. Characteristic TOF-SIMS profiles were generated from each therapeutic standard in positive and negative ion mode. Based on the relative abundances of characteristic molecular and fragment ion, targeted masses and ion mode were selected for quantification during cell incorporation experiments. Different therapeutic targets show prominent abundance in one ionization mode. Cell interrogation was performed using submicrometer spatial resolution in order to correlate the drug distribution with the targeted distribution. Cell culture samples were treated with a gradient of drug concentration (5 points) in order to evaluate potential interferences and semi-quantitation on the single-cell level. The total ion count corresponding to the targeted molecular compound was normalized to the surface are of the targeted delivery distribution, thus allowing for comparison between different cell loadings. Preliminary data suggests that the relative abundance of the therapeutic molecular and fragment ions correlates with the increase in cell loading. This method will permit a better understanding of drug delivery and pharmacokinetics in ongoing therapeutic studies.

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A Paper-Based Device for Rapid Visualization of NADH Based on Dissolution of Gold Nanoparticles

Pingping Lliang

We describe a paper-based device that enables rapid and sensitive room-temperature detection of dihydronicotinamide adenine dinucleotide (NADH) via a colorimetric readout, and demonstrate its value for monitoring NAD+-driven enzymatic reactions with and without dehydrogenase inhibitors. Our system is based on NADH-mediated inhibition of gold nanoparticle (AuNPs) dissolution in an Au3+-cetyltrimethylammonium bromide (CTAB) solution. We fabricated a device consisting of a mixed cellulose ester (MCE) paper featuring a wax-encircled, AuNP-coated film atop a cotton absorbent layer, sandwiched between two plastic cover layers. In the absence of NADH, the Au3+-CTAB complex dissolves the AuNP layer completely, generating a white color in the test zone. In the presence of NADH, Au3+ is rapidly reduced to Au+, greatly decreasing the dissolution of AuNPs and yielding a red color that becomes stronger at increasing concentrations of NADH. This device exploits capillary force-assisted vertical diffusion, allowing us to apply a 25 µL sample to a surface-confined test zone to achieve a detection limit of 12.5 µM NADH. We used the enzyme glucose dehydrogenase as a model to demonstrate that our paper-based device can monitor NAD+-driven biochemical processes with and without selective dehydrogenase inhibitors by naked-eye observation within 4 min at room temperature in a sample volume of 25 µL. We believe that our paper-based device could offer a valuable and low-cost analytical tool for monitoring NAD+-associated enzymatic reactions and screening for dehydrogenase inhibitors in a variety of testing contexts.

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CGG repeat instability is modulated by DNA base lesion and base excision repair

Ruipeng Lei

Fragile X syndrome (FXS) is a neurodegenerative disease that is caused by CGG repeats expansion in the human Fragile X mental retardation 1 (FMR1) gene on the X chromosome. Currently, there is no effective treatment for FXS due to lack of understanding of the underlying mechanisms. CGG repeats are tandem repeats containing stretches of guanines, which are hotspots of oxidative DNA damage that can be repaired through base excision repair (BER). Growing evidence shows that BER of base lesions in the context of TNR can cause repeat instability, including CAG, CTG and GAA repeats. However, it remains unknown whether BER is also involved in CGG repeat instability. To test this, herein, we found that BER of base lesions in the context of CGG repeats led to repeat instability. Further biochemical characterization revealed that this was determined by the formation of hairpins on the template and the damaged strands that were bypassed by DNA polymerase β and processed by flap endonuclease 1 with different efficiency. Our study indicates that BER is playing a role in mediating instability of the CGG repeats associated with FXS. Our study helps to identify BER as a novel target for the therapy of FXS.

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A Polymorphic DNA Polymerase β R137Q Variant Does Not Affect (CTG)n Trinucleotide Repeat Instability

Yaou Ren

Trinucleotide repeat (TNR) instability is associated with human neurodegenerative diseases and cancer. Recent studies have shown that DNA polymerase β (pol β) plays a critical role in modulating TNR instability in a damage location-dependent manner during DNA base excision repair (BER). A previous study has implicated the pol β polymorphic variant, arginine (R) to glutamine (Q) (R137Q), in cancer development due to its impaired polymerase. This variant was also indicated to have impaired interaction with PCNA, as well as an increased apoptosis rate in cells that express the variant. However, little is known about the mechanism of how pol β polymorphic variants may cause genome instability that is associated with human diseases. In this study, we used in vitro enzymatic assays and reconstitution of BER, followed by PCR and DNA fragment analysis to measure the TNR instability resulting from BER of base lesions located at both the 5'-end and in the middle of a (CTG)20 tract. Our results showed that the pol β polymorphic variant R137Q did not significantly affect TNR instability of a (CTG)20 tract. Biochemical characterization demonstrated that the pol β variant exhibited weaker polymerase activity on CTG repeats and that its impaired interaction with PCNA does not further increase the difference of polymerase activity from that of wild-type pol β. This indicates that the deficiency of polymerase activity of pol β R137Q variant and impaired interaction with PCNA does not lead to CTG repeat instability. We conclude that people with the pol β R137Q polymorphism would not have a significantly higher risk of developing human diseases such as neurodegenerative diseases and cancer which are associated with TNR expansions or deletions. This study would provide information of whether a polymorphism would affect human health in certain incurable diseases such as neurodegenerative diseases and cancer, thus initiating the prevention and controlling strategies.

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Hallway

The assessment of GeoChipTM functional gene microarray as an aid for soil provenance

Priyanka Kushwaha

Soils have served as an important evidence in forensic investigations. DNA profiling of soil bacterial communities using terminal restriction fragment length polymorphism (T-RFLP) for forensic comparison and discrimination of soils has been done in the past. Although soil bacterial profiles characterized using 16S rRNA hypervariable domains have been successful in discrimination of soil samples, the 16S rRNA domain is not adequate to establish microbial functional diversity. As soil microbial community plays an important role in biogeochemical cycles, it is imperative to understand the function of these microbial communities and add those data to existing methods to refine the discrimination techniques between soil samples. GeoChip is a functional microarray that contains oligonucleotides probes for genes involved in all of the biogeochemical cycles, stress related genes, gyrB-based phylogenetic markers, antibiotic resistance genes, and many others. The objective of the study was to compare the microbial functional gene profiles between two different soil types: Lauderhill Dania-Pahokee (Soil type 2; represented as KNT transect) and Perrine-Biscayne-Pennsuco (Soil type 4; represented CS transect) of Miami-Dade County, Florida. DNA was extracted from soil samples (n = 15) of KNT and CS transects. DNA was precipitated with 100% ethanol and 0.3M NaOAc and DNA purity was assessed using UV absorbance, dried and shipped to Institute of Environmental Genomics (IEG), University of Okhlahoma (Norman, OK) for processing the GeoChip 5.0 microarray. The raw data was pre-processed using the IEG data analysis pipeline and principal component analysis (PCA) on carbon and sulfur cycle genes was performed. PCA analysis of carbon and sulfur cycle genes resulted in clustering of the two soil samples onto different principle components. In addition, unpaired Student's t-test revealed the genes (AceB, CsoS1_CcmK, CsoS2, FBP_aldolase, FBPase, GAPDH_Calvin, PRI, and TIM) representing the carbon cycle and sulfur cycle genes (APS_APrB, APS_kinase_protist, Sir, dsrB, dsra, soxA, and soxY) that were significantly different ($p < 0.05$) for KNT and CS. In conclusion, this study was able to discriminate these different soil types from each other. The assessment of both the phylogenetic and functional genes of soil communities together will assist in higher discrimination of soil samples for provenance and forensic applications.

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Using Intraspecific Variability to Evaluate Filters on Community Assembly

Timothy Perez

Traditional niche theory assumes niche partitioning promotes coexistence. Conversely, null theory predicts that competitive equivalence and niche overlap leads to coexistence. If communities are competitive, they should exhibit niche partitioning. As species richness increases, the proportion of niche space occupied by each species decreases, a phenomenon known as nice-packing. Similarly, communities with differing external filters should partition smaller proportions of regional niche space. To understand how communities assemble, we used a novel approach to estimate niche partioning in four communities of the tropical plant genus Piper along an elevational and species richness gradient in Southeastern Peru. We used plant functional traits to identify internal filters that implicated life history and resource acquisition trade-offs between species. Our results indicated external filters of community assembly may act upon photosynthetic traits. Elevation did not effect on the strength of external filers for many of the traits we measured, which may have resulted from a competitive buffering effect of the cloud forest ecotone, or a mid-elevation hump in species richness. Identifying internal and external filters may be important for predicting how populations and communities shift their distribution in response to climate change.

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Identification of the Metastatic Cell Populations in a Mouse Model of Melanoma

Xiaoshuang Li

Recent evidence suggests that particular populations of tumor cells with a more undifferentiated phenotype may be responsible for melanoma initiation and resistance to various therapies. However, it is unclear if these undifferentiated cells have a higher propensity to metastasize. We have created an inducible mouse model of metastatic melanoma (Dct-Grm1/K5-Edn3) where metastasis to the lungs is 100% penetrant. Metastasis to the lungs can be detected as early as 3-4 months after primary tumor formation. The tumors present cellular heterogeneity with cells at varying levels of differentiation as shown by non-overlapping populations of cells expressing the stem cell marker NESTIN and the melanocyte-specific marker Tyrosinase. The main goal of this study is to determine if the population of NESTIN positive cells within the primary tumor is the major contributor to lung metastases. To accomplish this aim we crossed the Dct-Grm1/K5-Edn3 mice to Nes-CreERT2/ ROSAmT/mG or Tyr- CreERT2/ ROSAmT/mG mice to indelibly label the Nestin or Tyrosinase cell populations within the primary tumor and perform lineage tracing in the metastatic lesions. We were able to successfully label the specific cell populations in the primary tumors by fluorescence through the topical application of 4-Hydroxytamoxifen. The fluorescence signal obtained through this method can last as least 7 months without fading. Our preliminary data indicated that the primary tumor resident NESTIN positive cells are not the source of lung metastases in the Dct-Grm1/K5-Edn3 mice. Characterization of the more aggressive cells in melanoma will facilitate the development of new prognostic tests and novel therapeutic strategies to eliminate metastasis.

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Application of 6-plex microsatellite kit in the analysis of aged fecal DNA samples: prospective use in equine slaughter forensic cases

Ketaki Deshpande

Feces represent an unlimited and easily available source of DNA that can be used in forensic cases of domestic animals or wildlife. In cases of equine slaughter, fecal samples from stolen or missing horses can be used to identify and match to the remains of a slaughtered horse. In studies of elusive or endangered species, the advantage of fecal analysis is non-invasive sample collection, allowing more frequent sampling individuals without having to capture the animals. However, quite often amplification of DNA from extracted feces is compromised by environmental contaminants, dietary inhibitors coupled with low quantity and poor quality of genomic DNA. In the present study, non-invasive sampling of fecal matter from 10 domestic horses was used to develop the methods where fecal samples were aged up to six days from each individual. Genotypes were known for all horses. Field validation of five additional samples was conducted where fecal donors and days since defecation were unknown. We demonstrated a viable protocol for fecal DNA extraction and efficient genotyping using a 6-plex (VHL20, HTG4, HTG6, HMS7, HTG7, and HMS3) of equine microsatellite markers Methods: The extraction technique included using a modified Qiagen QIAmp® DNA Stool Mini Kit protocol coupled with pressure cycling technology (PCT). The modification to the manufacturer's protocol and incorporation of PCT where hydrostatic pressure was used in the lysis of cells to ensure maximal DNA output and clean up from inhibitors. Results: This technique yielded complete (6 loci) equine DNA profiles for 80% samples ≤ two days old and 40% of samples after six days of aging. We were also able to determine kinship for the 10 domestic horses and the "unknown" field samples based on the 6 loci using the ML-RELATE software. Conclusion: PCT along with the modified extraction method increased the likelihood of obtaining an equine DNA profile from fecal samples. This study provided a technique for degraded and compromised DNA evidence that can be used to identify individuals in animal forensic cases and equine slaughter cases where fecal samples may be the only evidence available.

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Biochemical characterization of ArsI: a novel C-As lyase for degradation of environmental organoarsenicals

Shashank Pawitwar

Arsenic is considered by the U.S. Environmental Protection Agency (EPA) to be the most prevalent environmental toxin. Pentavalent organoarsenicals such as MSMA (monosodium methylarsenate or MAs(V)), roxarsone (4-hydroxy-3-nitrophenylarsonic acid) (Rox(V)) and phenylarsenonic acid (PhAs(V)) are currently used as herbicides and growth enhancers in animal husbandry, respectively. They undergo environmental degradation to more toxic inorganic arsenite (As(III)) that contaminate crops and drinking water supplies. Recently, our laboratory identified a two-step pathway of degradation of MSMA to As(III) by microbial communities: (i) reduction of MSMA to methylarsonous acid (MAs(III)) by some bacterial species, and (ii) demethylation of MAs(III) to As(III) by other bacteria. We cloned the arsI gene responsible for MAs(III) demethylation from an environmental isolate, Bacillus sp. MD1. arsI encodes a non-heme iron-dependent dioxygenase that cleaves the carbon-arsenic bond. Purified ArsI catalyzes Fe(II)-dependent demethylation of the trivalent forms of MSMA and roxarsone. This is the first C-As lyase to be identified and shown to be involved in organoarsenical degradation. The objective of my research is characterization of the molecular mechanism of ArsI cleavage of the C-As bond. To investigate the role of specific residues in catalysis, amino acid residues lining the Fe(II)-binding site, and the substrate binding site have been altered by site directed mutagenesis. I evaluated the biochemical properties the altered enzymes using a combination of fluorometry, isothermal titration calorimetry (ITC) and other biophysical techniques. My results employing protein fluorescence of wild type ArsI show that the enzyme has the highest affinity for the trivalent form of the growth promoter roxarsone. The order of affinity is Rox(III)>PhAs(III)>MAs(III). The affinity (Kd) for PhAs(III) and Fe(II) determined by ITC is
0.62 nM and 4.2 μM, respectively. These data are in agreement with the results from ligand-dependent quenching of intrinsic protein fluorescence. Rox(III) has a unique absorption spectrum. ArsI produced a blue shift in the absorption spectrum of trivalent roxarsone, allowing for real-time measurement of catalysis. These data will elucidate the mechanism of ArsI catalysis, augmenting our understanding how microbes remodel the environment through biotransformation of organoarsenicals, and complement our understanding of the arsenic biogeochemical cycle.

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Characterization of intramolecular interactions of cytochrome c using nanoESI-HDX-TIMS-MS and molecular dynamics

Camilo Molano

Cytochrome-c (cyt c) is a multifunctional heme protein that is involved in key cellular processes. Cyt c interactions with multiple substrates and/or intracellular proteins have been associated with changes in cyt c conformation, including changes in the heme iron coordination and tertiary and secondary structure alteration suggesting that under native conditions cyt c can populate different conformational species. In the present study, kinetically trapped intermediates of cytochrome c were studied for the first time by correlating the experimental ion-neutral collision cross section and time resolved H/D back exchange using a trapped ion mobility spectrometer - mass spectrometer (HDX-TIMS-MS) combined with molecular modeling. The high mobility resolution of the TIMS cell permitted the observation of multiple IMS bands for [M+6H]+6 - [M+21H]+21 charge states. Solution memory effects (e.g., organic content and pH) were studied as a function of the charge state distribution, number of IMS bands, and collisional activation prior the TIMS-MS analysis. HDX-TIMS-MS results provided the rate of back-exchange between deuterated molecular ions and residual water bath gas molecules as a function of the time after desolvation. A novel HDX-TIMS scoring model was developed for the analysis of candidate structures based on the exchange rate of amide hydrogen atoms when the effect of neighboring residues is considered on the availability of exchangeable (e.g. non-bonded) hydrogens. Inspection of the candidate structures suggests that folding transitions are associated with the evolution from native (N) to molten globule (MG) to kinetic intermediates (Un). In particular, our kinetic results show that cyt c major structural unfolding is associated with the distancing between the N- and C- terminal helices and the solvent exposure of the heme cavity. A detail description of the intramolecular interactions associated with the N ↔ MG ↔ Un transitions is provided.

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PCNA stimulates FEN1 to modulate GAA triplet repeat instability

Eduardo Laverde

GAA repeat expansion is responsible for Friedreich's ataxia, which is an autosomal recessive neurodegenerative disorder. An expanded GAA repeat tract interferes with the expression of frataxin protein that is involved in the assembly of iron-sulfur clusters and energy metabolism. Our previous studies have shown that temozolomide, a chemotherapeutic drug, can cause large deletions of expanded GAA repeats in Friedreich's ataxia patient lymphocytes through base excision repair (BER). This suggests that BER plays an active role in modulating trinucleotide repeat instability. Proliferating Cell Nuclear Antigen (PCNA) can interact with a critical BER enzyme, Flap Endonuclease 1 (FEN1), and promotes its enzymatic activity. It is possible that PCNA can modulate trinucleotide repeat instability by affecting FEN1 activity. To test this hypothesis, we examined the effects of PCNA on the FEN1 cleavage of GAA repeats during BER of a base lesion located at different sites of a (GAA)20 repeat tract by performing a FEN1 activity assay in the absence and presence of PCNA, in vitro reconstitution of BER with purified enzymes, and DNA fragment analysis. We found that PCNA significantly stimulated FEN1 cleavage of GAA repeats during repair of an abasic lesion at both the 5'-side and in the middle the (GAA)20 repeat tract. We found that PCNA stimulated FEN1 cleavage of GAA repeats both in the absence and presence of DNA polymerase β (pol β). The results indicate that PCNA may promote GAA repeat deletion during BER. Our results further suggest that the PCNA-FEN1 interaction plays an important role in modulating GAA repeat instability during BER. Our study also suggests that PCNA may be developed as a new target for treatment and prevention of Friedreich's ataxia.

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Forensic Biofouling Project: Evaluating the Utility of Encrusting Organism Growth and Development for Estimating Time Since Submergence

Shamara Gough

Prosecution of lobster poachers remains difficult for the National Oceanic and Atmospheric Administration for Law Enforcement because investigators are not able to associate a probability with a submersion interval of lobster traps. The objective of this research is to evaluate the utility of encrusting organism growth and development to estimate a submersion interval. Inverse prediction methods used by entomologists to estimate a post mortem interval (PMI) may be useful for estimating a submersion interval and provide statistical methods for this research. Fifty-two replicates, broken apart from a lobster trap, were submerged off of a dock at Biscayne Bay campus during summer 2015 and now during the winter. Data was collected in the summer by photographing marked Hydroides elegans and Ecteinascidia turbinata on individual replicates to measure development every ten days and will be collected this winter in the same manner. The collected images were processed using ImageJ for an accurate length and width measurement of each species. The combination of both species' presence and absence on each replicate was recorded in a succession matrix. Because development and succession are majorly a function of temperature, the temperature was recorded as a variable every five minutes with a data logger during the duration of the experiment. With the temperature recordings and a development threshold of 0°C, time is presented in accumulated degree hours (ADH), a time measurement as the amount of heat input. Submersion intervals will be reported as accumulated degree hours. This research can help to prove the application of statistical models in estimating a submergence interval more precise which would lead to further research on different marine species in various bodies of water. This research is especially useful to the wildlife forensic science community in supporting prosecution of lobster poachers permitting an investigator to associate a probability with his or her conclusion concerning illegal behavior. The larger scale hope is that reference data can be developed containing developmental milestones and common combinations of marine organisms with their associated accumulated degree hours useful to the entire wildlife forensic science community.

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Stomata density variation in Gumbo Limbo (Bursera simaruba) of sub-tropical dry forests in Florida Keys and its implication in climate change

Suresh Subedi

The impact of stress in plants growing in saline environments is similar to the one faced by plants growing in dry environments). Like drought stress, salt-induced plant drought stress, called physiological drought, occurs when soluble salt levels in the soil solution are high enough to limit water uptake. One of the adaptations by which woody plants deal with drought or salt stress is to change stomatal morphology and its activities because transpiration of dry habitat plants requires to a minimum under conditions of water deficiency. Tree species growing under xeric environment typically have smaller and denser stomatal density compared with mesic species. We examined how stomatal characteristics of Bursera simaruba (Gumbo Limbo), a common species to Florida Keys tropical hammocks vary with elevation above the ground water table. Trees at higher elevations are unlikely to be affected by the salt stress, while it is possible that species at lower elevations may be affected if groundwater salinity is higher. As stomata density increases with physiological stress, stomata density expected to linearly increase with increase in elevation. While if groundwater is brackish, trees at lower elevation are likely to suffer most with salt stress and salt stress slowly decreases with increase in elevation. Therefore, with brackish groundwater, stomata density is expected to be greater at lower elevation and slowly decreases and again started to increase towards the higher elevation. To test this hypothesis, we used the leaf stable carbon isotope ratio to infer the underlying variation in physiological stress. We analyzed the variability in stomata density and size in eight different populations of Bursera simaruba across the islands in Florida Keys' hardwood hammock forest. The study on populations of hardwood hammock species across the elevation gradient in Florida Keys may provide on important information on how populations in different environment evolved with different stomatal characteristics and have adapted in these conditions from short and long-term environment changes.

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VEGFR inhibitor, SU5416, sensitizes pulmonary endothelial cells to estrogens: A microvascular model for the progression of lung cancer

Mayur Doke

Proliferative microvascular lesions are reported to be an aggressive angiogenic phenotype associated with a poor prognosis in non-small cell lung cancer (NSCLC). Recent studies suggest that CD133+ endothelial stem-like cells are recruited to the angiogenic vascular system of NSCLC and are associated with tumor stage and progression. Epidemiological studies have reported that women who received hormone replacement therapy (HRT) show an overall lower survival to lung cancer especially NSCLC when compared to women with no HRT. The VEGFR inhibitor, SU5416, has been widely used for an in vivo model of proliferative microvascular lesions. Therefore, the aim of this study was to determine whether SU5416 exposure of human pulmonary microvascular endothelial cells become more sensitive to estrogen-induced cell growth. We exposed human pulmonary endothelial cell line HPMEC-ST1.6R to SU5416 to select for a sub-population of cells which were then treated with 17β-estradiol and PCB153. We observed a significant increase of 2-3 fold change in cell growth and proliferation as determined by MTT, SRB, BrdU, and FACS analysis when SU5416 treated cells were exposed to estrogenic chemicals. Our findings demonstrate that SU5416 sensitized cells to estrogens resulting in higher cell growth compared to wild-type cells. Since VEGFR3 expression levels are reported to correlate with metastasis in NSCLC patients and based on our previous work showing increased VEGFR3 by exposure to SU5416 our findings may be used as a model to study how dysregulation of VEGFR signaling can promote the aggressive growth and spread of lung cancer when exposed to estrogens. A better understanding of how microvascular lesions depend on SU5416 may open new avenues for the prevention and treatment of lung cancer.

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Three-dimensional rhodopsin molecular contrast imaging and 3D visualization for functional assessment of photoreceptors

Zahra Nafar

Rhodopsin, the light-sensing molecule in the outer segments of rod photoreceptors, is responsible for converting light into neuronal signals in a process known as photo-transduction. Rhodopsin is thus a functional biomarker for rod photoreceptors. Here we report a novel technology based on visible light optical coherence tomography (VIS-OCT) for in vivo molecular imaging of rhodopsin. The depth resolution of OCT allows the visualization of the location where the change of optical absorption occurs and provides a potentially accurate assessment of rhodopsin content by segmentation of the image at the location. The technology was successfully tested in vivo by imaging both albino and pigmented rat retina. 3D visualization of rhodopsin in the retina was achieved through speckle suppression by an innovative speckle realignment algorithm. Rhodopsin OCT can be used to quantitatively image rhodopsin distribution and thus assess the distribution of functional rod photoreceptors in the retina. Rhodopsin OCT can bring significant impact into ophthalmic clinics by providing a tool for the diagnosis and severity assessment of a variety of retinal conditions.

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Electrical and Computer Engineering

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Room C

A Combinatorial Advanced Solution for PV Integration to Address Intermittency and Provide Inertial Response

Arash Anzalchi

The operation of a photovoltaic (PV) generating system under intermittent solar radiation is a challenging task. Furthermore, with high penetration levels of photovoltaic energy sources being integrated into the current electric power grid, the performance of the conventional synchronous generators is being changed and grid inertial response is deteriorating. This research proposes a combined virtual inertia emulator (VIE) and a hybrid battery-supercapacitor-based energy storage system for enhancing the stability of the Microgrid and smoothing the short-term power fluctuations simultaneously. Not only could the suggested system overcome the slow response of battery system (including dynamics of battery, controller, and converter operation) by redirecting the power surges to the supercapacitor system, but also enhance the inertial response by emulating the kinetic inertia of synchronous generator. Control systems for the VIE and battery-supercapacitor storage system are presented in this work. Correspondingly simulation results are discussed to validate the effectiveness of the proposed scheme. In this work, Matlab Simulink software has been considered to develop control designs of VIE and Hybrid Energy Storage System (HESS). Through these studies, it will be demonstrated that the recommended method is capable of achieving voltage and frequency regulation and effective management of the hybrid storage system. Since the suggested technique focuses on short-term fluctuations and includes no long-term power regulation, it needs no mass storage device. Thus, the method is economical. The other concerns raised by renewables (e.g., forecast accuracy, low voltage ride-through, etc.) have not been addressed within this study.

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Electrical and Computer Engineering

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Room C

The Human Fascination with Robots

Raul Camarca

Why are we so fascinated by robots? Aristotle, Leonardo, Babbage, and many other brilliant minds materialized this admiration through their creativity without delving into the rationale behind it. They have been, in a sense, an expression of the human fascination for automatons. My primary objective, then, was to explore the understanding of humanity's historical interest in artificial life. The research began with the analysis of fundamental examples, ranging from ancient myths and Aristotle to bionics and artificial intelligence. Sprung in the context of the FIU Honors College seminar taught by Dr. J. C. Espinosa, where I was exhorted to "examine epistemological references of the self and others throughout the human experience," as an engineering major I was drawn to develop research that would "demonstrate understanding of 'the self' and others" through the analysis of "the building blocks that define us." The main objective was to study the development of robotics from a sociological and psychological standpoint. I believed that understanding what has led philosophers, Renaissance men, and inventors towards the creation of artificial life may benefit the modern scientist and engineer, both from an ethical and from a creative standpoint, by opening a new window on their innate intellectual curiosity. We noticed that life and creativity constitute the common denominator of all the examples analyzed, and that the quest towards the creation of artificial life appears to be deeply rooted in the human mind. We concluded that the rationale behind the quest for the creation of artificial life is achieving the ultimate power of making. The creature longs to become Creator (in a comfortable sandbox) but the power to create artificial life eludes and haunts him. The poster was presented at FIU SRAI 2010, it received the 2010 FIU Libraries Undergraduate Research Award, and was one of two posters chosen for exhibit at the 2010 FIU Engineering Center Library Grand Opening.

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Importance Factor based Multiple Correspondence Analysis for Multimedia Big Data Analysis

Samira Pouyanfar

Multimedia concept detection is a challenging topic due to the well-known class imbalance or skewed distributions issue, especially in the current big data era. It is considered as “big data” not only because of its huge volume, but also because of its increasingly imminent position as a valuable source for insight and information in applications, ranging from business forecasting, healthcare, to science and hi-tech, to name a few. However, with the emergence of extremely large-scale data sets, researchers in machine learning and data mining communities are faced with numerous challenges as many well-established classification and regression approaches were not designed and thus not suitable for such memory- and time-intensive tasks. In this paper, we propose a novel machine learning algorithm called Importance Factor based Multiple Correspondence Analysis (IF-MCA) for multimedia big data analysis. It performs data pruning, feature selection, and classification in a coherent framework to effectively tackle the imbalanced data classification issue. In addition, it is capable of fully employing the MapReduce framework to significantly speed up the training process for big data analysis. Using disaster concept detection and soccer goal event recognition as example applications, the experimental results demonstrate the effectiveness and adaptivity of the proposed framework.

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Band gap tuning of germanene nanoribbon using Chemical Functionalization

Md Monshi

Graphene as a 2D carbon nanostructure has drawn tremendous interest worldwide because of its extremely high mobility and unique electronic, magnetic, and surface properties but opening a band gap remains challenging. Other 2D materials have emerged as promising materials that may be more easily altered to have a band gap, high mobility, and on/off ratio. Germanene with its buckled two-dimensional structure exhibits extremely high mobility, massless fermions behavior, and strong spin-orbit coupling which has drawn tremendous interest for high performance devices. However, it has no intrinsic band gap and low structural stability which are needed for logic and switching devices. Despite numerous attractive features in germanene it, like graphene, exhibits a semi-metallic zero band gap. Applying electric field, chemisorption of adatom species, introducing periodic nanoholes, doping and edge functionalization are all techniques aimed at opening a bandgap in germanene. Here we present a density functional theory based study of the influence of edge-functionalization using hydrogen (-H and -2H) and halogen (- F, -Cl, -Br, -I, -2F,-2Cl, -2Br, -2I), -S atoms and –SH, -OH, -CH3 groups termination. An overview is given of the influence of these edge-functional groups attached to different germanene nanoribbon (GNR) structures of varying width ranging from 6 to 19, focusing primarily on band gap. Additionally, the dependence of armchair GNR band gap on functionalization and ribbon width is explored. We found that edge functionalized armchair germanene nanoribbon (AGeNR) opened a band gap as small as 0.012 eV when functionalized by -2H and could be as high as 0.84 eV when functionalized with -2I. Nanoribbons could be classified into three families according to width as follows, W = 3K, 3K+1, and 3K+2. For mono-hydrogenated, fluorinated, chlorinated, hydroxyl termination, the band gap varied as EG (3K+2) < EG (3K) < EG (3K+1). For di-hydrogenated, fluorinated, and chlorinated we found band gap follwed the periodicity EG (3K+ 1) < EG (3K +2) < EG (3K). Formation energy studies revealed that the AGeNR produced a more stable structure with fluorine functionalization and -SH, -OH, -CH3 group's termination also provides similar result with sizable band gaps. Simulation results suggest that the electronic structure of germanene is similar to graphene and silicene. Energy band gap tuning of AGeNR using edge functionalization may provide a new means of integrating germanene in optoelectronics, low power and high performance switching devices.

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Nanoscience and technology approaches for continuous sensing of cortisol

Syed Pasha

A reagentless, direct electrochemical immunosensing strategy was demonstrated by employing nanomaterial integrated electrode as a signal generating probe. Nanoparticles integrated screen printed carbon electrodes (SPCE) were used to construct the immunosensing platform. The stress biomarker, cortisol was employed as a model analyte. Cortisol specific monoclonal antibodies (C-Mab) were covalently immobilized on the surface of the functionalized electrode with dithiobis(succinimidyl propionate) (DTSP) self-assembled monolayer (SAM). The redox signal could be detected directly through cyclic voltammetry and used as signal generation probe for the direct detection of cortisol. The proposed immunosensing strategy allows a rapid and sensitive means of cortisol analysis with a limit of detection of about 1 pg/mL. The said platform can be further applied for designing other label-free immunoassays.

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Hand Motion Tracking in 3D Space using Inertial Measurement Unit and Infrared Cameras

Nonnarit O-larnnithipong

This work is to develop a system that could determine the hand movement in real-time. The development of the interaction mechanisms to be as close as possible to the natural human interaction with their environment is increasingly emphasized. One of the most common ways to interact with our environment is to move our hands for grabbing, moving objects or even expressing sign language. Thus, it would be greatly beneficial if we could develop a system that could determine the position, orientation and movement tracking of the user's hand in real-time. This system would develop the new idea of Mid-air gestures Human-Computer Interaction, contributing significantly to improve 3D User Interfaces for disabilities to become more realistic. This hand motion tracking system will be able to track the hand position and orientation by determining the position of a single IR-reflective marker stripe and data from the inertial measurement unit attached on the wearable glove, respectively. The system consists of two technologies, which are OptiTrack V120: Trio for position tracking, and YEI 3-Space sensor for orientation tracking. The IR-reflective marker stripe was attached around the wrist of the wearable glove so that it will be the referencing point for other movement of the hand beyond the wrist. The maker will be visible to three infrared cameras and the system can continuously compute the position of the marker as Cartesian coordinate in real-time. The specific command has to be sent to the YEI 3-Space sensor in order to receive the filtered tared orientation as quaternions. The sensor data will be streaming to the host PC via serial USB communication. Both information for position and orientation were sent to Unity for visualization. As a result, it can be verified that we can simultaneously apply translation and rotation to the same 3D hand model using the combination of two different sources of information from two types of sensors in real-time. However, the hand to be tracked has to be visible within the range of IR cameras so as to have continuous position tracking.

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A Novel Integrated Guidance and Control System Design in Formation Flight

Ali Reza Abbaspour

Bird's formation flight is one of the best type of cooperation in nature. The bird's flight was the motivation of humans to flight. After one century of flight development, bird's formation flight was the motivation of humans to aircraft formation flight, as well. Based on the closeness of aircrafts in formation flight and the effect of disturbances such as vortex, the guidance and control of the followers aircraft is a challenging issue. This paper introduces a novel integration between guidance commands and system controller inputs. In recent papers the control system inputs were derived from approximate equations, and this approximation caused maneuver limitation. To tackle this problem, a new method is introduced which employs PID controller in integration block. This integrated guidance and control system employs the pure pursuit guidance to determine the unmanned aerial vehicle's (UAV's) acceleration command. A two loop dynamic inversion technique is used for designing attitude and velocity controller, while the acceleration feedback control is used between guidance system and attitude controller, which leads to increase maneuverability of UAV's formation flight. The simulation results show that the proposed method can control the UAV's formation with sufficient accuracy in severe maneuvers.

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Pediatric Epilepsy: Clustering by Functional Connectivity using Phase Synchronization

Hoda Rajaei

Problem statement Based on the Center for Disease Control (CDC), about 1% of children aged 0-17 are diagnosed as epileptic in the United States. The disease is distinguished by the presence of seizures affecting a variety of mental and physical functions. The epilepsy diagnosis is a critical factor for prescribing the treatment. The majority of epilepsy diagnostics are based on the monitored spikes in EEG recordings. While most of the diagnosis recordings are done between seizures, this characteristics of the disease, that an epileptic brain shows more connections, can help both diagnosis and treatment processes. Research objective This study proposes a nonlinear data-driven method to delineate Electroencephalogram (EEG) recordings as either coming from controls or patients with epilepsy. This method extracts the connectivity map of the brain using phase synchronization measure from interictal EEG. A set of six graph theory features extracted from connectivity maps used to cluster each individual to epileptic or control group. Methodology Multichannel scalp EEG signals from seven control subjects and seven patients diagnosed with epilepsy were recorded using referential montage following the 10-20 electrode placement protocol and sampling rate of 512Hz and 200Hz. Totally 134 segment of mostly 10 second extracted from all EEG data. All segments are preprocessed to eliminate the effect of unwanted noise. The connectivity map of each segment extracted using the correlation based on probability of recurrence method. Set of six graph theatrical features extracted from each connectivity map. The features from all segments fed to a k-means algorithm (K=2) in order to cluster each segment to one of the groups. Using the number of clustered segment in each group the probability of belonging is calculated for each individual and individuals are classified in epileptic or control groups. Conclusions The presented method shows statistically significant difference between average connectivity map of two groups ($t(340) = -37.4771$, $p < 0.01$) and supports the hypothesis that an epileptic brain is more connected comparing to a normal brain. The suggested algorithm shows satisfactory results with high specificity of 100%, accuracy of 92.8 % and sensitivity of 85.7%.

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The Analysis of Brain Connectivity Pattern in Multiple Electrodes Electroencephalogram with Implementation of Cross-correlation in Frequency Bands

Panuwat Janwattanapong

Research Title: The Analysis of Brain Connectivity Pattern in Multiple Electrodes Electroencephalogram with Implementation of Cross-correlation in Frequency Bands Problem Statement: Epilepsy or seizure disorders, is one of the most common neurological disorder, which affects people of all ages. Seizures are caused by a sudden discharge of electrical activity in the brain, creating irregular pattern of brain waves. The types of seizure fall into 2 broad categories, focal or partial seizures and generalized seizures. To diagnose the type of seizures from a patient, tests such as, an electroencephalogram (EEG), a computerized tomography (CT) scan , functional magnetic resonance imaging (fMRI), etc., are arranged according to doctor's initial assessment. These tests individually are still inconclusive to determine the exact type of seizures where the cost and complication increases along with the amount of required tests. Research Objectives The main objective of this research is to improve the detection of the seizure types by using non-invasive or scalp EEG. Research Methodology EEG recording data of 10-20 system montage with 19 electrodes is categorized by the type of spikes (Normal spikes, Complex spikes, and Repetitive spikes) and is segmented into a segment of 1 second where every segment contains a single spike depending on which type. Those segments are filtered into 4 bands of frequency, Delta, Theta, Alpha and Beta band. The cross-correlation method is applied to all of the segments to obtain the connectivity matrix where this matrix will be plotted into a connectivity diagram. The number of connections in the defined regions of the scalp will be used to determine the distinct pattern between each of the spike types. Results/Conclusions The results of the analysis are gathered and displayed in charts for interpretation. The scalp regions are divided into 2 cases, Anterior-Posterior area and Left-Right area. The most distinct pattern shows that, the number of interconnections between two areas of the normal spike in Delta band are relatively less than the number of connections within the area itself comparing to complex and repetitive spikes.

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Density Functional Theory Study on Energy Band Gap of Armchair Silicene Nanoribbons with Periodic Nanoholes

Sadegh Mehdi Aghaei

Discovery of graphene and its astonishing properties have given birth to a new class of materials known as 2D materials. Motivated by the success of graphene, alternative layered and non-layered 2D materials have become the focus of intense research due to their unique physical and chemical properties. Silicene has attracted enormous attention because of its expected compatibility with current silicon nanoelectronics. It is a two-dimensional allotrope of silicon, with a hexagonal honeycomb structure. Similar to graphene, silicene has zero bandgap. One approach for opening up a band gap is cutting the silicene sheet into silicene nanoribbons. In this study, density functional theory (DFT) is employed to investigate electronic properties of armchair silicene nanoribbons perforated with periodic nanoholes (ASiNRPNHs). The dangling bonds of armchair silicene nanoribbons (ASiNR) are passivated by mono- (:H) or di-hydrogen (:2H) atoms. Our results show that the ASiNRs can be categorized into three groups based on their width: W = 3n, 3n + 1, and 3n + 2, n is an integer. The band gap value order changes from "EG (3n + 2) < EG (3n) < EG (3n + 1)" to "EG (3n + 1) < EG (3n + 2) < EG (3n)" when edge hydrogenation varies from mono- to di-hydrogenated. The energy band gap values for ASiNRPNHs depend on the nanoribbons width and the repeat periodicity of the nanoholes. The band gap value of ASiNRPNHs is larger than that of pristine ASiNRs when repeat periodicity is even, while it is smaller than that of pristine ASiNRs when repeat periodicity is odd. In general, the value of energy band gap for ASiNRPNHs:2H is larger than that of ASiNRPNHs:H. So a band gap as large as 0.92 eV is achievable with ASiNRPNHs of width 12 and repeat periodicity of 2. Furthermore, creating periodic nanoholes near edge of the nanoribbons cause a larger band gap due to the strong quantum confinement effect. ASiNRPNHs have great potential for applications in electronics because of its band gap tunability which help address future requirements for nanodevices and its potential compatibility with existing silicon-based electronics.

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PostureMonitor: Real-Time IMU Device to Detect Bad Posture Using Fuzzy Logic Principle

Sudarat Tangnimitchok

The research shows the application of Posture Monitor System applied with Fuzzy Logic Principle on the developing prototype of a wearable posture monitor system, based on a miniature MEMS Inertial Measurement Unit (IMU) implemented in a sensor. The sensor uses accelerometers and gyroscopes to measure the changes in angle in three dimensional plain. Here is the simple description of how the system works: the system monitors the users' posture and sends the angle parameters in real time. Whenever the users slouches or be in an inappropriate posture, an alarm is triggered. Moreover, the pitch of the alarm sound is referred according to a lookup table whose data are calculated based on fuzzy logic control principle. The corresponding frequency will be selected as the output pitch depending on how pad the slouching angle of users is. Additionally, the system provides the level of difficult selection as well; the users are able to choose which mode they feel comfortable to start with. Each of three levels including easy, intermediate, and difficult has their own lookup table with the different parameter to determine the pitch of the alarm sound. This flexibility helps users in term of getting familiar with the system. By using the developing prototype of PostureMonitor, it is to be expected that gradually, users will maintain their good posture routinely without thinking. The related work prior to this abstract had already presented in the HCI-I international conference 2015, and it brought a lot of attention from the crowd. Due to the nature of a miniature MEMs sensor's size which is very small makes it a suitable choice for the wearable technology to implement on. Many manufacturers have an interest in developing a project based on the IMU sensor and this abstract proposal is one of the great examples of how to augment the sensor to the project in practice.

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DC Voltage Ripple Quantification for a Flywheel-Battery Based Hybrid Energy Storage System

Lashway Christopher

Flywheel energy storage has started attracting more attention as an energy storage means, but certain impediments face their deployment such as a high self-discharging rate and power quality issues. A potential solution is to combine flywheels with another energy storage types to form a Hybrid Energy Storage System (HESS). In this paper, a new method is established to perform power quality analysis and DC voltage ripple quantification in an HESS connected solely to a DC bus. Previous efforts have analyzed voltage and current ripple using an AC frequency reference, but these techniques are ineffective when the system does not contain a connection to a traditional AC grid. Extensive laboratory testing and verification is conducted to characterize a flywheel-battery based HESS with different battery contribution levels. A correlation is made between the required battery support and resulting DC voltage ripple. Due to the nature of a flywheel operating at various speeds, a new Machine Speed Multiple (MSM) frequency reference is used as a profiling tool corresponding to the harmonic number in AC systems. Using the MSM in conjunction with the Discrete Fourier Transform, a voltage ripple frequency table is produced to highlight the target frequencies which must be reduced. A quantitative analysis identifies an overall reduction of voltage ripple magnitudes as a result of current injection from the battery. Using a system of this nature, new power and energy applications which plan to include a flywheel energy storage system will be able to transmit cleaner, more efficient energy.

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Data Collection using UAVs to build a 3D quality map of LTE and Wi-Fi Signal Strength

Virgilio Acuna

Due to the mobility and advancement of technology, the number of UAVs being controlled by cellular network is increasing nowadays. However, very few are known for the coverage of RF signal above ground level, since this kind of network had been primarily designed for ground-based devices. Our goal in this project is to collect the signal strength of LTE and Wi-Fi network, and create a 3D quality map for indoor/outdoor environment. An Android device was attached to the drone in order to get all the data needed. For the application, two Android apps were to be merged into one and installed in a cellphone placed on the drone. As far as the functionalities of the device goes, it was used as a sensor to measures the Wi-Fi/LTE signal strength, while the altitude was accessed from the flight controller via Mission Planner. All the data collected were gathered to create a 3D quality map for further analysis.

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It Is On You: Trinket Based Mobile Authentication

Mozhgan Azimpourkivi

We introduce Pixie, a novel, two-factor authentication solution for mobile devices. Pixie combines graphical password and physical token based authentication concepts in a single familiar action of capturing a photo. It leverages images of physical objects carried, worn, or otherwise readily accessible to users, called ``trinkets", to establish trust. We introduce new features we extract from trinket images, and leverage supervised learning algorithms, to address inconsistencies in the trinket images captured during the password setting and authentication steps. We develop rules and supervised algorithms that filter out images on which Pixie is predicted to fail, as well as images on which Pixie has not been trained. Our experiments show that Pixie is fast and accurate, and that the developed filters significantly improve its performance. We introduce brute-force, image dictionary attacks, and show that Pixie has a small false accept rate for large public image datasets and datasets that we have collected. We performed a user study with 42 participants and discovered that Pixie outperforms text passwords on memorability, speed, and user preference. Pixie demonstrates a promising alternative for mobile authentication, as it is also both discoverable and accurate, and users are able to remember their trinkets hiding in plain sight even 7 days after registering them.

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Nanocatalysts for Improved Capacity Retention in Lithium-Air Batteries

Neha Chawla

Demand for high energy-density and high power-density batteries have motivated research for the hunt for new battery chemistries or improving on existing ones. Lithium-air batteries have high specific energy density far exceeding existing lithium-ion batteries. However, problems with cycle-to-cycle efficiency, cyclability, and charge/discharge current densities have impeded the adoption of lithium-air batteries. Catalysts have been shown to improve both the battery capacity retention and the cyclability of these batteries when used in cathodes. In this study, we investigate various modes of loading palladium-based catalysts and their effect on various electrochemical metrics of the battery such as capacity, round-trip efficiency, over-potential, and impedance growth. The aim of this study is to increase the first discharge capacity and retain this high capacity for subsequent cycles. The loading and morphology of cathodes were studied using transmission electron microscopy. Electrochemical characterization using electrochemical impedance spectroscopy and charge-discharge cycling were also investigated.

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SuRE Method in Load Monitoring Application

Shervin Tashakori

Structural health monitoring is an emerging research area to develop methods for the evaluation of integrity of structures and they have resulted in improvement of reliability and decrease in periodical maintenances. In the last few years, active structural health monitoring methods such as lamb wave and electromechanical impedance (EMI) based methods have received a lot of interests. Surface response to excitation (SuRE) method is a low-cost alternative to the electromechanical impedance method. The SuRE Method uses two or more piezoelectric sensors on the part's surface. One of these sensors excites the part at a certain frequency range and creates surface waves. These waves propagate on the surface of the structure. The other piezoelectric element or laser vibrometer monitors the dynamic response of the surface to the excitation. The dynamic response of the system is collected at the optimal operating conditions. Any significant change of the spectral characteristics may indicate defects, improper loading or loose fasteners. In this study, the performance of SuRE method was evaluated when the conventional piezoelectric elements and scanning laser vibrometer were used for monitoring the presence of loads on the surface. Although the piezoelectric element collected the data with better resolution, the results with the scanning laser vibrometer were acceptable and can be used when attaching piezoelectric elements are not allowed to the surface.

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Ternary gel polymer electrolyte based on polymerized ionic liquid as solid state electrolyte for lithium ion battery application

Meer Safa

Lithium ion batteries (LIBs) have been extensively studied as energy sources for devices ranging from portable electronics to electric vehicles (EVs). LIBs safety remains one of their biggest concerns due to the use of flammable organic liquid as electrolytes. In recent years, the emergence of gel polymer electrolytes (GPE) based on ionic liquid solvent opened up an avenue for safer solid-state battery technology due to the nonflammability nature of the liquid. These type of GPEs consist of a liquid electrolyte solvent with a lithium salt and a polymer. In this work, we are reporting a ternary gel polymer electrolyte(GPE) which was synthesized by blending of a polymerized ionic liquid (PIL)- poly (diallyldimethylammonium bis(trifluoromethane) sulfonimide (PDADMATFSI) polymer, an imidazolium based ionic liquid- 1-ethyl-3-methyl imidazolium bis(trifluoromethanesulfonyl)imide and lithium salt LiTFSI in acetone and then solvent cast on glass slide. Thermal and electrochemical properties of the electrolyte were performed to evaluate the applicability of polymer electrolyte in lithium-ion battery application. The synthesized polymer electrolyte was thermally stable at high temperature upto 440C with improved ionic conductivity of 3.36 mS/cm at 25C was obtained. The synthesized GPE was electrochemically stable up to 4.9V vs Li/Li+ and high lithium transference number (t+) of 0.42 was observed at room temperature (22C). Finally, cell performances were evaluated by constructing Li/GPE/LiFePO4 setup and galvanostatic cyclic charge-discharge test were performed at different C-rates(C/10, C/5, C/2, 1C, 2C, 3C and 5C) at room temperature (22C). The battery with the GPE as electrolyte showed very good cyclability with 168mAh/g discharge capacity at C/10 rate and 127mAh/g at 1C rate and was able to perform cyclic charge-discharge at high C-rate up to 5C. The results obtained indicate that the new IL-based GPE is a promising candidate as an electrolyte for future generation solid state lithium ion polymer batteries.

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Defect detection in hollow cylinders using Surface Response to Excitation (SuRE) method

Amin Baghalian

Recent developments in guided wave based structural health monitoring (SHM) have sparked an interest of their application for SHM in pipe-like structures. Wave transmission technology, time reversal and impedance based SHM methods are among most successful guided wave based SHM techniques that have been used for detecting defects in hollow cylindrical structures. In Impedance based methods, a piezoelectric transducer is bonded to a target structure and it is used to simultaneously excite the structure, in a broad high frequency range, and to read the dynamic response of system. For monitoring a large area in this method, a high number of transducers are needed to be mounted on the surface of the part of interest. In the SuRE method, which is a variation of Impedance method, dynamic characteristics of a structure is monitored through using a second piezoelectric element that is also mounted on the surface of structure; this method opened new ways to substitute the second piezoelectric sensor with a noncontact sensor, such as laser vibrometer, in the monitoring process. So far, the SuRE method has been successfully applied to assess the state of the health in plates and multi robotic arms. The purpose of the work presented here is to propose a new strategy based on application of SuRE Method for accurately and quantitatively characterizing defects in pipes. The surface of the pipe was excited with a continuous sweep sine wave and the generated surface waves on the selected points were monitored by using a scanning laser vibrometer. In this study, it is shown that the SuRE method can effectively be used for detection of damages and determination of their severity in pipe-like structures.

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Electrochemical investigation of the effect of inorganic fillers in gel polymer electrolytes for Li-O2 batteries

Amir Chamaani

As the world moves towards electrification of transportation and renewable recourses for grid power applications, there is an increased demand for more efficient energy storage systems. This has fueled fundamental research into newer battery chemistries beyond Li-ion batteries (BLI). Li-O2 chemistry is a typical example of BLIs, which has garnered much attention owing to its high theoretical energy density. The current design of Li-O2 batteries consists of lithium anode, porous cathode open to the air, and an ionically conductive electrolyte separating these electrodes. The usage of liquid electrolyte in Li-O2 batteries poses many technical difficulties ranging from liquid electrolyte evaporation during cycling to limited choices in cell design. Substituting the liquid electrolyte with a solid-state electrolyte would be a promising option to overcome the aforementioned shortcomings. Among solid-state electrolytes, gel polymer electrolytes composed of liquid electrolytes and polymer matrices are have been studied due to their impressive ionic conductivity and mechanical flexibility. As of today, limited success has been reported in gel polymer electrolyte for Li-O2 batteries. The introduction of inorganic fillers to gel polymer electrolytes has been proposed as a possible method to improve the ionic conductivity, processability, and mechanical durability. However, little improvements have been reported for these fillers on recyclability and discharge capacity of Li-O2 batteries. This study aims to fully explore the effect of one-dimensional silicon dioxide fillers in gel polymer electrolytes. These electrochemical characterizations include cyclic voltammetry, charge/discharge cyclability, electrochemical impedance spectroscopy (EIS); in addition to scanning electron microscopy (SEM), X-ray diffraction (XRD), and Raman Spectroscopy. The gel polymer electrolyte was prepared by mixing different ratios of electrolyte solution, 1 M bis (trifluoromethane) sulfonamide (LiTFSI) lithium salt in tetraethylene glycol dimethyl ether (TEGDME) with the UV-curable polymer ethoxylated trimethylolpropane triacrylate (ETPTA), and silicon dioxide fibers. Mixture solutions were layered on substrates and irradiated with UV light for 10 min. The curing process yielded freestanding flexible films with 150-250 microns thickness. The cathodes were prepared by coating MWCNT/ polyvinylidene fluoride (PVDF) on 0.5 inch conductive porous carbon cloth. The typical MWCNT loading was 0.5 mg per cathode. Figure 1 illustrates discharge cycle performance of gel polymer electrolyte with and without the fillers at current density of 250 mA/g- MWCNT with a fixed capacity of 500 mAh/g-MWCNT. All of the cycling tests were performed under ultra-dry O2. Introducing the filler materials increased the recyclability by approximately 2-fold. Further electrochemical analyses and investigation of source of the improvement are detailed in this study.

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Acoustophoresis of Circulating Tumor Cell Analogs

Ata Dolatmoradi

The mechanical properties of cells have been suggested to be a promising label-free biomarker indicative of various intracellular changes associated with disease processes. In this respect, cells with membrane stiffened due to cellular anomalies deserve attention. Observations of anomalous hardening in the membrane of some types of cancer cells have been reported to be the direct outcome of dysregulation in the mechanisms by which the cholesterol content of the membrane is controlled. Accumulation of cholesterol in the membrane would give rise to the decreased membrane fluidity, that is, very similar appearance but more rigid membranes for the cancer cells compared to their healthy counterparts. It is worth bearing in mind that no label-free method has been proposed that reliably separate same-size cells of almost same density but different membrane properties. Of all the separation methods, acoustophoresis, i.e. separation using acoustic standing waves, is in fact the only one which is in theory capable of differentiating particles according to their density and relative rigidity. This method, however, has only employed in aligning and separating cells with different shape and size. Therefore, it would seem reasonable to address the question whether any difference in the membrane rigidity of cells could render them differentiable in acoustic radiation fields. Here, giant phospholipid vesicles were in the first step chosen to emulate the behavior of cells in an acoustically-excited microchannel. Giant vesicles (GVs), which are large spherical vesicles composed of lipid bilayers, have drawn interest as analogues of real biological cells in many different applications. Our preliminary results from the first part showed that GVs could be reliably aligned and separated on a microfluidic chip actuated acoustically at a specific frequency. The second part of this study, provided that GVs behave similarly as cells in acoustically- driven media, aims to explore the idea of how a change in the physical properties of the phospholipid bilayer would affect the acoustic behavior of GVs. For doing so, pre-tagged cholesterol will be added to the membrane of GVs to see how it would affect the acoustic behavior in membranes incorporated with cholesterol.

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Effect of Anodization on Platelet Adhesion on Polymer Coated MZC

Elnaz Mirtaheri

Recently, researchers have shown great interest in the usage of magnesium alloys as a biodegradable implant material. Magnesium is biocompatible and is metabolized by the body, thereby negating the need for additional surgeries, which lowers medical costs and reduces patient morbidity. A major concern with magnesium alloys is the high rate of corrosion during the initial period of implantation, which results in hydrogen evolution and localized elevated metal ion concentration at adjacent cells. These conditions are undesirable for cell viability and proliferation. Thus, there have been major efforts to reduce the rate of degradation of these alloys. Two surface treatments were adopted in this study to reduce the rate of corrosion of magnesium-zinc-calcium (MZC) alloys: a) Anodization which produces a passivating oxide; and b) coating which provides an impermeable barrier to protect the underlying metal. Anodized MZC was dip-coated with the co-polymer polyglycolic-co-caprolactone (PGCL) (90/10). The effect of anodization and polymer coating on the rate of corrosion of MZC were compared, as was their effect on platelet adhesion which was assessed using a flow chamber through which porcine blood was circulated. The wettability of MZC and polymer coated MZC were compared with respect to platelet adhesion. Anti-thrombogenic behavior was observed on polymer coated MZC when anodization parameters were optimized.

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Room C

Lithium-Ion Capacitor Based on Electrodes Constructed Via Electrochemical Spray Deposition

Richa Agrawal

Conventional Electrochemical double-layer capacitors (EDLCs) are well suited as power devices that can provide large bursts of energy in short time periods. However, their relatively poor energy densities hinder their application in devices that require simultaneous supplies of both high energy and high power. In the wake of addressing this shortcoming of EDLCs, the concept of hybridization of lithium-ion batteries (LIBs) and EDLCs has started to gain popularity in recent years. Such a device, generally referred to as the "lithium-ion capacitor" typically utilizes a lithium intercalating electrode along with a fast charging capacitor electrode in a lithium-containing electrolyte. Herein we have constructed a lithium ion capacitor comprising a Li4Ti5O12 (LTO) anode and a graphene and carbon nanotube (G-CNT) composite cathode using electrostatic spray deposition (ESD). The morphology and material properties were studied scanning electron microscopy and X-ray diffraction studies, respectively. Cyclic voltammetry, galvanostatic charge-discharge and electrochemical impedance spectroscopy measurements were carried out to evaluate the electrochemical performance of both half cells and full cells. The details will be presented at the conference.

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Synthesizing of Polyaniline/Multi-Walled Carbon Nanotubes and characterization of their damping and strain sensing g properties

Weiwei Lin

Polyaniline (PANI) / 11% Multi-carbon nanotubes (MWCNT) nanocomposites were synthesized through an in situ polymerization method. Frits compression method was adopted to make PANI/MWCNT. Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM) tests results showed that this technique produced a coating of PANI onto the MWCNT, which indicated that carbon nanotubes were well dispersed in the polymer matrix. The free end vibration test results showed that the double sided attachment has higher values than single side's attachment. Also, damping ratios are higher when the sensor is placed at the clamped end. The strain sensing properties of PANI/MWCNT sensors were compared with the conventional foil strain gage. The loading cycle tests showed that though there appears to be residual strain in PANI/MWCNT sensor after the load is removed, both PANI/MWCNT and the foil strain gage react linearly when re-engaged. The dynamic sensing test results showed that over the range of 10-1000 Hz, the PANI/MWCNT composite sensor was consistently superior for sensing purposes.

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Room C

Smoke Paths of Spatial Extrusion

Emanuel Ferro

Etienne-Jules Marey (1830-1904), captured this beautiful image in one of a series of air movement studies. Étienne-Jules Marey (1830-1904) Triangular prism presenting one of its bases to the air stream. In a extrusion with geometry, This work conveys abstract spatial Qualities of a remapping, how smoke and air behaves. Creating an artistic spatial composition.

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Room C

Performance of Rectangular Rapid Flashing Beacons (RRFBs) at Midblock Pedestrian Crossings

Homa Fartash

Rectangular Rapid Flashing Beacons (RRFBs) are increasingly being installed to facilitate pedestrian crossings at midblock locations. RRFBs are high intensity signal heads that flash lights when activated by pedestrians at midblock crossings. This paper focuses on evaluating the road user behaviors at midblock crossing locations installed with RRFBs. The study includes four RRFB locations along West Flagler Street in Miami, Florida. Data on pedestrian and driver behaviors at these locations were collected two days a week over a total of seven weeks. The performance of RRFBs was evaluated using the following five measures: RRFB activation percentages, pedestrian crosswalk usage percentages, pedestrian crosswalk clearance percentages, driver yielding percentages, and driver smooth stopping percentages. One-way Analysis of Variance (ANOVA) statistical tests were conducted to determine whether or not the change in these performance measures over time is statistically significant. The results indicated that after the initial two weeks, all the performance measures improved as road users became familiarized with RRFBs, and then plateaued for the rest of the data collection period. Furthermore, the higher the pedestrian volumes, the more effective the RRFBs are. Based on the study results, RRFBs are recommended to be installed on high-speed multilane urban arterials with high vehicular, pedestrian, and bicycle traffic.

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Room C

Estimation of the Total Cost of Bridge Construction for use in Accelerated Bridge Construction Selection Decisions

Jianmin Jia

In this study, a framework for the comparison of Accelerated Bridge Construction (ABC) and conventional construction methods is developed and implemented to a case study. The construction cost of ABC are estimated based on a historical database of ABC costs and point towards higher cost of ABC compared to other methods. The main influencing factors on the cost are found to be the average annual daily traffic (AADT), number of spans, location (urban versus rural), and ABC type. Analyses based on limited data did not identify any statistically significant difference in the indirect and agency costs between ABC and conventional bridge construction methods. This study incorporates the dollar values of mobility, travel time reliability, safety, and emission in calculating user costs. The estimation of the construction impacts on the user costs is done using a number of tools and methods that are integrated with the estimation of the construction costs, in a single environment by the research team. The application of this study framework to a case study demonstrates the benefits of using the total cost in the decision making process associated with ABC versus conventional bridge selection. The case study demonstrates that the ABC can have a higher construction cost than conventional methods but its total cost can be lower, if all the elements of construction costs and user costs are added.

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Room C

A Framework for Investigating the Impact of Planners' Risk Attitude on Optimal Project Completion Outcomes

Reza Sheykhi

This research represents the development of a framework that helps decision makers investigate impact of their risk attitude toward resource productivity on project completion outputs, such as time and cost. The framework finds optimal resource utilization solutions for a portfolio of a projects considering limited pool of resources and different resource sharing policies, and enables planners to select solutions that fit their risk-taking policy the best. To this end, productivity simulation model (PSM) from the literature is employed to simulate stochastic nature of time-related risk factors on resource production rate using Monte Carlo Simulation Method. In addition, the NSGA-II multi-objective optimization method has been implemented in order to simultaneously minimize portfolio completion time and cost, through utilization of various resource planning scenarios. The proposed simulation-optimization framework develops non-dominated optimal time-cost tradeoffs and demonstrates how overall time and budget limitations, as well as risk attitude, affect decision making process. It also enables planners to examine the impact of resource sharing prioritization and overtime working policies on project outcomes regarding certain risk attitudes. This study provides construction managers with a broader and more realistic perspective on resource utilization planning of their projects. An application example has been analyzed to capture capabilities of the proposed framework.

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Improved Model for Estimating Incident Impact on Urban Street Travel Time with Consideration of Upstream Intersection Capacity Reduction

Aidin Massahi

The estimations of incident and incident management impacts on urban street performance have been a challenging issue for signalized networks due to the interactions between traffic control and the drop in capacity due to incidents. This study proposes a methodology to calculate the incident delays at signalized networks, taking into consideration this interaction. Regression equation are developed, based on microscopic simulation modeling, to allow the estimation of the drop in capacity at upstream intersections considering the distance to a downstream incident location and the volume to capacity (V/C) ratio at the incident location. As expected, the drop in capacity increases as the incident location gets closer to the upstream signal and as the V/C ratio at the incident location increases.

The incident delay impacts are calculated as a combination of the traffic delay at the incident location calculated using queuing equations plus the increase in control delay at the upstream intersection resulting from the queue spilling back due to the incident. The increase in control delay is calculated using the signalized intersection control delay equations of the Highway Capacity Manual (HCM). Comparison with microscopic simulation results shows that estimating the delay using this method produces better results than those produced when using the deterministic queuing method procedure by it. The derived regression models are recommended to be used in sketch planning tools, macroscopic and mesoscopic simulation models, and data analytics tools to calculate incident delays on urban streets.

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Optimizing Gate Opening for Flow Regime Control: Experimental and Artificial Neural Network Development

Amirmasoud Hamedi

Vertical gates as important hydraulic structures can control the hydraulics of the flow in both downstream and upstream flows of the rivers and canals. In this research, laboratory tests were conducted to find an optimum gate opening as a function of upstream water level to forecast downstream flow, in order to obtain stable condition. In this investigation, physical simulations were conducted within a range of discharges in an experimental flume to identify an optimum gate opening in a vertical gate for which flow stability occurs. Also, fuzzy concepts were used to define ”stability”. The experimental results were treated by an artificial neural network (ANN) to estimate optimum gate opening. In addition, in order to reduce the error of estimation, the ANN results were post-processed via regression analysis. The regression was successful in further reducing the amount of error of estimation. This investigation points out at the potential of optimizing hydraulic performance based on regression based post-processing ANN to define optimal design and operational conditions of hydraulic structures (e.g., gates) in the control of stream flow conditions.

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Modeling Adaptive (Traffic Responsive) Ramp Metering in Macroscopic Simulation Environment

Samaneh Khazraeian

Existing adaptive ramp metering algorithms take the dynamic nature of traffic flow into account for the determination of an optimal ramp metering rate. These rates are usually identified in real time based on the traffic detector's measurements such as speeds and occupancies. This research investigates the incorporation of adaptive ramp metering algorithms in tools that implement the Highway Capacity Manual (HCM) freeway facility procedures to allow the assessment of these algorithms based on the HCM procedure. It was determined in this study that not all the necessary inputs for most adaptive ramp metering algorithms are available in the current HCM procedures and their tool implementation. For instance, parameters such as occupancies are needed as inputs to the algorithms. Modifications including the estimation of these parameters had to be made to the HCM procedure tool implementation to allowing the development of a test bed environment for modeling adaptive ramp metering. As an example, the Fuzzy Logic ramp metering algorithm is modeled in the HCM freeway facilities methodology and the results from case studies have been validated against real world measurements and microscopic simulation analysis. The findings of this research can help analysts to model any adaptive ramp metering in the HCM context. This can help practitioners to tune the necessary ramp metering algorithm parameters to improve the freeway performance. Also, it will enable a platform for assessing any other emerging ramp metering algorithm.

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Assessing an Innovative Interchange for a Signalized Intersection

Eazaz Sadeghvaziri

Existing intersections and interchange designs can be deficient due to the inability to accommodate common traffic patterns and due to road networks being originally engineered for a strong hierarchy of intersecting roads when currently many intersecting roads have similar characteristics. An intersection construction is far cheaper than an interchange, however, the travel delay in the interchange is almost zero. There are plenty of ways to reduce the delay in an intersection, however, no researcher can claim their proposed methods would remove the delay completely. This study is introducing an innovative interchange for an intersection to reduce the travel delay almost as low as an interchange. Its general plan is introduced and different movements including; right turn, left turn, and U-turn are discussed. Moreover, the advantages and disadvantages of its implementing is discussed. This paper is the first phase of assessing the innovative interchange and considers different aspects of evaluating. In order to state that this innovative interchange is the best alternative choice for at-grad intersection, further investigation will be accomplished in next phases of this research.

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Room C

A Comprehensive Review of Travel Behavior and Mobility Pattern Studies Using Mobile Phone Data

Mario B. Rojas IV

Traditional data acquisition methods for transportation studies, via travel surveys and diaries, have become more burdensome and inefficient, in light of the emerging passively collected data. These data sources have the ability to improve data quality and accuracy, and the potential to complement conventional data sources. This paper presents a comprehensive review of past studies that have utilized these passively collected data, such as data from personal or vehicles GPS devices, mobile phone network data, and more recently smartphone GPS data. This review focuses on the various data processing algorithms that have been used to derive travel information from the trajectory traces, as well as the wide variety of applications that have been conducted based on these data. Some applications of these data include OD estimation, real-time traffic monitoring, and human mobility pattern analysis. While passively collected data have great potential, there are also issues with possible sample bias and a lack of demographic data, which requires further research. This study may help people that are interested in employing these data to get a better understanding on the current practices, the potentials and challenges.

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Room C

The Effect of Implementing Traffic Separators on Travel Time of Express Lanes, Case Study: I-95 Express Lane, Miami, USA

Seyedmirsajad Mokhtarimousavi

Travel time is a fundamental measurement in transportation engineering. Accurate travel time prediction is also crucial to the development of intelligent transportation systems and advanced traveler information systems. With the increased deployment of Express Lanes (EL), the transportation industry has been able to better understand the advantages, disadvantages, and impacts of lane separation techniques in order to better manage express lanes. In this study the data from detectors which are located at I-95 Northbound (NB) at Golden Glade interchange were assessed in order to see whether the changes before and after installing traffic barriers are significant. SPSS was used to obtain speed characteristics in selected detectors and T-Test was accomplished to see whether the changes are significant. In all statistical analysis, the 95% confidence interval was considered. It was expected that channelizing the express lane, as it eliminates weaving movements, would lead to speed increment, however, the results showed that the average speed decreased significantly.

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Room C

Affective Sensing Through Non-Invasive Physiological Sensors for Enhanced Construction Safety

Bhuiyan Munir

Construction industry has consistently suffered the highest number of fatalities among any industries. To improve safety conditions on the construction jobsite, the Occupational Safety and Health Administration or OSHA (a US federal organization, part of the Department of Labor) identified four types of major incidents (fall, electrocution, caught between the objects and struck by objects) and gave a name-"Fatal Four". The last two of them are deeply related with equipment and "human factor" is a dominating cause for those incidents. This research intends to measure the physiological status of construction workers before the "human error". It deals with the feasibility and performance study of non-intrusive physiological sensors in the virtual construction scenario. A 3D construction simulation is created using the real-time location and site geometry data gathered from an active construction site. Safety hazards are introduced to the simulated environment and responses of the subjects were recorded by tracking their physiological status through three sensors, Galvanic Skin Response, Blood Volume Pulse and Skin Temperature. The data is statistically analyzed and the feasibility of deploying physiological sensors at jobsites to enhance construction safety is assessed. The developed framework can be used in the future to predict the physiological response of workers when exposed to an unexpected hazardous situation on site. The ability of the workers to handle extraordinary situations can lead to improved safety and save lives. It can also be used by safety managers to make decisions on training requirements of the workers. The framework can be extended to potentially identify and measure other human factors that govern site safety conditions.

Oral Presentations
Tuesday, March 29, 2016

Health & Biomedical Sciences

9:00 AM - 9:15 AM

Room A

Porcine Small Intestinal Submucosal Valve Dynamics in the Aortic Position

Omkar Mankame

Critical congenital heart valve diseases have extremely limited treatment options. Lack of sizing options and an inability of a prosthetic valve to grow with the pediatric patient are the primary technical barriers. Tissue engineering is a concept which can provide for growth, self-repair and a permanent approach for replacing defective heart valves. Recently cardiovascular substitutes made from extra cellular matrix derived from the porcine small intestinal submucosa (PSIS) have shown immense potential for in-vivo tissue regeneration as the PSIS bioscaffold degrades. To our knowledge we are the first and only group to have employed this treatment in pediatric patients, with the valve observed (via echocardiography) to function flawlessly for over a year thus far. Here we conducted an organized functional assessment of PSIS valves in order to define its opening and closing characteristics. To achieve this task, we utilized a dedicated Pulse Duplicator System (Vivitro Laboratories, Victoria, Canada), which has been modified to evaluate the valves in physiological conditions as that of the functioning heart. Through this study we aim to determine functional effectiveness of tri-leaflet PSIS bioscaffold valve sutured in the Aortic position using a pulse simulator. Hydrodynamic evaluation of PSIS aortic valves revealed that the resulting pressure and flow waveforms were physiologically-shaped. Robust forward flow was observed in both the heart valves. The in-vitro testing of the heart valves in the aortic location clearly demonstrated robust acute functionality of PSIS valves when compared to the bioprosthetic control valves thus validating further investigation of the PSIS valves for valve replacement. However there was significantly greater energy loss in the PSIS valves, possibly due to its stiffer leaflet material properties. This may be an area of concern for the long term functionality of PSIS valves, depending on its potential to support de-novo valvular tissue growth in-vivo. Hence, our next steps will involve further hydrodynamic testing and optimization of PSIS bioscaffold valves as well as in-vivo studies.

Oral Presentations
Tuesday, March 29, 2016

Health & Biomedical Sciences

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Room A

Investigating the Physiological Effects of Endotracheal Suction in the Pediatric Intensive Care Unit

Teshaun Francis

Endotracheal (ET) suction is a routine and necessary procedure for children receiving mechanical ventilation to remove accumulated secretions from the airway. The physiologic effects of ET suction with or without saline instillation during the procedure are not well studied in children. The use of saline during ET suction might help to increase sputum yield and improve airway clearance. However, saline instillation may worsen physiologic instability that can potentially occur during ET suction. This study evaluates the effect of saline on various physiologic parameters after ET suction in ventilated children. For pediatrics of mean age 6 ± 5.3, n = 26 Patients' Heart Rates, Blood Pressures (Systolic and Diastolic), Respiratory Rates, and Tissue Oxygenations were monitored continuously before and after suction; each patient had suction by routine or as-needed and saline was prescribed at the discretion of the clinician for a total of n = 332 suction events. The results reported are derived from the mean values of a 5-minute window. Heart Rate was found to increase by 3.63 bpm on average due to suction with saline ($P<0.01$), while all other parameters had no significant changes. However, when suction was performed without saline, Heart Rate, Systolic Blood Pressure, and Diastolic Blood Pressure increased by 3.14 bpm, 1.83 mmHg, and 1.34 mmHg, respectively ($P<0.01$). Tissue Oxygenation decreased by 0.28% ($P<0.01$), while Respiratory Rate had no significant change. The results of this study strongly suggest that the changes due to suction and saline are very small and can only be seen with large samples. This study shows that instillation of saline during ET suction does not worsen physiologic instability. Provided there are no other complications from the use of saline it can be safely used during ET suction.

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Health & Biomedical Sciences

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Room A

Targeted and controlled anticancer drug delivery and release with magnetoelectric nanoparticles

Alexandra Rodzinski

Our study demonstrates the effectiveness of magnetoelectric nanoparticles (MENs), which have been developed to address the critical issue of normal cell off-targeting in cancer treatment, in both in-vitro and in-vivo studies, as well as characterizes their biodistribution and clearance. Exploiting the difference in electric properties between normal and cancer cell membranes, MENs are able to enter cancerous cells carrying a therapeutic payload and release the payload intracellularly with the application of an external magnetic field, while not affecting normal cells. SKOV-3 human ovarian carcinoma cells were used as a model to showcase the unique cancer targeting capabilities of these CoFe2O4@BaTiO3 nanostructures carrying the mitotic inhibitor Paclitaxel (PTX). The MENs-PTX bond was characterized in the lysate of treated cells using spectroscopic analysis and scanning probe microscopy. SKOV-3 xenografted athymic nude mice were treated via subcutaneous or IV injection on a weekly basis with a MEN, conventional ferromagnetic nanoparticle (MN), or polymer nanoparticle (PLGA) formulation. Conventional fluorescent markers and a novel nanoparticle distribution approach based on energy ¬dispersion spectroscopy (EDS) are exploited to investigate the biodistribution and clearance of MENs. In-vitro studies on the cell lysate of MENs treated SKOV-3 cells determined reliable entry into the cells with the application of a small magnetic field (~100 Oe) and reliable payload release with the application of an a.c. magnetic field (~50 Oe, 100 Hz). In-vivo studies demonstrated that the MENs-PTX formulation in combination with an externally applied magnetic field reduces tumor growth rate when injected subcutaneously, and fully cures the cancer when delivered via IV injection. The MENs formulation was more successful in treating tumors than both MN and PLGA formulations. EDS confirmed the presence of MENs in tumor tissues. MENs provide a novel mechanism by which cancer cells are targeted (using the inherent difference between cancer and normal electric cell membrane properties) and a drug payload is released (triggered with external a.c. magnetic field application) reliably. The underlying physics of the electric field interactions involved in the MENs drug delivery system was demonstrated here using ovarian cancer, but the technology can be applied to virtually any cancer to improve patient treatment options.

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Health & Biomedical Sciences

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Room A

Drug Response Comparison of Planar and Spheroidal Tumor via Impedance Spectroscopy

Krystine Pimentel

This research establishes a methodology for automated chemotherapy assays and explores tumor spheroids cytotoxicity. Tumor cells in spheroidal morphology exhibit increased drug resistance compared to monolayer cell cultures. Impedance monitoring systems allow detection of morphological changes in 3D cellular models. Real-time impedance measurements verified that cancer cell monolayer cultures underwent apoptosis when exposed to chemotherapeutic agent arsenic trioxide. Experiments performed, evaluated changes in drug concentration and time exposure required to induce apoptosis in tumor spheroids via impedance spectroscopy. Results indicate 3D tumor models provide sensitivity of in-vivo systems to drug resistance. This work will provide information on mechanisms behind drug resistance in 3D tumor models and framework for 3D cytotoxicity assays for biosensor applications.

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Room A

Using a Humanoid Robot Along With a Registered Dietitian in an After-School Program to Promote Healthy Eating Habits and Physical Activity in School-aged Children

Nadine Mikati

The objective of this study was to determine the effectiveness of a novel 6-week after school nutrition and physical activity intervention administered by a registered dietitian with the help of a humanoid robot targeting elementary school aged children aged 6-12 years. The study was conducted across four Young Men's Christian's Association (YMCA) sites in Miami-Dade County, Florida (N= 114, Mean age: 8.16 ±1.57 years) using a pretest-posttest quasi-experimental design via randomly assigned intervention (two sites; n=63) and comparison groups (two sites; n=51). The validated Coordinated Approach to Child Health (CATCH) kids club questionnaire and the validated Previous Day Physical Activity Recall (PDPAR) were used to assess nutrition and physical activity knowledge, attitudes/beliefs and behavior change. The Inbody 230 instrument (Biospace, California) was used to calculate body composition and weight. Body Mass Index (BMI) percentiles and associated BMI z-scores for age and gender were calculated based on the Center for Disease Control and Prevention (CDC) growth charts. Data measures were collected at baseline (week 0) and one-week post intervention (week 7). Statistical analysis included independent and paired t-test for continuous variables, chi-square for categorical variables and linear regression. Results indicated that nutrition knowledge score significantly increased from 67.43% ±21.03 to 81.31% ±18.47 in the intervention group ($p<0.001$) whereas no significant increase was noted in the comparison group ($p=0.565$). PDPAR also significantly increased in the intervention group ($P<0.001$), however, a significant decrease was shown in the comparison group ($p<0.001$). It was portrayed that children in the intervention group consumed significantly more vegetables ($p=0.043$) and significantly less high fat snacks ($p=0.005$) the previous day than the comparison group post-intervention. Screen time during the week ($p<0.001$) and weekend ($p=0.022$) was significantly less post-intervention in the intervention group when compared to the control. There was no significant change in BMI z-scores pre/post intervention ($p=0.977$). Our findings indicate that this innovative 6-week intervention had promising results with respect to nutrition and physical activity knowledge and behavior change. However, a longer follow-up time would be needed to observe a change in BMI z-scores as well as sustainability of the behavior change.

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Room A

Reversibility Test on Pulmonary Arterial Hypertension

Chooda Khanal

Pulmonary Arterial Hypertension (PAH) or simply Pulmonary Hypertension (PH) occurs when pressure builds up only in the arteries leading to the lungs. PAH is a progressive and fatal disease. It is characterized by vasoconstriction and obliteration of the precapillary arterioles, which reduces the cross- sectional area for blood flow resulting chronic elevation of the pulmonary arterial pressure. The increase in pressure makes it more difficult for the right side of the heart to pump non oxygenated blood through the lungs and typically causes right heart failure and the patients die within 3 years after diagnosis if left untreated. Pulmonary Artery Smooth Muscle Cells (PASMC) are apoptosis. The stiffness (elasticity) of the arteries keeps on increasing as the time progresses. Since the pressure increase in pulmonary arteries results in right heart failure, we attempt to study the functionality and variation of right ventricle using echocardiography. We performed right heart catheterization to measured systolic, diastolic and mean arterial pressure along with cardiac output, cardiac index and pulmonary vascular resistance of 30 patients. Use of nitricoxide and/or nitroglycerin during the right heart cardiac catheterization shows the potential reversibility of pulmonary arterial hypertension.

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10:45 AM - 11:00 AM

Room A

Gender Inequality in Hepatitis C virus Infection and testing among criminal justice involved Latinos in the United States: The need for routine testing among Latina female drug users inmates

Rehab Auf

Introduction: HCV has been coined the "secrete epidemic" in the USA, as around 75% of infected people are unaware. Currently, correctional populations represents 1/3 of all HCV cases in the U.S with women having higher risk of HCV infection. Therefore, we aimed to examine the likelihood that drug-using Latina women involved in the criminal justice system will be interested in HCV testing, while controlling for knowledge of HCV related risky behavior and the risky behaviors they are engaged in comparison to drug-using Latino men. Methods: Latino offenders in Miami (n = 184), with history of recent drug use, were interviewed to assess the study aim, while employing a multivariate backward stepwise logistic regression. Results: 120 males (65.2%) and 64 females (34.8%) participated with age range between 18-51 years (average: males 29.8 & females 30.8). Around 82% reported having at least high school diploma & % 63% had a yearly income < $40,000. In the multivariate logistic regression, which explained 69% of the variance, female offenders were more likely to have a greater number of partners (OR=4, 95% CI: 1.1 – 14.7), have sex with partners who were high or drunk (OR=2, 95% CI: 1.3 – 3.3), but there was no difference in their interest to be tested for HCV compared to males (<10% took part in the study free HCV testing). Women were more likely to report that injection drugs is mainly a risk factor for HIV rather than HCV (OR=1.7, 95% CI: 1.06 – 2.8), but they were more likely to be aware that HCV infection does not lead to an immediate jaundice (OR=4.9, 95% CI: 2.3 – 10.8) and having sex while high puts individuals at greater risk (OR=1.7, 95% CI: 1 – 2.7) compared to men. No other differences were observed in other knowledge items. Conclusion: Female offenders are at higher risk for HCV infection due to being engaged in risky behavior; yet they were not more likely to be interested in HCV testing than males, even after controlling for knowledge & sociodemographic factors. Our results underscore a strong need to provide mandatory HCV screening for female offenders with history of drug intake as vulnerable group.

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Room A

Factors Influencing Physical Activity, Sedentary, and Eating Habits among FIU Students: A Qualitative Approach

Chintan Bhatt

Background: The transition between high school and college is a critical period regarding changes in eating habits and physical activity for college students. The incidence of obesity in the U.S. college-aged population has increased from 12% in 1991 to 36% in 2012. Only 45% of adults get the recommended 30 minutes of physical activity on 5 or more days per week, and adolescents are similarly inactive. Objectives: To explore students' accounts of how this transition affected their eating patterns, physical activity and overweight/obesity in Florida International University. Secondly, we aimed to collect ideas and recommendations to increase physical activity, decrease sedentary behaviors and healthy eating habits in university students. Methods: Using a semi-structured question guide, six focus group discussions were conducted consisting of 7 male and 33 female university students from a variety of study disciplines. 10 in-depth interviews were conducted to further explore the emerging ideas. Results: Students reported that physical and sedentary activities were influenced by individual factors (e.g. perceived enjoyment, self-discipline, time and convenience), their social networks (e.g. (lack of) parental control, modelling, social support), physical environment (e.g. availability and accessibility, travel time/distance, prices), and macro environment (e.g. media and advertising). Furthermore, the same themes emerged when triangulated with In-depth interview results. The relationships between determinants and university students' physical activity and sedentary behavior seemed to be moderated by university characteristics, such as residency, university lifestyle, exams and academic pressure. Recommendations for future physical activity interventions include improving information strategies regarding on-campus sports activities, cheaper and/or more flexible sports subscriptions and formulas. Conclusions: The recommendations and ideas discussed in this study may facilitate the development of effective and tailored (multilevel) intervention programs aiming to increase physical activity and decrease sedentary behaviors in university students.

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Room A

Immigration and Health inequities: Call for Social Justice

Ramandeep Kaur

Problem Statement: The southernmost region of Texas along the US/Mexico border has a high concentration of socioeconomically disadvantaged population of native born and Mexican immigrants. This region is characterized by low levels of household income and educational attainment, and high rates of unemployment and food insecurity. Objectives: This paper presents sociodemographic data collected during Beyond Sabor Study, a program designed to improve health outcomes in a food insecure population. It aims to highlight the ill health profile exhibited by the residents of the Lower Rio Grande Valley (LRGV), located at the southernmost tip of Texas. Methods: The study had a random cluster design, involving 132 sites. A total of 1237 food insecure participants reported a high prevalence of chronic diseases. Self-reported information was further validated through laboratory tests, which included measurement of blood pressure, pulse, fasting glucose, and detailed lipid profile. Descriptive analysis and chi-square tests were used. Results: Laboratory results and self- reported data, congruently, highlighted the poor health profile of this population, as a majority of the participants were overweight or obese (84%), hypertensive (66%), and pre-diabetics (75%), with many receiving no medical care for these conditions. Analysis indicated that the majority of this population consists of immigrants (73%). About 78% of these immigrants were Food Bank clients, significantly less educated, unemployed, and had low levels of income. Significance: Clinical findings from this population have significant differences, which are attributable to socio-structural inequalities, along with environmental and biological determinants. In the existing socio-political scenario of US, it is tough for this disadvantaged population of LRGV to come at par with the larger American society. Moreover, a large number of Mexican immigrants lack access to health care, as they do not qualify for Medicaid or indigent care for health services. Broader impact: Social justice is a primary concern while conducting research with this community. Public health professionals, in consensus with the Commonwealth representatives, need to advocate for political action to bring about positive change in the two important aspects of this health disparity issue: immigration and health care

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Health & Biomedical Sciences

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Room A

Human papillomavirus knowledge and perceptions among sexually diverse college students: Results of an educational intervention

Sharice Preston

Human papillomavirus (HPV) is a sexually transmitted infection that is prevalent in approximately 70% of the U.S. adult population. High-risk HPV strains cause cervical, anal, and other cancers while low-risk strains have milder outcomes such as genital and anal warts. A safe and effective vaccine initially recommended for girls was licensed in the U.S. in 2009, and in 2011 for boys also. Vaccination coverage rates remain dismal. HPV knowledge disparities persist among men and lesbian/gay/bisexual/transgender (LGBT) persons. Limited data are available about HPV knowledge and perceptions among LGBT college students. Our objective was to evaluate the efficacy of a pilot educational intervention to increase awareness and knowledge on the topic, and assess current perceptions of HPV and related health outcomes in a university setting among sexually diverse students. Participants completed matched surveys before and after a 40-minute presentation and question and answer session regarding the HPV virus, methods of transmission, related clinical outcomes, and vaccination options. Significant statistical differences were tested with chi-square. LGBT students (n=38) were similar to heterosexual students (n=43) regarding demographics and lifetime sexual experiences. LGBT students found the question and answer session more useful and rated the overall presentation "very positive" ($p<0.10$). All participants considered the session helpful in formulating a decision about vaccine uptake, and 35% had strong intentions to be vaccinated after ($p=.04$). Additionally, 75.7% of the LGBT participants found male vaccination against HPV acceptable following the intervention, an increase of 36.2% compared to pre- intervention ($p=.08$). Awareness and perceptions of HPV as a serious health threat can be improved among sexually and ethnically diverse college students through a brief, carefully designed intervention. Education on HPV and vaccination would be a cost-effective approach to increasing the currently low vaccine coverage in the absence of a national routine vaccination program. S.M. was supported by NIH/NIGMS R25 GM061347. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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Room A

Physical Activity Engagement and Barriers: A Qualitative Study of Undergraduate College Students

Jessica Weissman

According to the spring 2015 American College Health Association-National College Health Assessment II, less than half (47.2%) of undergraduate students (N = 74,438) met the American College of Sports Medicine's minimum recommendation for aerobic exercise. Moreover, many of the students reported that depression (14.8%), stress (32.5%), anxiety 23.4%, and sleep difficulties (22.0%), all health problems that have been demonstrated to improve via physical activity and exercise, had negatively affected their academic performance (ie. received a lower grade on an exam) within the last 12 months. The purpose of this study was to explore physical activity and exercise habits and trends including barriers to engaging in physical activity in a sample of college students at an ethnically diverse university in South Florida. Six focus groups (N = 40) were conducted with undergraduate students at Florida International University. Audio-recorded focus groups were transcribed manually using Microsoft Word version 2010. The following six major themes were identified by three doctor of philosophy students in public health (n = 2) and nutrition (n = 1): body image, weight gain when beginning college, time constraints, lack of motivation/laziness, unawareness of physical activity opportunities on campus, and personal health as a motivator to exercise. Findings revealed that weight gain after beginning college was common, and personal health and body image were major motivators to engaging in physical activity. Future directions include conducting a quantitative study to determine associations between physical activity and specific academic performance indicators (ie. grade point average). A campus wide campaign to address lack of motivation and time constraints as major barriers to engaging in physical activity could be a cost-effective strategy to increase physical activity among undergraduate students. Established motivators such as body image and personal health should be incorporated such curriculum. In the future, if it is shown that increasing exercise among undergraduate students has a positive impact on academic performance; colleges throughout the United States could invest in physical activity services (ie. fitness classes) and physical activity campaigns as a strategy to improve time to graduation and overall graduation rates.

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Room A

Translation and Adaptation of the Mini Mental State Examination (MMSE) into Creole for Creole Speaking Haitian Immigrants in the United States

Million Mesfun

Translation and Adaptation of the Mini Mental State Examination (MMSE) into Creole for Creole Speaking Haitian Immigrants in the United States Million Mesfun1 and Raed Bahelah2 College of Nursing1 and College of Public Health2, Florida International University Abstract The U.S. Census Bureau projects that the U.S. population will be considerably older and more racially and ethnically diverse by 2060 (US Census Bureau [US.C.B], 2012). The increase in diversity is attracting researchers' interest to focus on minority groups such as immigrants. Adapting a different lifestyle, language barriers and economic difficulties put immigrants at higher risk for psychological stress and mental problems. Consequently, there is a need to assess mental health of immigrants into the US. Although relatively small, immigrants born in Haiti constitute an expanding share of foreign-born immigrants in the US. The number of Haiti-born immigrants has increased by three fold between 1990 and 2012; constituting 1.5 percent of the total U.S. foreign-born population. There is no prior research that evaluated mental and cognitive impairments among Haitian immigrants in the US. Conducting research studies that involve immigrants requires valid and reliable measurement instruments. Using already existing valid and reliable instruments is convenient and time saving. However, these instruments need to be translated in to the native language of the immigrants. Linguistic translations and adaptation of culturally sensitive research instrument is a fundamental and critical step in designing an instrument for use in languages other than the original language. Furthermore, the increase in awareness, and expansion of cross-cultural and international health research, increases the importance of translation and adaptation of a research instruments exponentially. To the best of our knowledge, there is no MMSE translated to Creole. The purpose of the proposed study is to translate and adapt the Mini Mental State Examination (MMSE) scale in to Creole for Creole speaking Haitian Immigrants in the United States. The MMSE is a questionnaire, used in research and clinical settings to measure cognitive impairment and to screen for dementia. The first stage of this study will be translation and adaption of the MMSE into Creole for use by Creole speaking Haitian immigrants in the US using the forward backward translation and cognitive interview techniques. In the second stage of the study psychometric properties of the Creole-version of MMSE will be tested using confirmatory factor analysis under the framework of structural equation modeling. In the third stage of the study measurement of equivalence of the MMSE will be tested by comparing data collected from a sample of 150 Haitian immigrants using the Creole-version MMSE with a secondary data collected from non-Haitian US citizens using the English version MMSE in a separate study. The findings will establish the prevalence and factors of dementia and cognitive impairments among Haitian immigrants in the US using a culturally-adapted and validated questionnaire.

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Humanities I

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Room B

Carlton Moss and African American Cultural Emancipation

Nathan Seeley

In 1944, the United States Army commissioned the film, The Negro Soldier. The government authorized the project for two objects: as a training tool for incoming soldiers and to garner African American support for the war. Washington chose Carlton Moss to lead the production. Although many historians have analyzed Moss's movie, they have generally overlooked the creator himself. This project redresses that oversight. It examines Moss's life and career within the particular history and meaning of the film and his other works. In doing so, it reestablishes Moss at the forefront of a liberal movement for African American Cultural Emancipation. Carlton Moss coined the term "Cultural Emancipation" to define a vital part of the struggle for civil rights. He believed that political reform would be a gradual process. Changes in legislation would only occur after Americans as a whole had a better sense of racial equality. Men and women like Moss believed that cultural productions on stage made political statements. Although African American control of black cultural representations was an unworthy substitute for economic or political rights, those like Moss viewed it as a necessary first step before securing civil rights reform. Moss worked within radio, theater, and film to promote the idea of Cultural Emancipation. These mediums of popular culture allowed Moss to reach a broad range of Americans. As the first black playwright hired by the National Broadcasting Company (NBC), co-director of New York City's Lafayette Theater of the Federal Theater Project, and filmmaker who produced one of the first positive portrayals of African Americans on the screen, Moss's impact has long been underestimated.

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Room B

Cultural-isms in the face of Modernism: Emerging Spatial Representations in the Caribbean

Marsha McDonald

Since the first bid for Independence by Haiti, the Caribbean islands have been the basis of change through the establishment of nations. From Haiti, Cuba to Jamaica, Barbados and Trinidad, who gained their nationhood as recent as 1960s, it seem that our colonial past and slavery days could no longer facilitate the emerging cultural identities as the new nations began to implement new policies and create new spaces to represent and present new identities. What is our culture and thereby what is our cultural heritage? Can we tear it down and remake as easy as we tear down a building? What will be built in its place? The modern era birthed many new nations as colonial powers such as Spain and England lost many territories due to wars or began a process of decolonization. This coincided with the development of Modernism as an architectural style and as a social lifestyle which began to change the tapestry of the world. How did these Caribbean nations respond to this new age of modernity and what did the emerging cultural framework provide to the new nations? Did the new style provide these new nations an avenue to distinguish themselves culturally and spatially? What was the resultant cultural landscape in these nations and ultimately how was that translated into our built environments? Culturalism in the face of Modernism is a look at how these main Caribbean island-nations pursued the notion of cultural identity as a spatial representation especially during the 1940s to 1960s, though the investigation of maps, photos and publications.

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Room B

"I Am a Coversation": Steven Universe, Deconstruction, and the Ethics of Gem Fusion

Jorge Cartaya

Steven Universe, an animated television series airing on Cartoon Network, actively interrupts its audience's understanding of the traditional, Western philosophical notions of the individual and community. The performative aspects of Gem Fusion—bowing, dancing, and the purposeful melding of each character's instrumental motif to disinter a new musical arrangement—highlight that this communicative and constitutive act must occur between, for, and toward partners to even occur at all. By watching the characters fuse with one another, the audience learns that fusion is "a conversation" between consenting, respectful, and often loving partners. What begins to emerge from the audience's experience is a consciousness of accountability to the other whom we, like the characters, are toward. I claim that the visual metaphor of Gem Fusion embodies the understanding of being as "being-with," or the idea that our existences as singular beings is inextricable from a relation with—or towardness to—others. To be with and to be toward is inherently ethical in that it establishes accountability to others, thus giving us some language to discuss Steven Universe's ethical impact. Thus Gem Fusion's visual metaphor also provides a more accessible avenue to our understanding of these notoriously difficult concepts from deconstructive ethics. I argue that the series's creator and showrunner—Rebecca Sugar—may be attempting to foster this sense of ethical accountability in both her target demographic of children 7+ and its older viewers alike. In combination with the series's progressive engagement with themes of sexual, gender, racial, and neuro-diversity—as well as its critiques of colonialism, imperialism, oppression, and discrimination—Sugar and her team are able to both encourage their audience to adopt more accepting attitudes toward marginalized groups and create a space for these marginalized groups to encounter and explore positive, nuanced representations of themselves in media.

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Room B

Bounded Grievance in Transnational Contexts: Nations, Bodies, and Histories

Renata Bozzetto

This paper historicizes narratives of difference in order to critically examine the emergence of solidarity in social media spaces. Social media platforms, such as Facebook, are increasingly relevant in the articulation and maintenance of social networks. At the same time that social media create new spaces for social relationships, indicating globalized contexts and the interconnectivity of contemporary reality, these platforms also seem to inform historical conditions that interconnect certain kinds of individuals while isolating others. This project is a conversation about the raced, gendered, and sexualized narratives that are implicitly and explicitly advanced in the politics of translocal solidarity and mourning. I examine the fast dissemination of information about certain kinds of crises and ask: why do individuals utilize their social media profiles to demonstrate solidarity to some communities and not to others? I focus on the distinct social media responses to two events that occurred in November 2015: the terrorist attacks in Paris, and the bursting of Fundão Dam in Brazil. The global solidarity that is displayed in social media demonstrates that certain bodies might be allowed to move freely both through historical accounts and digital spaces; more importantly, these default bodies are grievable. I start by analyzing race, gender, and sexual narratives across time and space, in order to demonstrate how such categories have been mobilized to define static subjects in translocal contexts. In a next section, I discuss different ways through which feminisms have been articulated to address precarious conditions that trespass borders. I argue that a feminist consciousness that is committed to decolonization enables the emergence of necessary forms of translocal accountability both within social media and beyond these platforms.

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Room B

Forming modern subjectivities in the internal colony: Jewish women social scientists and their transracial, transdisciplinary and transnational networks, 1920-1965

Abby Gondek

Jews in the first half of the 20th century were objects of internal colonization and participated in research that served the colonial/imperial agenda of their nations. This archival dissertation [method] considers how the anti-racist stance taken by Jewish female social scientists was a way to fight anti-Semitism by "remote control," to try to understand their otherness through "the most other" [results/conclusion]. I interrogate how Jewish female social scientists (like women in imperialist and nationalist struggles from the late 19th century until WWII) proved their nationalist-imperialist belonging and "modern" subjectivities through their research with black and indigenous women [objective]. Studies of Jewish social scientists lack analysis of gender and sexuality, while studies of women social scientists who were Jewish lack inquiry into the gendered and racialized Jewishness of their theorizing [problem]. Histories (including feminist histories) of anthropology and sociology problematically examine (1) individual women in isolation from each other or racially segregate women; (2) the history of the disciplines in isolation; and (3) scholars within one national context [problem]. Women are typically remembered as the "daughters" of a prominent figure rather than in-network with female scholars. Instead of looking at individual "heroines," I use a feminist post-colonial approach to social network analysis [method] to investigate the transracial, transdisciplinary and transnational networks between women theorists [objective]. I concentrate on women's networks to challenge the assumption that what "counts" as "theory" are "male" domains: public-macro-institutional [significance]. I intervene in the foundations of social science knowledge by studying the knowledge-production of women social scientists across racial boundaries, and investigating how their positions informed their critiques of the theoretical divisions between the realm of the micro-private-social-cultural and the macro-public-institutional-structural [broader impact].

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Room B

Consumption and Culture Through Symbolism: A Study of the Brazilian Soap Opera Império

Fernanda Da Silva

This study discusses the relationship between consumption and culture with symbolism, using the Brazilian soap opera Império as an object of study. It strives to understand how signals and symbols can work through mediation to bring about a message to an audience. The research is done with a bibliographical basis consisting of various authors in the Communications field, including Brazilian culture theorists. After building a solid theoretical structure, the research moves on to the soap opera, and an analysis of multiple episodes is done by a formatted annotation of characteristics noticed in each of the main characters in every scene. These characters made up four different plots of the story, but did interact with one another as well. The symbols analyzed included clothes, accessories, hairstyles, house furniture, gadgets, and professions, among others. As a conclusion, it was noticed how the soap opera made a clear division between the characters, creating two groups based on their economical status. These two groups shared similar symbols that dictated to the viewer what a poor person and a rich person in Rio de Janeiro, Brazil, as of 2015, looked and acted like. This study is useful in current times as a red flag for studies on the relationship between social status and representation in the media, calling attention to the fact that even as technology changes the relationship between media and audience, symbols are still present and utilized to mediate messages.

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Humanities I

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Room B

Development and the "Socialism for the Twenty-First Century"

Diego Zambrano

This paper evaluates the performance of the "twenty-first century socialism" implemented in Venezuela between 1999 and 2015. The evaluation consists on an analytical revision of several socioeconomic indicators gathered from Venezuelan and international databases related to development. First, this paper outlines the theoretical framework of the "twenty-first century socialism." Then, it analyzes the performance of the indicators regarding the official goals of the "twenty-first century socialism" established in its theoretical framework and determines its successes and failures. Such weaknesses and achievements are compared to the same indicators of other South American countries in order to determine the exceptionality of the alternative model. This test indicates that the "twenty-first century socialism" had a negative performance in developing Venezuela; it failed to achieve most of its goals, its failures are exclusive of the model, and its successes seem to be consequence of regional trends.

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Humanities I

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Room B

The Evolution of Power Transition Theory: A Lakatosian Analysis

Deniss Kaskurs

For over five decades power transition theory has provided policy makers with insights about power dynamics and state behavior in international politics. The theory has also generated lots of scholarship and continues to receive interest within the academic community. The aim of this paper is to analyze the evolution of power transition theory through the perspective of Imre Lakatos's methodology of scientific research programs. In this paper I reconstruct the development of the power transition theory by analyzing the theory's core assumptions, its negative and positive heuristics and subsequent scholarly works that expand the theoretical and empirical framework of this theory. Analysis shows that the assumptions that nations are the key actors in international politics; national power is determined by demographic, economic and political development; and the international order is hierarchically structured, are at the core of the power transition theory. The negative heuristic discourages the use of models that posits the importance of non-state actors and the absence of order in the international system. The positive heuristic suggests constructing conceptual and operational definitions of political development and state dissatisfaction with the international order. Finally, the study shows that subsequent scholarly works such as the multilevel hierarchy model expand the theory's framework by predicting new facts. On the other hand, the alliance transition model does not expand the framework because it does not predict novel facts. The vitality of the power transition theory will require continues efforts to expand the theory's framework so that it generates new testable propositions.

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Room B

Enhancing Credibility in the Shadow of the Commitment Problem: A Mixed-Method Examination of the Rhineland Crisis

Yang Gyu Kim

Problem Statement The literature on the bargaining model of war has focused heavily on the informational problem (uncertainty in the opponent's intention and capabilities). The commitment problem (difficulty in committing oneself to abide by a present-day agreement in the future due to its expected favorable position later on), however, has received relatively little attention from the scholarship. Research Objectives With this gap in mind, this paper aims to test the impact of those measures used for increasing the credibility of a signal in the game that contains the informational problem if they are applied in a game that involves both the informational and the commitment problems. Research Methodology This paper stylizes the Rhineland crisis in 1936 with a complete-information model reflecting factors suggested in the literature, and predicts possible outcomes of the game. The model's assumptions and causal mechanism are tested by investigating the case through process-tracing methods. Results/Conclusions This study shows that an introduction of the commitment problem to a game where the informational problem already exists transforms the dynamics of the game from a contest of resolve into a contest of capabilities. It also finds that among the three independent variables – war costs, probability of victory, and audience/reputational costs –, the probability of victory matters most in increasing the threat credibility. Contribution/Significance; Broader Impacts The scholarship of the international crisis has been remarkably silent about the impact of the commitment problem on actors' behavior and strategic thinking during crises. Many crises in the real world, however, involve both the informational and the commitment problems at the same time, which leads policymakers to deal with doubly uncertain dynamics. This study's findings, thus, contribute to the literature by broadening its research scope as well as suggesting a causal mechanism that shows how the presence of the commitment problem changes actors' strategic calculations during crises.

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Humanities I

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Room B

The gendered priorities and needs of internally Displaced Persons in post-earthquake Haiti

Nicki Fraser

The field of Disaster Management is rich in research covering the phases of preparedness, response, mitigation, and short-term recovery. Yet researchers often overlook the critical phase of long-term recovery (Rubin 2009; Jordan and Javernick 2012). This becomes a dire issue when dealing with the needs of the Internally Displaced Persons (IDPs) particularly women, who are often stuck in a recovery limbo, in neither a permanent development community nor recipients of humanitarian aid. This study has three aims: First, to understand the rebuilding needs and priorities of IDPs in Haiti through a gendered lens. Second, to determine gender specific factors that enable or hinder women's participation and voice. Last, to assist policy makers, Non-Governmental Organizations (NGOs), and International Financial Institutions (IFIs) in addressing the needs of women IDPs. In order to accomplish the aforementioned goals, qualitative research will be utilized in several of Haiti's IDP camps encompassing focus groups, semi-structured interviews, and participant observations. This research hopes to provide scholarship, which will enhance the literature on gendered long-term recovery. Disasters are often deeply disempowering for women, yet they can also create potential spaces for women's empowerment when women's voices are incorporated in the long-term recovery phase. This study utilizes the frameworks of Human Development Theory (HDT), and Albert Hirschman's (1970) Exit, Voice, and Loyalty in an attempt to explore and examine the often-sublimated priorities and needs of women IDPs in Haiti. This research will draw on how these frameworks within the context of Disaster Management, Feminist Studies, and Public Administration may clarify IDP gender issues in the process of long-term disaster recovery. The study is significant because it will help us understand the priorities of women which are not well understood and the factors which enable or hinder their participation. The study will have implications for government officials and international aid agency representatives interested in incorporating women's needs into recovery process ad in involving tem in decision making processes We hope the research will positively impact the lives of IDPs.

*Abstract rescinded by applicant

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Humanities I

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Room B

Gendered Experience of Emotional Labor- Lessons from the Haiti Earthquake

Pallavi Awasthi

Post-disaster contexts demand intense emotional engagement from disaster response and recovery workers in the form of desired emotional displays at work. Yet, there is a lack of research in public administration that adopt a gendered lens to understand emotional labor during disaster response and recovery, especially in international contexts. To fill in this gap in the literature, this study compares the gendered experience of emotional labor and consequences of emotional labor (e.g., burnout) among those involved in response and recovery efforts in the aftermath of the 2010 Haiti earthquake. The study's focus is on both types of emotional labor: (1) surface acting: displaying the professionally appropriate emotions without actually feeling them; and (2) deep acting: modifying the inner feelings to appear authentic to the intended audience. The study reveals that although both types of emotional labor are an unquestionable requirement for effective disaster response and recovery operations, male workers are more likely to experience burnout in post-disaster contexts. The primary data collection methods for the study include approximately 80 in-depth interviews and 120 close-ended surveys with response and recovery workers involved after the Haiti earthquake, such as representatives of international aid agencies based in Haiti (e.g., International Federation of Red Cross and Red Crescent Society, International Organization for Migration) as well as members of search, rescue and medical teams deployed from the U.S. to Haiti after the earthquake. The importance of the research is threefold. First, it will help disaster response and recovery workers better understand their emotional work and the factors that contribute to job satisfaction and burnout. Second, a better understanding of emotional work in the aftermath of disasters will help ensure the success of disaster relief and recovery programs undertaken by international aid agencies or national governments. Third, the study will help agencies that are involved in charge of response and recovery enhance their organizational performance by outlining gender-based strategies that could help these agencies recruit their employees and reduce the harmful effects of emotional labor in the workplace (e.g., through enhancing the work environment, training and support, and organizational culture).

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Humanities I

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Room B

Perspectives on Ecocultural Ethics in Jaina Philosophy

Venu Mehta

Humans have indubitably pushed themselves and all other lives in ecological crisis. This condition has poised a stage of re-thinking to monitor the violence, neglect and the form of compassion towards nature on the earth. A perspective of ethics needs to be attached while approaching nature with ecocultural lens. As people draw out their concepts and implications towards nature from their culture and religion, an ethical framework can also be drawn out of culture and religion. Jainism is one of the most ancient religions of the India tradition, despite its antiquity; it resonates well with modern concern of the ecological movement. The paper discusses Jainism as having ethical framework to match an interdisciplinary and interconnected relationship with nature. Jainism offers a world-view that is compatible with core values associated with environmental activism. Jainism in its prime philosophy holds value of non-violence towards everything living and non-living on the earth. The study discusses how the Jaina philosophy emphasizes the concept of right to exist beyond the human realms to other species and natural formations. Jainism focuses on co-existence towards nature with not only as religious practice but as logic to survive and thrive. Jainism offers all logical, moral and ethical reasons to have compassion and respect towards nature, while living with-within it and while framing the context of consuming it. In this regard, the paper discusses Jainism's philosophy to have bio-centrism, eco-centrism and deep-centrism models for the relationship between human and nature. The study throws light on how Jaina philosophy makes an explicit connection between human and other species. The paper attempts to inquire how the Jaina world-view and ethic can inspire an effective ecological vision. The paper explains how the Jaina idea of a connecting web corresponds with scientific understanding.

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Humanities II

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Room C

Willingness To Pay and Determinants of Household Choice for Sea Level Rise Adaptation Plan

Sisi Meng

Accumulating evidence indicates that global sea levels have been rising at an accelerating rate. This trend, linked with global warming, is posing a great risk to the communities living in the low elevation coastal areas. Florida is particularly vulnerable to the effects of sea level rise (SLR) due to its low topography, porous geology, subtropical climate, and densely populated coastal counties. We have conducted a household survey in selected Florida coastal communities to understand the household preference on different sea level rise adaptation plans. This survey is used to identify the determinants of households' preferences for adapting to increased sea level in the short term (10 -20 years) and in the long term (30-50 years). We also examine the differences and similarities in perceptions and preferences for adaptation options among yearlong and seasonal residents. The socio-economic characteristics of households that affect their preferences are explored. In particular, we use a series of choice experiments and random parameters logit models to compute the households' willingness to pay (WTP) for different attributes of SLR adaptation policies. The empirical evidence can provide important inputs to the design of optimal adaptation plans and mitigation policies to avoid risks posed by climate change-induced sea level rise.

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Humanities II

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Room C

An intersection between governmental policies' potential and the construction of identity.

Vanessa Leon

Identity is an ongoing social process, in which a group of individuals strategically embody in a daily basis. Several countries, particularly Latin American ones, have tried to impose a national identity. Recently, national policies emerged from the ideology of XXI Century Socialism in Ecuador attempting to strength indigenous identity in tourist communities. Nevertheless, that strategy did not reach an internal recognition of their indigeneity and did not leave any legacy of collective identification. In stark contrast to all of these government efforts to promote the region's indigenous roots, local people remain largely unconvinced of the value of an indigenous identity. This work aims to understand how locals perceive the indigenous identity reinforced by national governmental plans. The research contends that identity politics cannot be an external imposition. People deal with their identity on a daily basis while communities strategically use it according to their needs. By documenting a new case about the intersection between governmental policies and how local people deal with identity recognition, this case study contributes to the extensive discussion about identity politics. Besides, this case includes a variable that lacks investigation but highly significant in Latin America: XXI century socialism policies. The present research identified the policies applied by the Ecuadorian government strengthening the indigenous identity of tourist communities. Also, the research examined census data to identify the indigenous nationality the communities answered to belong. Finally, interviews and focus groups, allowed to registering how locals perceive and value their indigenous identity.

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Humanities II

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Room C

An Investigation of Food Service Employee Illegal Drug Practices Using Social Learning Theory

Kristen Kaminski

There is a general consensus that employee drug use is detrimental to work environments and company success (Elliot & Shelley, 2006; Strazewski, 2001). Previous research (Kitterlin, Curtis, & Cervara, 2014; Kitterlin, Moll, & Moreno, 2015) has confirmed illegal drug use to be prevalent among foodservice workers. When compared to other sectors, the foodservice industry has been found to employ the largest number of illegal drug using workers. Previous research has highlighted aspects of the foodservice industry that may facilitate employee drug use ("Industry must take steps", 1997; Spector, 2001; Hoffmann, Brittingham, & Larison, 1996). The question remains: Does the foodservice industry attract illegal drug users, or does the industry breed illegal drug users? Thus, the purpose of this study is to investigate the prevalence of illegal drug use in the food and beverage industry with the application of social learning theory. Hypotheses: H1: The foodservice industry attracts illegal drug using employees. H2: The foodservice industry creates illegal drug using employees. Proposed Methodology: The population for study will consist of foodservice employees in the United States. Five hundred full-time and part-time employed food and beverage workers, in both the front and back of the house, will be surveyed using the SLT & Drug Use Survey, a self-administered questionnaire developed by the researchers for foodservice employees to complete. The instrument will include questions about demographic information, as well as perceived rewards and punishments related to drug use, social desirability, and responses to questions derived from the Drug Abuse Screening Test (DAST). Application to Education and Industry: In order to fully understand the phenomenon of excessive drug use among foodservice employees, it is necessary to conduct further academic research. Results of this study may indicate a greater need for pre-employment and/or random drug-testing policies within the restaurant industry. This study may also identify a need for change within the culture of the restaurant industry, specifically with regards to recruiting, screening, selection, and supervision.

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Humanities II

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Room C

Impact of Cultural Factors on Sexual Harassment in the Hotel Industry: A Comparison of Eastern and Western Workplace

Xiaochan Wu

Problem Statement: In recent years, sexual harassment has become a major issue for the entire hospitality industry and has gained increasing attention by researchers. Although previous studies have examined sexual harassment in terms of causes of and consequences to both individuals and organizations, there is a lack of investigation in the Eastern lodging industry, as well as comparatively against Western lodging companies. Examining the aspects of sexual harassment in these two distinctly different cultures may yield valuable findings on the perception, reporting, and prevention of sexual harassment in the Eastern lodging industry. Research Objectives: This study seeks to examine differences in victims' and organizations' perceptions, responses and prevention strategies to sexual harassment, as well as the cause of any differences based on power and cultural perspectives. Research Methodology: These differences will be investigated across four samples of hotel employees from two cultures (Eastern and Western) and two occupational levels (front line and management). The participants will be given a Likert-type scale to rank different behaviors as to what they feel constitute sexual harassment and how they respond to sexual harassment issues. ANOVA and regression analysis will be conducted to analyze research data, and Hofstede's (1980) cultural theory will be used to explain any differences between these two cultures. Contributions/Significance: Findings are expected to offer strategies to help managers determine helpful communication strategies for handling targets of sexual harassment in different cultures, as well as organizations and individuals who have business or work in other countries with different workplace cultures. Keywords: sexual harassment; culture; lodging industry; Eastern and Western workplace

Oral Presentations
Tuesday, March 29, 2016

Humanities II

10:15 AM - 10:30 AM

Room C

Between Regulation and Prohibition: Drug Policy in Uruguay and Ecuador

Nicolas Beckmann

As part of my broader research agenda, which focuses on explaining variations of drug policy across Latin America, the present project examines recent changes in the drug policies of Uruguay and Ecuador. In the year 2013, both of Uruguay's parliamentary chambers approved a drug policy reform, designed to regulate the entire production and commercialization of marijuana, from plant to end-user. Once all of the measures proposed by the new law are implemented, Uruguay will be the first nation state to have legalized the sale and consumption of marijuana in its entire territory. Ecuador has chosen a different approach to respond to its current upsurge of domestic consumption: After having taken a series of steps towards treating drug use as a health problem rather than a criminal offense, in September 2015 it decided to toughen up penalties for drug possession, and by doing so criminalizing the possession of small amounts of illegal narcotics. The present project seeks to explain why Uruguay and Ecuador have chosen such different approaches to drug policy. In doing so, it studies the impact of three different factors: (1) the specific drug-related problems that affect these countries; (2) the preferences of the countries' societies on drugs and crime; and (3) regional norms and incentives. Drawing on public opinion surveys, media sources, and statements of politicians, this project advances the argument that Uruguay's marijuana reform was essentially driven by finding adequate solutions to its drug-related problems as well as regional incentives, whereas the Ecuadorian approach was guided primarily by the values and preferences for a punitive approach of its society.

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Tuesday, March 29, 2016

Humanities II

10:30 AM - 10:45 AM

Room C

Immigration Policies and Impacts on the American Religious Landscape: A Case for Teaching Religious Subjects

Raymond Awadzi

ABSTRACT The movement of people from one country to another and the subsequent settling of migrants in host communities diversely affect all parties in relocation processes. Directly or indirectly, both migrant and their host communities respond differently to the worldviews of the migrants and the socio-cultural contexts of the host communities. While the religious beliefs of people appear to be the least considered values of parties involved in the migration processes, its centrality in orientating the behavior patterns of the parties cannot be downplayed. This makes people's religious beliefs and practices an important value for knowing, understanding and creating an atmosphere of tolerance and harmonious leaving in societies. It is more important, especially in America, where changing policies are applied to immigration processes. Since the enactment of the First Amendment however, the United States has relegated teaching and learning of religious subjects in her foundational education curriculum. This stance towards religious education has its own ramification on people's socio-cultural and political behavior. On the one hand, the removal of religious subjects has denied citizens the opportunity to learn about religious values of the other and subsequently becoming ignorance about how people's religious values shape their behavioral in the society. On other hand, the absence of transmitting authentic knowledge about people's religious orientations with academic approaches leaves individual to acquire religious knowledge from sources which sometimes impact knowledge grounded on misinformed religious indoctrination. Considering the ever increasing religious diversities in America with immigration as a major factor, this paper explores the extent to which immigration has changed the religious landscape of the American society in a pluralistic one. Using Otto Maduro's framework of power, knowledge and values, I argue that religious underpinnings influence the outcomes of encounters between migrants and their respective host communities in America. And one of the surest ways of keeping tolerance with other's religious worldviews, prevention of conflicts and crime fashioned out of misinformed religious indoctrination is for America to consider reintroduction of teaching and learning religious subjects into the foundational education curriculum.

Oral Presentations
Tuesday, March 29, 2016

Humanities II

10:45 AM - 11:00 AM

Room C

Climate Change & International Security: Mass Migration, Social Clashes, and Unrest. The Impacts of Climate Change in Darfur, Sudan

Felix Reynoso

The Darfur region of Sudan is currently undergoing serious climate change situations that may prove difficult in the years to come. Due to the fact that Darfur has a heavy history of violence, climactic variations have made it all the more difficult to achieve overall peace along with socioeconomic and political stability. Environmentalists and scholars have researched the region and found severe levels of drought, deforestation, and diseases. Although it is essential to understand the ramifications of the effects of climate change, international relations scholars, myself included, are more interested as to how climate change has impacted Darfur's political sustainability, social structure, population displacement, guerilla warfare, and mass migration. The reaction of neighboring countries to guerilla warfare and mass migration should also be taken into account as a result of this climactic shift. The remaining portion of this article will present an introduction to Sudan and Darfur, list population statistics as well as the breakdown of social structure, and summarize their violent history. Once a foundation of Sudan/Darfur history has been established, the concept of climate change will be applied and its effects such as drought, desertification, and spread of diseases will be taken into account. In addition, migration waves from Darfur to Chad and Central African Republic will be analyzed in order to discuss how these host countries are receiving Darfur refugees and understand their reasons for fleeing. Finally, the importance of merging discourses between climate change and international relations will be presented, along with a few policy recommendations and suggestions.

Oral Presentations
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Humanities II

11:00 AM - 11:15 AM

Room C

A National Assessment of the Role of Crime Prevention through Environmental Design Approach in Campus Safety

Auzeen Shariati

The issue of campus safety has been raised as a matter of great concern in recent years. The growing rates of on-campus crimes and the serious problems that students may experience following their victimization have highlighted the importance of taking proper preventive actions to deal with the issue of crime on university campuses. While efforts to make school campuses safer commonly focus on greater policy restrictions and policing procedures, another approach entails the manipulation of environmental design to reduce the suitability of campus facilities as a venue for crime. It remains uncertain, however, whether campuses with more secure designs experience less crime. This study examines the application and impact of Crime Prevention through Environmental Design (CPTED) on the extent of campus safety. It is hypothesized that campuses with design regulations that are consistent with CPTED principles will have lower rates of crime incidents compared to those campuses that do not. The study relies on a quantitative comparative assessment of a national sample of college campuses. Implications for policy are discussed.

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Tuesday, March 29, 2016

Business

12:45 PM - 1:00 PM

Room A

Are Female CFO more efficient in investment?

Mohammad Nazrul Islam

I have examined the association between chief financial officer (CFO) gender and investment efficiency. Based on the findings of prior studies on gender differences in variety of decisions settings—risk taking attitudes, financial judgments, quality of accounting, and compliance with regulation—I hypothesize that firms with female CFOs will be more efficient in investment. The empirical findings, based on 123,506 firm-year observations for the year 1993 to 2014, support my hypothesis. The study shows that firms with female CFOs are more likely not to overinvest and underinvest, after controlling for other variables that prior research has shown to be associated with investment efficiency.

Oral Presentations
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Business

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Room A

Why Can't We Be Friends?

Zachary Thames

Problem Statement: Lick your finger, apply finger to the corner of page, lift page and continue to read the pages of any economic book and you will discover that economies are built on production and consumption. Presently, the number of black businesses producing products is extensively low, a contributing factor to why only “2 cents of every dollar an African American spends goes towards black owned businesses.” (Kenney, Nicole. "Know Your Worth: If We Don't Know, We Can't Grow Our Community." Know Your Worth: If We Don't Know, We Can't Grow Our Community. NAACP, 24 Sept. 2012. Web. 11 Feb. 2016.) On the contrary, black people consume extensively as was documented in 2013 when black people were projected to have a “buying power of $1.1 trillion by 2015.” (Baker, C. Daniel. "African-American's Buying Power To Be $1.1 Trillion By 2015." Black Enterprise. N.p., 13 Nov. 2013. Web. 11 Feb. 2016.) This lack in the production and consumption balance of economics is the reason why too many black communities struggle fiscally. Research Objectives: Identify the following reasons: Why do black businesses appear sparse? Why have national banks such as J.P. Morgan and Citibank settled multi-million dollar lawsuits for racial discrimination against wealthy blacks and black businesses but yet faced very little backlash? How to increase percentage of black dollar going into black businesses? How to increase circulation of black dollars within black community? Research Methodology: Gather information from current events, macro and microeconomic situations of communities within the United States and conduct interviews of my peers to garner their opinion on current state of the black community. Conclusion: The establishment of black business partnerships within black communities. Contribution/Significance: This will solve the aforementioned questions which lead to significant steps being taken that will improve the economies of majority black communities which as a result will lower the crime rate of such communities, increase college graduation rates, and lessen community dependency on federal government and a decrease the United States wealth gap. Broader Impact: Improve the economic trajectory of the people of the United States of America regardless of their race.

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Business

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Room A

A New Take on the Relationship between Interest Rates and Credit Spreads

Qianying Zhang, Brice Dupoyet, & Xiaoquan Jiang

We revisit the link between interest rates and corporate bond credit spreads by applying to the relation Rigobon's (2003) heteroskedasticity identification methodology. Accounting for endogeneity problem, we find that credit spreads respond negatively to interest rates, a result consistent with the implications of Merton's (1974) structural model. The negative relation is robust to macroeconomic shocks, interest rates characteristics, different volatility regimes, bond ratings, and callability features. Finally, we show that business cycles could quite plausibly be responsible for the negative relation, significantly more so than the option feature embedded in callable corporate bonds.

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Business

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Room A

The Extreme Poor Hand-To-Mouth

Nazmul Islam

This paper introduces a new dimension of hand-to-mouth(HtM) that is not mentioned in Kaplan et al.(2014), which is extreme poor hand-to-mouth (EP-HtM).This group of households holds negative liquid and illiquid assets. The EP-HtM faces some financial obstacles due to recession or other reasons for several periods. They even have to borrow liquid assets for their livelihood. This study represents how the EP-HtM households' consumption responds to the income and this HtM households' characteristics control variables, and it shows the comparative analysis to other HtMs used in Kaplan et al.(2014). I used PSID survey data on U.S. household portfolios in this paper. In this study, liquid assets include the value of checking and savings accounts, money market funds, certificates of deposit, savings bonds, and treasury bills, plus directly held shares of stock in publicly held corporations, mutual funds, or investment trusts. Liquid debt includes credit card debt, student loans, medical or legal bills, and personal loans. Net illiquid wealth is the value of home equity plus the net value of other real estate plus the value of private annuities or IRAs and the value of other investments in trusts or estates, bond funds, and life insurance policies. Net worth is the sum of net illiquid and net liquid wealth. The EP-HtM households spend the maximum portion of their additional income to pay their debts. This may result in their low MPC. They are the poorest group of the society in addition of being about 7 percent of the whole households. This suggests this type of hand-to-mouth households needs its own unique place in frameworks that are to be used for analyzing and forecasting the effects of fiscal policy and macroeconomic modeling.

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Business

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Room A

Global Value Chain, Exchange Rate Pass-Through: Re-visiting the trade competitiveness

Syed Al-Helal Uddin

How exchange rate changes pass-through to relative prices of exports and imports with increasing participation in global value chains? Does this pass-through change the conventional notion of the relationship between exchange rates and trade? This paper measures the exchange rate-pass through under production chains, where intermediate inputs are shared between and among countries in a back-and-forth manner for producing a single final product. For the empirical estimation of the pass-through, I use World Input-Output Database (WIOD). Empirical estimation suggests that ignoring the value-added by trade will cause a systematic upward bias. From the empirical investigation it is evident that sectors which are highly integrated in the global market have a lower exchange rate pass-through compared to the sectors that are less integrated.

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Business

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Room A

Latin American export structure and China growth spillover

Yulin Hou

Strong growth of China and its increased integration with the global economy have significant effects on the Latin America and Caribbean region (LAC) for the last decade and a half. The recent trade boom favored raw-material exporters in LAC and resulted in a strong concentration of exports to China in a few products. Therefore, some countries in LAC exploited these opportunities while other countries missed. Countries that better take advantage of this positive demand shock would enjoy important windfall profits and experience faster growth. However, the empirical basis for judging this issue has been weak so far. I address these concerns by using a database of 17 LAC countries and built an index of potential trade with China in order to solve self-selection problem. I also employ treatment and control regression analysis with difference-in-differences method. I find evidence that the LAC countries with the higher levels of exports to China were the countries that grew faster even if during the great recession over the last decade and a half.

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Business

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Room A

Making The Connection: Cross-Cultural Management Course and Cultural Intelligence

Chen Wang, Kowoon Kim, & Mary Ann Von Glinow

As multinational corporations (MNCs) are likely to rely more heavily on expatriates to run their foreign operations, there has been a growing recognition about cultural intelligence (CQ) as one of the key predictors of expatriate success. Consequently, the importance of CQ becomes more apparent than it has ever been before in today's multicultural business environment. The purpose of this study is to examine the impact of cross-cultural management course on the four factors of cultural intelligence – Metacognitive CQ, Cognitive CQ, Motivational CQ, and Behavioral CQ – and their inter-correlation. We found empirically that cross-cultural management courses have a positive impact on all four factors of CQ, especially when it increases correlation amongst the four CQ factors. The implication of these findings will be discussed with regard to whether the current cultural training programs are most effective in developing employees' CQ.

Oral Presentations
Tuesday, March 29, 2016

Business

2:45 PM - 3:00 PM

Room A

Significance of cyber security in IT industry

Mounica Velisetti

Most businesses in today's era are completely reliant on information technology. As the world is highly digitalized and interconnected, the term cyber security is important for every government and non-government (IT sector) organizations to protect their records from data breaches. The fresh breed of attacks are more advanced and sophisticated affecting all the possible domains of IT organization. Leading companies realized that in a digital world, cyber security is the key to protect their most valuable assets such as intellectual property, employee records like social security numbers and financial information. Major cyber-attacks are seen in IT industry to hack highly secured business critical information. Exploit vector is the path by which hacker can gain access to computer systems for data breaches. So the cyber security helps to stop infiltration mechanisms of today's cyber attacks and persistence. IT risk cannot be avoided or eliminated completely, so it is critical to mitigate the exposures as much as possible by developing an information security plan. This study explains the main factors that makes organization vulnerable to data breaches due to single factor authentication, major exploit vectors of malware, types of social engineering attacks and long term drivers shaping the cybersecurity industry. This study describes the role of multi factor authentication for risk mitigation considering large-scale breaches, role of ethics in information security, governance in the age of information security, challenges in meeting expectations around information security. Finally this study recommend the companies to invest significant amount of money in securing the business critical information and to deploy multi-factor authentication technologies to secure the applications from hackers. The companies should follow both defensive and offensive measures (partnership with government) to combat cyber-attacks. The results of this study includes compliance standards to be followed and strong counter measures implemented at the global level to defend against malicious activities.

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Business

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Room A

She Likes Me. She Likes Me Not. He Does Not Like Me. I Spend a Lot. How Sexual Acceptance and Rejection Induce Men and Women to Strategically Change Their Consumption

Broderick Turner

Despite the fact that sexual rejection is experienced by almost every consumer at some point in their life, there is little theoretical or empirical work done to examine how these events affect consumer behavior. This work explores the impact of sexual in the domain of consumer spending, and captures differences in gender and relationship status. Using work from parental investment theory, and error management theory, we demonstrate that sexually excluded men spend more money (vs save more money) when they are engaged in mate attraction (vs in a relationship). Whereas men who are sexually excluded by their partners save more money (vs spend) when compared to men engaged in mate attraction. Further we show the opposite effect for women. Women who are sexually rejected by their mate spend more money (vs save). While women who are sexually rejected by a potential partner save more money (vs spend). Overall results suggest that sexual exclusion drives people to spend strategically to improve their reproductive success. Theoretical and practical implications are provided.

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Business

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Room A

Choosin'- The Game of Choices

Marcus Herndon

We are human, we are social beings. Every so often, we are engaged in or invited to a party or event. Similarly, every so often, those parties or events are boring or lack the amount of excitement or interaction most people desire from a "social" atmosphere. The purpose of this proposal is to showcase a new party game, Choosin'- The Game of Choices, which brings a new perspective to entertainment and interaction, while mixing childhood concepts like truth or dare with modern day group, card games. The audience for this game includes anyone of college age and older who simply want a fun and interactive party game, possibly even a chance to meet new people and friends!

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Business

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Room A

The indirect effects of transformational leadership on counterproductive work behaviors

Jose F. Rodriguez & Valentina Bruk-Lee

This paper attempts to place the role of transformational leadership within the stressor-strain process by investigating the potential indirect effects of transformational leadership on counterproductive work behaviors. Online questionnaires were completed by 200 participants, mostly working in the field of higher education. A moderated mediated relationship was found in which transformational leadership transmitted its effects onto counterproductive work behavior through non-task organizational conflict. However, this indirect effect was moderated by individual differences in interpersonal locus of control. Implications for future studies that integrate the literatures of leadership and occupational health psychology are explored.

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Business

4:00 PM - 4:15 PM

Room A

Estimating the Value of Statistical Lives from Hurricane Evacuation Behavior: An Empirical Analysis

Fan Jiang

The value of statistical life (VSL) to understand the economic value placed on changes in the risk of loss of human life is widely used. The value of statistical life reflects the aggregation of people's willingness to pay (WTP) for avoiding risk and the economic value for a society to reduce the statistical incidence of premature death in the population. Studies on the value of a statistical life have been extensively done in a wide range of contexts; however, very few such studies can be found for natural hazards. This paper presents an empirical analysis that estimates individuals' willingness to pay for hurricane evacuation. We analyze the hurricane evacuation decision of households using revealed and stated preference (SP) methods using data from a survey of Texas residents who experienced hurricane Ike (one of the costliest hurricanes that have impacted the United States). We also estimate an average individual's willingness to pay for avoiding hurricane risk under voluntary and mandatory evacuation order and calculate the associated value of statistical life. Our Results indicate that an individual's marginal willingness to pay is approximately $4269 to $6051 under voluntary evacuation order and about $5897 to $8946 when the evacuation order is mandatory. The VSL estimate is between $2.1 million and $4.4 million depending on the type of evacuation order. By using the $ 2.1million VSL, approximately 6 lives saved would justify a mandatory evacuation order, relative to a voluntary evacuation order. These estimates may be useful for future hurricane evacuation planning. We strongly believe that the findings of the paper will be useful for the community planners in Florida.

Oral Presentations
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Psychology

12:45 PM - 1:00 PM

Room B

Scandinavia's Rightist Parties: How Its Ideology & Electoral Success is Related to Other Parties

Anand Shastri

This article focuses on the relationship between ideology and electoral success of the rightist, populist/nationalist, party in each Scandinavian country in comparison to other parties with representation in their respective parliaments. The main goal of this study is to see if changes in the ideological distance between right-wing, nationalist parties and other parties in the left-right political spectrum are correlated to the electoral success of these rightist parties. The ideological distance will be measured by taking the 1) mean and 2) median score of other parties in comparison, and seeing how it varies from one parliamentary election to the next. I hypothesize that an increase in ideological distance from right-wing, populist/nationalist party and the other parties with representation in government will result in a greater percentage of the vote garnered by the rightist parties. I use data from the European Election Database for ideological descriptions of the parties, and in one election, voting shares as well, and also gathering data from the Comparative Manifesto Project for voting shares, and also the left-right, ideological scale scores. For Denmark's right-wing, populist/nationalist party, the Danish People's Party, the findings are mixed with a split on confirmation vs. disconfirmation. Yet the degree is small in any direction, which could imply a static left-right score, not that impacted by other parties. In the case of Norway's rightist, Progress Party, there is a strong relationship between the variables, as elections go from distant past to recent, but it is in the opposite direction than hypothesized as this rightist party gained vote share as their ideological gap narrowed, and it moved decisively towards the middle. Yet it was the only party on the right by the end, so it had a monopoly. In the case of Sweden, there was an exact non-linear pattern as data points, but in the opposite direction than anticipated. As the rightist party moved to the Center, it garnered a noticeably larger percentage of the vote, while whenever it moved to the Right, its share collapsed.

Oral Presentations
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Psychology

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Room B

State-Formation and Violence: Explaining Variations in State Capacity in Chile and Peru

Onur Erpul

International Relations Theories have generated a wealth of explanations concerning how and why states ally with each other in order to overcome the challenges of international anarchy. In contrast, "internal-balancing" or what states can do domestically to improve their geopolitical competitiveness, is understudied. To rectify this deficiency, I propose that state-building policies are a form of internal balancing. I explore this idea by addressing the pervasiveness of intra-state violence in South American countries, which are attributed to a legacy of institutional weakness resulting from a relatively pacific state-formation period. My contribution is in improving on previous frameworks to study state-building policies and applying them to previously unexplored cases, fleshing out new indicators of state-capacity, adding refinements to existing literature, and connecting the literature on State-Formation/Transformation with International Relations Theory and Latin American security.

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Psychology

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Room B

Social Laterality in Spider Monkeys (Ateles fusciceps rufiventris): A Test of the Cerebral Dominance Hypothesis

Emily Boeving

Reports of lateralized behaviors (e.g., functions associated with one brain hemisphere) are widespread in vertebrate and invertebrate animals. The left hemisphere is thought to be dominant for simple, learned activities while the right hemisphere is thought to be involved in fear responses and monitoring during social interactions. The cerebral dominance hypothesis specifically places social behaviors in the right hemisphere, however behavioral asymmetries to elucidate functional differences between hemispheres for social behavior has been sparse. Non-human primates may be of particular importance for testing this hypothesis given their complex social repertoire. We tested the hypothesis that socio-behavior is related to hemispheric specialization in Colombian spider monkeys (Ateles fusciceps rufiventris). We predicted a left side bias (right hemisphere) across three dyadic socio-communicative behaviors: face-embrace-vocalization, embrace, and grooming. These behaviors were chosen because they are broadly social and widely classified as affiliative behaviors. If the affiliative socio-behavioral function is the same, then we would expect these to be organized similarly at the hemispheric level. We utilized an ad libitum sampling method to record 186 hours of matched-to-time samples of observational data (N=15). Multinomial tests indicated embrace and face-embrace-vocalization were both lateralized to the left side of the body ($p< 0.001$) while grooming was lateralized to the right side of the body ($p<0.001$). The results suggest that while these three behaviors are broadly social, there may be critical differences in function causing differential hemispheric organization.

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Psychology

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Room B

Habenula activity following positive and negative feedback among abstinent cigarette smokers

Jessica Flannery

Objective: The habenula (HB) is an epithalamic nucleus that inhibits dopamine-releasing neurons following the absence of an expected reward, possesses a high density of nicotinic acetylcholine receptors (nAChRs), and is linked with the aversive effects of nicotine withdrawal and high nicotine doses. Given that nicotine withdrawal is associated with reduced activity in the mesocorticolimbic pathway during nondrug-related reward processing, elevated HB activity during early abstinence may contribute to such hypoactivity. Here we examined a response-feedback task previously shown to differentially activate the HB as well as the insula, anterior cingulate cortex (ACC), and ventral striatum (VS) among nonsmoking participants. As an initial step towards characterizing the impact of smoking status, we aimed to confirm task-related fMRI effects among abstinent smokers. Methods: 24 overnight-abstinent smokers participated in 6 fMRI sessions during a two-drug (nicotine and varenicline), placebo-controlled, double- blind crossover study. To probe HB functioning, we employed a "motion prediction task" in which participant responses (correct vs. error) were followed by performance feedback that did or did not provide information about trial outcomes (informative vs. non-informative). Task-related regions were anticipated to show differential activations on error-trials versus correct-trials followed by informative, but not non-informative feedback (i.e., a whole-brain RESPONSE x FEEDBACK interaction, pcorrected<0.01). Results: Assessment of task-related effects across all sessions identified differential activations following positive versus negative feedback in the HB, insula, ACC, and VS. Specifically, the whole-brain RESPONSE x FEEDBACK interaction indicated that HB activity was increased following informative negative feedback relative to informative positive feedback, whereas no difference in HB activity was observed following non-informative feedback. Similar effects were observed in the insula and ACC. In contrast, VS activity was increased following informative positive feedback relative to informative negative feedback. Conclusions: As previously observed among nonsmokers, abstinent smokers showed increased HB activity following negative feedback, a signal inverse to that of the VS. These data support a role for the HB in reward processing and suggest the feasibility of this paradigm to further probe the impact of smoking status and drug effects on such brain activity.

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Psychology

2:00 PM - 2:15 PM

Room B

Resting state functional connectivity of the human habenula using ultra-high field, high-resolution imaging at 7T

Katherine Bottenhorn

The habenula is a small brain region immediately posterior to the medial thalamus and dorsal to the posterior commissure. This region, implicated in reward processing, receives input from several subcortical regions and projects to midbrain regions, modulating serotonin and dopamine release. To more broadly investigate the interactions between the habenula and the rest of the brain, we used a seed-to-voxel analysis to probe the intrinsic connectivity of the habenula. Data were collected from 22 healthy individuals on a 7-Tesla Siemens MAGNETOM scanner housed at Auburn University's MRI Research Center. We acquired structural and resting-state functional images with sub-millimeter resolution. The habenula was manually defined in each subject's native space and used as a seed region from which we extracted the mean fMRI signal time series and assessed correlations between that seed region's time course and the time series of voxels in the rest of the brain. Our seed-based analysis uncovered temporal correlations (Pcorrected < 0.0001) of the habenula's fMRI signal with regions known to be structurally connected, including the caudate and putamen (CPu), internal globus pallidus (GPi), nucleus accumbens, and substantia nigra (SN). Connectivity was demonstrated between the habenula and midline regions including the anterior, mid- and posterior cingulate cortex (ACC, MCC, and PCC), ventromedial prefrontal cortex, thalamus, and cerebellar vermis. Cingulate clusters appeared to extend into the paracingulate sulcus, supplementary motor area (SMA), and pre-SMA. The correlation between habenula and ACC activity suggests an integration of conflict monitoring into habenula's negative feedback and processing of reward prediction errors. Furthermore, habenula connectivity with nodes of the cortico- basal motor loop (CPu, GPi, SN, SMA, pre-SMA) supports the notion that the habenula is involved in the translation of negative feedback to goal-directed action (or the inhibition thereof). This, combined with implied connections to hubs within the default mode network, indicates that the habenula potentially plays a role in integrating associations between actions and negative consequences into the mental rehearsal component of mind-wandering. This study is the first to assess the functional connectivity of the habenula with ultra-high field imaging, necessary for obtaining the resolution needed to investigate a structure of its size.

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Psychology

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Room B

Examining Error Monitoring and Attentional Control in Youth with and Without Anxiety

Michelle Ramos

As anxiety disorders are of the most common psychological disorders observed within a pediatric population, understanding the neural mechanisms underlying its etiology may be useful for informing treatment and diagnosis. One neural correlate is the error-related negativity (ERN), an event-related potential (ERP) component associated with error detection (Moser et al. 2013). Specifically, individuals with anxiety have been shown to display greater ERN amplitude compared to healthy individuals (Ladoucer et al., 2006). Additionally, it has been proposed that error monitoring is an appraisal component aiding in furthering cognitive control (Botvinick et al., 2001). However, few studies have examined these differences within a pediatric population. The current study examined the ERN in youth with an anxiety disorder (N=15, 10 male, 11 years) and non-anxious youth (N=15, 9 male, 11.8 years). Participants completed 384 trials (50% congruent) of the arrow version of the Eriksen flanker task (Eriksen & Eriksen, 1974) while simultaneous EEG was collected. Data were filtered, segmented, and baseline corrected offline and the ERN was identified within a 0-75 ms time window post-error. Youth completed the child version of the Attentional Control Scale (ACS-C; Derryberry & Reed, 2002) to assess focus and shift attention, and parents completed the Parent version of the Screen for Child Anxiety Related Disorders (P-SCARED; Birmaher et al., 1995) to assess child anxiety symptoms. Controlling for age, we saw a trend towards significance between anxious symptoms and ERN amplitude, $r(21)= -.412$, $p= .051$, showing that higher levels of anxiety corresponded to larger, more negative ERN amplitudes. Repeated measures ANOVA with site (Fz, Cz) as the within subjects factor and group (anxious, non- anxious) as the between subjects factor was conducted. No significant interaction or main effects for the ERN were found. When individual differences in attentional control were examined in relation to ERN amplitudes, a marginal positive correlation was found, $r(21)= .40$, $p= .059$. While no group level differences in ERN amplitudes were found, results suggest that individual differences in anxiety and attentional control may be more predictive of ERN amplitudes. Moving forward, we will be exploring attentional control as a possible moderator between ERN amplitude and anxiety.

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Psychology

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Room B

Parenting Stress and Child Behavior Problems: A Meta-Analysis

Nicole Barroso

BACKGROUND: Research has demonstrated an association between parenting stress and child behavior problems and suggested levels of parenting stress are higher among parents of children at risk for behavior problems, such as those with autism and developmental delay (ASD/DD). However, no meta-analysis has systematically examined the relation between parenting stress and behavior problems and the level of parenting stress among high-risk clinical populations. OBJECTIVE: Conduct a meta-analysis on existing empirical studies of parenting stress and child externalizing and internalizing behavior problems among different clinical populations. METHODS: We searched Arts and Humanities, Science, and Social Sciences Citation Index, MEDLINE, ProQuest, PsychINFO, and Google Scholar. Two reviewers assessed studies against predetermined inclusion criteria. RESULTS: One-hundred thirty-three studies met criteria for inclusion and had sufficient data for analysis. Parenting stress more strongly related to child externalizing (weighted ES r = .57, d = 1.39) than internalizing (weighted ES r = .37, d=.79) problems. Moderation analyses indicated that the association between parenting stress and child behavior problems was stronger among studies which had mostly clinic and male samples. Overall parenting stress levels were higher for parents of children with ASD/DD compared to parents of children with psychological diagnoses or at-risk for psychological problems and children with chronic illnesses. LIMITATIONS: The methodology of the reviewed studies (e.g., cross-sectional findings and parent report) limits conclusions about the findings, such as the directionality of effects. CONCLUSIONS: Findings document the association between parenting stress and child behavior problems and highlight the importance of assessing parenting stress as part of routine care in pediatric primary care, especially for populations of children at high-risk for behavior problems, such as children with ASD/DD.

Oral Presentations
Tuesday, March 29, 2016

Psychology

2:45 PM - 3:00 PM

Room B

Do Individual Differences in Processing Speed Predict Comprehension of Dimension Terms?

Rosalie Odean

Our knowledge of when and how children learn to comprehend words has grown enormously, largely from research examining children's comprehension of nouns. However, to develop a comprehensive theory of word learning requires that we understand the development of other words types, including words that describe features of our spatial world. Differences in how children comprehend and process spatial terms are important to our understanding of individual differences in performance on spatial reasoning tasks, a skill linked to success in Science, Technology, Engineering, and Mathematics (STEM). The current study investigates three-year-old children's comprehension and processing of English dimensional adjectives or words that describe the dimensions of objects, such as the size of objects. A total of 19 three-year-olds viewed pairs of images depicting one of four dimensional adjectives (i.e., large, small, long, short) on a television screen and were asked to identify a target image via a spoken verbal cue (e.g., "Can you find the long pencil?). A Tobii X60 eye-tracker recorded children's total looking to target image after hearing the verbal cue (i.e., comprehension measure) and time to shift to target image upon hearing the verbal cue (i.e., processing speed measure). Children's processing speed of dimensional adjectives predicted the size of children's dimensional adjective vocabulary. Future research will examine whether these early individual differences in dimensional adjective comprehension and processing speed are predictive of later spatial ability. By developing measures of individual differences in spatial reasoning at even younger ages, we will be able to determine which children need extra help earlier, so that all children will have a strong foundation in spatial skills when they begin school.

Oral Presentations
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Psychology

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Room B

Prenatal Light Exposure Affects Coordinated Movement in Bobwhite Quail Chicks (Colinus virginianus)

Starlie Belnap

Motor development and cognitive development are thought to be inter-related. One example of how these processes may overlap is seen in hemispheric specialization. In precocial birds, light has been shown to play a fundamental role in the development of hemispheric specialization and cognitive processing. There is mounting evidence to suggest motor coordination may also be affected by exposure to prenatal light experience. The aim of this study was to assess the relationship between prenatal light exposure and the development of coordinated movement in bobwhite quail hatchlings. We experimentally modified the amount of prenatal light experience quail embryos received prior to hatching. Embryos were randomly assigned to four light conditions, no light, 2 hours of light, 6 hours of light, and a normal low-light control. Birds were tested and video recorded from an anterior camera walking down a Plexiglas runway at three developmental time points (12 hour, 24 hour, and 48 hour post-hatch). The videos were scored and analyzed for number, duration, and latency of forward movement, a measurement of coordination, and falls, a measurement of instability. Results indicated that light affects post-natal coordinated motor behavior after accounting for individual variation and age effects. Quail chicks in the dark and 6 hour light conditions had a significant increase in the number of falls compared to controls, indicating an increase of instability with the decrease of light exposure. Overall the number of forward locomotion movements increased with a decrease in light exposure, suggesting that chicks were taking smaller steps to cover the same distance. Taken together, these results suggest that light influences the development of motor coordination, potentially through the facilitation of hemispheric lateralization.

Oral Presentations
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Psychology

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Room B

Longitudinal Effects of Elevated Levels of Non-Clinical Maternal Depression on Infant and Maternal Behaviors during the Still-Face Paradigm

Vanessa Vieites

Maternal depression can significantly influence infant social and emotional development (Feldman et al., 2009). Previously, it has been shown that infants of clinically depressed mothers display blunted levels of negative affect when their mothers discontinue interacting with them during the still-face paradigm (SFP; Field et al., 2009). Similarly, 5-month-old infants of mothers with elevated, but non-clinical levels of depression display blunted emotionality, suggesting that even slight elevations in maternal depression can significantly influence infants' affective behavior (Alfonso et al., 2015). To examine whether elevated levels of maternal depression continue to affect infant affect during the SFP, infants (N=63, 32 male) were assessed in the SFP at 5 and 9 months. A variety of infant and maternal behaviors were coded using the Infant and Caregiver Engagement Phases (ICEP; Weinberg & Tronick, 1999). Maternal depression was assessed at 5 months using the Beck Depression Inventory (Beck et al., 1961). Repeated measures ANOVA with age and phase as the within-subjects measures and maternal depression as the covariate revealed a significant Phase x Maternal Depression interaction effect ($F(2,122) = 4.273$, $p = .016$) on infant negative engagement. Follow-up analyses of each age separately revealed a significant Phase x Maternal Depression interaction effect ($F(2,122) = 3.803$, $p = .025$) on infant negativity, whereby blunted negativity during the still-face phase was present at 5 months, but not at 9 months ($p > .39$). Furthermore, assessment of infant social monitoring at 5 months revealed a marginal Phase x Maternal Depression interaction effect ($F(2,122) = 2.853$, $p = .062$), whereby lower levels of social monitoring were present during the reunion phase. Maternal positive engagement and social monitoring were also analyzed; however, maternal depression had no significant bearing on any of the maternal behaviors explored. Conversely, analysis of the main effect of maternal depression on mother-infant matching on social monitoring at 5 months revealed a trend toward significance ($F(1, 61) = 3.308$, $p = .074$). Hence, sub-clinical maternal depression does not appear to affect maternal behaviors toward the infant. These results demonstrate that slight elevations in maternal depressive symptomology can have a substantial impact on infant affect and behavior, but do not necessarily have a long-lasting influence.

Oral Presentations
Tuesday, March 29, 2016

Psychology

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Room B

Graying in Paradise? Aging Gay/Bisexual Latino/Hispanic Men of South Florida

Victor Vila

The number of aging people in the United States (U.S.) is growing (Clover; 2006; Cohn & Taylor, 2010; Fenkl, 2014). According to census data persons 65 years and older numbered 44.7 million in 2013 and by 2060 there will be an estimated 98 million (Census, 2013). While there is a growing body of literature examining aging in Hispanic (Kim, et al, 2009; Al Hazzouri et al, 2011; Afable-Munsuz et al, 2013) and gay communities,(Clover, 2006; Johnson et al, 2005; Knochel, 2011Fenkl, 2014) there are few studies that specifically examine the experiences of older Latino/Hispanic gay men as discussed by the National Hispanic Council on Aging ([NHCOA], 2013). This is concerning given that this unique population must negotiate multiple levels of marginalization, not only directed toward them as a member of an ethnic group, but as aging lesbian, gay, bisexual and transgender (LGBT) people thus creating a matrix of oppression (Sidanius & Pratto, 1999; Crawford, et al, 2002; Jost et al., 204; Ahmad, 2010; North & Fiske, 2012; Stone & McMinn, 2012; Fenkl, 2014). This proposed research will examine the social relationships that help and hinder older gay Hispanic men's aging well- being. Specifically, this study will identify social relationship structures, functions, and quality, to understand their association with well-being around aging concerns in this population. As method of data collection and analysis that provides rich description and special access to the lives of individuals, qualitative methods will be used to explore two key research questions (Babbie, 2005; Berg, 2006; Charmaz, 2006; Fenkl, 2014): 1) What social relationships do older Latino/Hispanic gay men perceive as having an influence on their health and aging experiences?, and 2) How do these social relationships help and/ or hinder older Latino/Hispanic gay men's ability to address these factors influencing their health and aging experiences? This study will include a sample of 20 men between the ages of 50 to 70 years of age, self-identifying as gay or bisexual and who identify as Latino/Hispanic will be recruited. This project has the potential to help this vulnerable and under-represented population and can add to the understanding of the special needs of aging gay ethnic minorities in the U.S.

Oral Presentations
Tuesday, March 29, 2016

Psychology

4:00 PM - 4:15 PM

Room B

Role of Social Workers in Addressing Poverty Among Refugees: Case of Afghan Refugees

Mitra Ahmadinejad

Poverty causes diverse individual and social problems, varying from negative health issues to more multifaceted consequences like violence and crime (Morduch, 1994; Tanumihardjo et al., 2007) . Despite universal efforts for poverty alleviation, this problem still impacts vulnerable populations around the world. Among individuals prone to poverty, are refugees, who have been forced to flee their countries of origin with very limited resources (Potocky-Tripodi, 2002) . Of particular concern are Afghan refugees, one of the world's largest and most long-standing refugee populations (United Nations High Commissioner for Refugees [UNHCR], 2014). This population is mainly concentrated in two immediate neighboring countries to Afghanistan: Iran and Pakistan. Anecdotal available data on this population and analysis conducted by the author confirms a high rate of income poverty among Afghan refugees in Iran. To conduct the analyses, a secondary data set has been used. The utilized data set consisted of socio-economic information of 2,035 Afghan households in Iran (Ahmadinejad, 2011). For calculating income poverty, Foster- Greer-Thorbecke's poverty matrix method was applied (Foster James, Joel Greer, & Erik Thorbecke, 1984) . Key findings of the study included: i) high rate of income poverty among the surveyed population, ii) higher rates of poverty in urban and rural areas in comparison to colonies. Social workers are well positioned to address the problem of poverty among Afghan refugees. They can alleviate the poverty at the macro level by advocating for Afghan refugees' rights and at the micro level through an effective referral system and investment on refugees' social capital.

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Psychology

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Room B

Dyadic Self-Administered Cognitive Training for Healthy Older Adults: A Novel Approach

Natalia Shtompel

Age-related cognitive decline has been linked with negative effects on individual, family, and societal levels. Cognitive vitality helps prolong independence and maintain quality of life in non-demented older adults. Research shows that cognitive engagement is among protective factors for cognitive vitality. Cognitive training typically involves either group, onsite, paper-and-pencil interventions or individual, home-based, computerized interventions. To date, none of the interventions involved peer-learning, where older adults engage in cognitive training in pairs without a facilitator. The present study evaluated feasibility and participant acceptability of a novel, dyadic approach to cognitive training (N = 22). In this approach, two familiar or non-familiar older adults met twice a week for up to 12 weeks and took turns giving each other paper-and-pencil tasks targeting verbal memory, attention, and visuospatial processing. The facilitator was present during the first session only to show how to use the training manual, and checked in with participants over the phone. Pre-and post-intervention assessment included measures of executive functioning (Trail Making Test and Stroop Test) and a battery of comprehensive neuropsychological functioning (RBANS-Update). The study also included a qualitative component, as the participants were interviewed with regard to their experience with the training. Preliminary findings are reported.

Oral Presentations
Tuesday, March 29, 2016

Psychology

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Room B

Problematic video game play in a sample of children and youth: An empirical examination

Stephanie Diez

Introduction: Researchers have identified psychological and physical consequences of excessive internet and video game utilization among youth. The DSM-V has included Internet Gaming Disorder as a condition warranting more research. However, most research has focused on problematic video game use among adolescents outside of the U.S. with little research comparing adolescents with pre-adolescent children who are also frequently engaged in video game playing. This exploratory study reports the degree of problematic video game play in a diverse community sample of children and adolescents, using a valid and reliable established measure of problematic video game playing. Methods: The sample consisted of one hundred and sixty children the mean age of participants was 12.6 years (SD = 3.2), with most (n= 76, 48%) of elementary school age. In addition to providing the brief demographics, participants completed the nine-item Problem Video Game Playing scale (PVP). Higher scores on the PVP indicate more problematic video game playing use. As this was an exploratory study, planned analyses examined differences in PVP scores with age and gender, and any interaction effects. Results: There was a significant interaction effect between gender and school age level, $F(2, 24.43) = 32.45$, $p = .03$, partial $\eta 2 = .043$. Mean scores for younger males had the highest problematic gaming scores ($M = 4.47$), followed by males in middle school. However, high school aged males had the lowest problematic gaming scores of the entire sample. With the girls, there were no significant differences between school age groups, $F(2, 78) = .93$, $p = .40$. However, there was a significant difference across age groups for the boys, $F(2, 75) = 11.47$, $p < .001$, partial $\eta 2 = .234$. Discussion: Elementary school aged males presented with the most problematic video game use. Gaming platforms are becoming less expensive and more portable, which makes the risk of problematic gaming an increasing concern among children. There is a need for continued surveillance among this age group. Given the older males had the lowest PVP scores, longitudinal studies are needed to examine if risk reduces with ages and what factors effect problematic use.

Oral Presentations
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Education

11:30 AM - 11:45 AM

Room C

Employee Engagement & Generational Differences

Markease Doe

Employee engagement is exhibited differently and changes generationally. The different types of employee engagement, and shared life experiences define the characteristics of each generation and shape generational perception on employee engagement and how each generation actually engages at work. As a result, generational differences, characteristics, and shared life experiences make salient how employee engagement changes.

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Education

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Room C

Using the HPST Framework to improve Reading Comprehension with Students with Intellectual Disabilities in a University Setting

Jose Pombo

The Historic, Philosophic, Societal, and a Takeaway (HPST) Framework, a pedagogical guide developed for document analysis (Pombo, 2015), was implemented in Project Panther LIFE, a postsecondary transition program at Florida International University in Miami, Florida. The HPST Framework was used as a tool to interpret, understand, extract content knowledge, and create higher order connection making from a selection of text with students in the Panther LIFE program who are diagnosed with an Intellectual Disability (ID). The purpose of this study was to explore the necessary adaptions for the implementation with students with ID at the university level as well as their reading comprehension outcomes. Students partook in a series of three focus group sessions using the assigned literature. Results from the sessions demonstrated that the Framework assisted students with ID in higher order thinking and connection making with minimal accommodations. Further implementation and research is necessary to explore long-term reading comprehension levels as well as the implementation of the HPST Framework in diverse settings.

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Education

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Room C

Construction of Stereotypes and Their Effects of Education

Indira Gil

This paper explores the construction of stereotypes through historical accounts and how these stereotypes have been manifested in education. It examines the choices students make when choosing their classes and careers and questions the validity of these stereotypes. The stereotypes considered are women as caretakers, men superior in the sciences, and Black and Latinos in need of control. The data used to investigate this topic consists of articles, books, and government statistics.

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Education

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Room C

Examining College Level Chinese International Students' perceptions toward Black People and Racism – Ac case study at Florida International University

Xiuyuan Yang

This research was conducted with seven Chinese college level students, through interpersonal interview, to explore their perceptions toward black people and racism. Three key findings were concluded, and corresponding suggestions were provided.

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Education

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Room C

Difficulties Encountered in Class by College Level Chinese Students in Academic English: A Focus on Chinese Students Who Ae Enrolled in Beihang-FIU Program

Yinhong Duan

This study was conducted with four Chinese international students who are enrolled in the Beihang-FIU program, and are currently studying at FIU . It examined their difficulties in academic English through interpersonal interviews, and data was sorted into four categories: listening, speaking, reading, and writing.

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Education

1:00 PM - 1:15 PM

Room C

Longitudinal Study of Students' Participation in Review Sessions of Active Learning Classroom

Binod Nainabasti

We analyzed the relationship between students' participation in classroom review sessions during two Interactive Learning Environment (ILE) physics courses in a studio format that implemented the Investigative-Science-Learning-Environment (ISLE) curriculum and their success through the courses. Research has shown that ILE can be an effective learning environment for acquiring transferrable knowledge. These classroom review sessions took place at the beginning of each class meeting throughout the two courses and were student directed. To quantify students' participation we coded the review sessions in real time without videotaping according to a coding scheme that we developed which included codes for interacting, disengagement and uncodable. Each student was assigned a single code for the entire review session. We found that students' interactional codes during the first semester were strongly predictive of their interactional codes during a subsequent semester. This indicates that students directed interaction does not bring changes in their nature of participation.

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Education

1:15 PM - 1:30 PM

Room C

Investigation of Physics Identity within a Classroom Social Network

Eric Williams

Underrepresented minority students in the United States face unique challenges across the Science, Technology, Engineering, and Math (STEM) fields, but the situation in physics is especially concerning: of all the physics bachelor degrees awarded nationwide, only 3% go to African American students and only 4% to Hispanics. This low representation can be investigated through the perspective of student self-beliefs and social cognitive constructs, which can vary with student ethnicity. One such construct is physics identity, or how strongly a student "feels like a physics person." Physics identity has been shown to be positively correlated with greater chance of choosing to pursue a physics degree, higher student persistence in finishing the degree, and increased likelihood of choosing a physics career. To this end, understanding how physics identity develops may present actionable best practices to implement in the classroom. There exist three main components of physics identity, the most promising of which – recognition, or how strongly a student feels that other people "see them as a physics person" – is strongly impacted by a student's social group. In this study, we investigate the relationship between students' physics identity and their social interactions within a collaborative-learning Modeling Instruction introductory physics course at Florida International University. A preliminary version of the Conceptual Understanding and Physics Identity Development (CUPID) instrument is used to measure student identity, while Social Network Analysis (SNA) is used to calculate centrality – a measure of how embedded or "central" a particular student is within the classroom social network. Results indicate that incoming recognition beliefs do indeed predict student interactions within the classroom, as measured by centrality. This research contributes to a body of work that supports active-learning classroom structures, is among the first of its kind to unite SNA methods with social cognitive constructs, and forms the basis of a larger project that investigates the relationship between identity, centrality, and persistence to confront and resolve the critically low representation of Hispanic students in physics.

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Education

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Room C

Classroom Instruction Promotes Posterior Medial Cortex Brain Activity During Problem-Solving: An fMRI study on Physics Learning

Jessica Bartley

Modeling student thinking in physics is often measured by observing physics problem solving (PPS); this then informs education research on effective teaching strategies. However, no neuroeducation study has characterized the neurobiological processes underlying PPS or skill development via classroom instruction. We used functional magnetic resonance imaging (fMRI) to delineate PPS brain networks and probe differences resulting from a semester of college physics instruction. 15 students (age 18-24; 9 male) underwent pre- and identical post-instruction fMRI sessions wherein they solved physics problems. We assessed brain activity and identified regions more engaged post- relative to pre-instruction ($P<0.05$). FMRI data revealed consistently left lateralized fronto-parietal networks contributing to PPS. Moreover, significant increased activity in dorsal posterior cingulate (dPCC) and retrosplenial cortices (RSC), accompanied by improved PPS scores, following instruction implicate this region's critical role in physics learning. As RSC/dPCC likely supports spatial memory and attentional focus [1,2], pre- vs. post-instruction activation shifts suggest educational experience augments brain activity which, in turn, contributes to enhanced PPS skills. These novel neurobiological observations provide insight into how classroom learning may drive large-scale brain network reorganization in physics students. [1] Leech et al. 2014 Brain 137: pp12 [2] Vann et al. 2009 Nat Rev Neurosci 10: pp792

Oral Presentations
Tuesday, March 29, 2016

Education

2:00 PM - 2:15 PM

Room C

Pre-Kindergartners' Gains in Spatial Skills

Carla Abad

Hispanics and women are underrepresented in STEM fields; given increasing demands for STEM skills and the growing Hispanic population, it is important to explore factors leading to this underrepresentation. One factor predictive of entry and achievement in STEM disciplines is spatial thinking. The current study explores early sex differences in a variety of spatial skills within a Hispanic population to better understand the development of spatial thinking in young girls and minority children. Ninety-three Hispanic Spanish/English bilingual children completed a spatial assessment battery at the beginning and end of pre-kindergarten assessing their ability to: (1) rotate shapes and objects (Children's Mental Transformation Task); (2) reconstruct patterns using colored blocks (WPPSI-III's Block Design test); (3) make analogies between two spatial figures (Spatial Analogies subtest from The Primary Test of Cognitive Skills); and (4) comprehend words for a variety of spatial concepts (Boehm-3 Preschool Test of Basic Concepts). Results suggest boys and girls differed in their gains on the mental rotation task, with girls improving significantly more than boys. These findings point to the importance of examining factors that potentially affect the development of spatial thinking, including the role of early education, spatial activity experiences, and spatial language input, particularly in girls and minority youth.

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Tuesday, March 29, 2016

Education

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Room C

High School Science Experiences of Three Non-science Major Undergraduate Students

Feng Li

The percentage of female students choosing science majors in college is still low in the U.S. compared to their male counterpart. Hispanic students are also underrepresented in college science majors in the U.S. To address this issue, it is important to identify factors that influence high school students' choice of college majors. This study was intrigued by the finding from PRiSE project data analyses that factors from high school biology experiences and career outcome expectations can only explain 13% of students' biology identities, along with the 16% correlation coefficient between high school physics experiences/career outcome expectations and students' physics identities in the physics field. I developed the research idea of qualitatively exploring non-science majoring undergraduate students' perceptions of their high school science experiences and, from their perspectives, the influence of their high school science experiences on their choice of non-science college majors. In this study, I conducted semi-structured interviews with three participants respectively, who were Hispanic female non-science majoring undergraduate students in a southern university in the U.S. I explored and identified factors from the participants' high school science experiences that, from their perspectives, influenced their choice of a non-science college major. The most critical experiences that impacted their interest, motivation, and subsequently persistence in science were teaching styles and instructional strategies that their high school science teachers used in science teaching. All three participants claimed that their high school science teachers did not connect science concepts with real life, which made science meaningless to them. It will also be discussed how their Hispanic background and/or their female gender role influenced their perceptions and further construction of high school science experiences. This study can contribute to developing a survey questionnaire to collect data for more predictive power to college major choice and students' persistence in science. Findings in this study can also be employed by high school science education researchers and practitioners to encourage more students, particularly Hispanic and/or female students, to pursue science degrees in college.

Oral Presentations
Tuesday, March 29, 2016

Education

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Room C

Beyond Performance Metrics: Examining a Drop in Students' Physics Self-Efficacy Through a Social Networks Lens

Remy Dou

The Modeling Instruction (MI) approach to introductory physics manifests significant increases in student conceptual understanding and attitudes toward physics. In light of these findings, we investigated changes in student self-efficacy while considering the construct's contribution to the career-decision making process. Students in the Fall 2014 MI course at Florida International University exhibited a significant decrease in total self-efficacy (N = 73) as measured by the Sources of Self-Efficacy in Science Courses – Physics (SOSESC-P) survey. This unexpected decrease was also seen on the "verbal persuasion" sub-section of the survey, and suggested a more nuanced view of the generally accepted benefits of active-learning curricula. Given the highly interactive nature of the MI course and the drops observed on the SOSESC-P, we chose to further explore students' changes in self-efficacy as a function of centrality measures (i.e., relational position in the classroom social network). We collected social network data by periodically asking students to list the names of peers with whom they had meaningful interactions. While controlling for PRE scores on the SOSESC-P, bootstrapped linear regressions revealed POST self-efficacy scores to be significantly predicted by inDegree and PageRank centralities (r2 = .33 and .35, respectively)—the former defined as the number of times peers listed a particular student on network surveys and the latter as the probability of a random walker on the network arriving at a particular node. In short, both of these related measures of centrality signified an advantage for students receiving academic recognition from peers. This held true regardless of student gender or incoming GPA. We suspect that the nature of the MI classroom may create an environment where students perceive one another on an academic social continuum that plays a role in self-efficacy formation.

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Poster Presentations
Tuesday, March 29, 2016

Health and Biomedical Sciences

1:30:00 PM - 2:30:00 PM

Hallway

Prevalence and Associated Risk Factors of Hypertension among the Adults in Bangladesh: Estimates from a National Survey

Muhammad Abdul Baker Chowdhury

Background Hypertension is an increasing problem in Southeast Asia, particularly in Bangladesh. Although some epidemiological studies on hypertension have been conducted in Bangladesh, the factors associated with hypertension in this nation remain unclear. We aimed to determine the factors associated with hypertension among the adults in Bangladesh. Methods We conducted a cross-sectional study using data from the nationally representative 2011 Bangladesh Demographic and Health Survey (BDHS). A total of 7,839 (3,964 women and 3,875 men) adults aged 35 years and older who participated in the survey was included. Hypertension was defined by a systolic blood pressure ≥ 140 mmHg and/or, diastolic blood pressure ≥ 90 mmHg and/or, receipt of an anti-hypertensive medication at time of the survey. The degree of association between the risk factors and the outcome was assessed by the odd ratio (OR) obtained from the bivariate and multivariable logistic regression models. Results The overall prevalence of hypertension was 26.4 %, and the prevalence was higher in women (32.4 %) than men (20.3 %). Study participants with the age group of 60–69 years had higher odds of having hypertension (AOR: 3.77, 95 % CI: 3.01–4.72) than the age group 35–39 years. Moreover, individuals who had higher educational attainment (AOR: 1.63, 95 % C.I: 1.25–2.14) and higher wealth status (AOR = 1.91, 95 % CI: 1.54–2.38) had higher odds of having hypertension than the individuals with no education and lower social status, respectively. The analysis also showed that high BMI (AOR: 2.19, 95 % C.I: 1.87–2.57) and having diabetes (AOR: 1.54, 95 % C.I: 1.31–1.83) were associated with the increasing risk of hypertension. Conclusions Our study shows that the risk of hypertension was significantly associated with older age, sex, education, place of residence, working status, wealth index, BMI, and diabetes. Moreover, hypertension is largely untreated, especially in rural settings. The health system needs to develop appropriate strategies including early diagnosis, awareness via mass media, and health education programs for changing lifestyles should be initiated for older age, wealthy, and/or higher educated individuals in Bangladesh. Moreover, area-specific longitudinal research is necessary to find out the underlying causes of regional variations.

Poster Presentations
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Health and Biomedical Sciences

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Hallway

Neurological symptoms in children with intussusception and their outcomes at a large community hospital

Daniel Castro

Introduction and Objective: Intussusception most commonly presents with a triad of classical abdominal symptoms pain, vomiting, and bloody stools. However, it can also present with neurological manifestations with or without the classical symptoms. This atypical presentation makes the identification of intussusception more difficult and may delay its diagnosis, potentially leading to complications. The objective of this study was to find if children with intussusception presenting with neurological symptoms with or without classical symptoms have a higher frequency of complications than children who display only classical symptoms. Methods: Historical cohort based on chart reviewing of all children under 3 years of age with one or multiple episodes of intussusceptions seen at Baptist Health South Florida (a multi-center community hospital system) from January 2009 to December 2013. The main outcome was the frequency of failed enema and surgery to treat the intussusception. Rates of other complications such as death, admission to the intensive care unit (ICU), recurrence of intussusception, and length of hospital stay were secondary endpoints. Results: A total of 153 episodes (in 156 patients) were included. Most episodes were observed in infants below two years of age (71%) and in males (65%). Duration of symptoms was under 24 hours in approximately 75% of episodes. Neurological symptoms were significantly more prevalent among episodes of non-Hispanics than in episodes among Hispanics (60.0% vs. 40.0%; p= 0.002). Complications were observed in 23 episodes, and according to the unadjusted analysis were more frequent in those presenting with neurological symptoms compared to those with classical symptoms (OR 4.1; 95% CI: 1.24 -13.61; p= 0.021). These findings were confirmed in the adjusted analysis where age, and duration of symptoms were controlled (OR 4.12; 95% CI: 1.18 – 14.37; p= 0.026). Discussion: It is important that physicians consider intussusception in pediatric patients presenting with neurological symptoms since these patients have a higher frequency of complications as well as a longer length of hospital stays.

Poster Presentations
Tuesday, March 29, 2016

Health and Biomedical Sciences

1:30:00 PM - 2:30:00 PM

Hallway

A Case of Twenty Nail Dystrophy: A Review of Treatment Options

Emily Tongdee

Introduction and Objective: Twenty nail dystrophy (TND) originally described dystrophy occurring in all twenty nails. However, since all twenty nails are not always affected, the term trachyonychia has been used. TND is an abnormality of the proximal matrix that consists of a homogenous roughness that creates a sandpaper-like appearance. TND presents as nail dystrophy with longitudinal ridging and striations which cause the nails to have a rough or broken appearance. Numerous superficial pits on nail surfaces leave the nails with a shiny appearance.2 Over time, the nails general evolve into a muddy white-grayish discoloration.4 Spontaneous resolution generally occurs within 5-6 years. Many patients find this too long, as this nail disorder is disfiguring. There is no well-established gold standard treatment of this condition to date. We present a case of idiopathic TND and provide an updated review of the literature and the various treatments that have been utilized. Case Presentation: A 34-year-old Filipino female presents to the clinic with nail disease in all twenty of her nails, starting with the thumb and progressing one by one about two years before our first encounter. She had seen previous dermatologists who stated fungal cultures were negative and was empirically treated with oral antifungal medications for months with no improvement. Her physical exam revealed thickened dystrophic nails with pitting, longitudinal ridging, and onycholysis. All twenty nails were involved and no associations were seen. Conclusions-Implications: TND is a disease that can present independently or associated with other conditions. Nail matrix biopsies are not recommended as they risk leaving the patient with permanent nail damage and the diagnosis can be made on a clinical basis. No particular treatment has been universally accepted. Great response has been seen when TND was treated with griseofulvin injections, PUVA, systemic steroids, oral retinoids, cyclosporine A, and nail plate dressings. TND is a self-limiting disease and thus should be treated only if necessary. The patient's quality of life may be detrimentally affected, or they simply do not want to wait 5-6 years with disfigurement. The aforementioned treatments would significantly shorten the duration of the disease.

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The Effect of Cocaine on the Pathogenesis of Liver Fibrosis in Hiv/Hcv Co-Infection

Alhanoof Alohaly

Background:Liver disease is one of the major causes of morbidity and mortality in HIV-infected patients in the United States. Moreover, cocaine use increase case-fatality ratio. The aim of this study is to examine the effect of cocaine and HIV/HCV co-infection on progression of liver fibrosis in the following groups: HIV/HCV co-infected and HIV mono-infected cocaine users, compared to HIV/HCV co-infected and HIV mono-infected persons who do not use cocaine. Methods: (1) Socio-demographics: Age, gender, anthropometrics, socio-economic characteristics (education and income), (2) measures of HIV disease progression (CD4 cell count and viral load), (3) measures of liver fibrosis (FIB-4), and (4) measures of oxidative stress (oxidized glutathione and mitochondria-specific 8-oxo-dG) at baseline and over time. Descriptive statistics, T-tests (independent-samples, and paired), $\chi 2$, Pearson Correlation, Regression Analysis, and Mixed models were conducted using SPSS and SAS programs. Results: Mean age in this study was 47.2 years, mostly males (64%) and African American (70.3%); 29% used cocaine and 85% were on antiretroviral therapy (ART). Cocaine users at baseline had significantly lower ART use (78% vs. 88%, P = 0.05), higher viral load (2.76±1.28 vs. 2.38±1.1, P =0.0196) lower BMI (26.4±5.6 vs. 28±5.1 kg/m2, P=0.026) and higher intake of alcohol (89.4% vs. 54.5%, P <0.0001) compared to non-users. Over one year, those who used cocaine had increased oxidized glutathione (β= 2.18, SE= 1.08, P=0.044) and 8-oxo-dG (β=0.051, SE=0.02, p=0.047) compared to those who did not used, with the exclusion of HCV, excessive alcohol and BMI>30 kg/m2. Conclusions: Cocaine use accelerates liver fibrosis in HIV-infected and HIV/HCV co-infected adults. Moreover, cocaine use is an independent risk factor for increased measures of oxidative stress over one year, a potential mechanism of action for liver fibrosis. PLWH will benefit from cocaine cessation programs, especially those who are co-infected with Hepatitis C.

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Adipocyte lipid droplet formation: a novel role of Rab5-Activating Protein 6

Praew Chantarasinlapin

Adipogenesis is a formation of fat-laden adipose tissues that serve as energy storage to be used during fasting or starvation. Insulin-mediated receptor activation triggers multiple intracellular signaling that induces the accumulation of adipocyte lipid droplets. Rab5-Guanine Exchange Factor (GEF) has been speculated to facilitate intracellular membrane trafficking and receptor signaling, suggesting an involvement of Rab5-GEF in adipogenic processes. The present study demonstrated that Rab5-Activating Protein 6 (RAP6), a Rab5-GEF containing a Vps9 domain, PH domain and Ras-GAP domain, plays an important role in adipogenesis. Expression of RAP6:wild type blocked differentiation of cultured 3T3-L1 preadipocytes. Consistently, expression of other Rab5-GEFs (i.e., Rin1, Rabex-5 and RinL) inhibited differentiation of 3T3-L1 preadipocytes. In contrast, RNAi-mediated depletion of RAP6 inhibited cell differentiation in 3T3-L1 preadipocytes, suggesting that RAP6 activity is essential for adipogenic process. Furthermore, expression of RAP6:wild type, but not RNAi-mediated depletion of RAP6, suppressed the expression of adipogenic-specific transcriptional factors, PPARγ and C/EBPα. Interestingly, expression of RAP6 domains individually blocked cell differentiation in 3T3-L1 preadipocytes. In addition, RAP6 mutants (i.e., D138A and Y1420F) that interfered with Rab5-GEF activity poorly diminished 3T3-L1 preadipocyte differentiation. The findings indicate that altering the level of active Rab5 by RAP6 influences the differentiation of 3T3-L1 preadipocytes, suggesting RAP6 as one of key modulators in adipogenesis.

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Adolescents' body mass index (BMI) and cardiovascular disease risk among adults: Results from 12 years of follow-up among the National Longitudinal Study of Adolescent to Adult Health (Add Health Cohort)

Rehab Auf

Background: Obesity is an increasing problem among adolescents with serious health effects. This study aims to examine the impact of adolescents' obesity on the increased risk for cardiovascular disease (CVD) among participants in the Add Health cohort by examining the association between blood lipoproteins profile and BMItrajectories. Methods: The Add Health study followed children who were attending middle and high school for 4 waves along 12 years. Growth modelling was used to examine the relation between body mass index (BMI) at baseline and longitudinal trajectories to predict the BMI at the last follow up point and the blood lipids profile (cholesterol, Low Density Lipoproteins – LDL, and High Density Lipoproteins – HDL), while controlling for important sociodemographic factors. Results: The study included 6,493 individuals (females: 3,349, 51.6%) who took the baseline survey between 7 to 12 grades at school. The majority of the study participants were White (66%) followed by Black (24%). In the growth model, higher BMI at baseline and higher trajectories predicted higher BMI at wave 4 (p 0.05). However, higher BMI at baseline (β= -0.046, p = 0.009) and BMI trajectories (β =-0.23, p = 0.008) predicted lower HDL at wave 4, after controlling for use of dyslipidemia medications and other demographic factors. The model had good fitness indicators (SRMR = 0.056 and CFI = 0.9). Conclusions: Adolescents' obesity was associated with higher risk for adults' obesity and elevated risk for CVD as defined by lower levels of HDL, which dyslipidemia medications did not correct. This underscores the need for more efforts to control childhood obesity as a preventive measure for cardiovascular diseases. This study reports novel and plausible association between childhood obesity and adult HDL levels from national representative cohort.

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Factors associated with waterpipe smoking discontinuation among adolescents: findings from Global Youth Tobacco Survey

Raed Bahelah

Background Waterpipe (hookah, shisha) tobacco smoking (WTS) is increasing worldwide especially among youth. As compared to cigarette smokers, fewer waterpipe smokers are interested in discontinuing waterpipe smoking. The objective of this study is to examine the factors associated with smoking discontinuation among adolescent waterpipe smokers from 12 Middle Eastern countries. Methods Using pooled data from Global Youth Tobacco Survey (GYTS), only countries with national surveys that specifically inquired about WTS among adolescents (13-15 years old) were included in the current analysis. Adolescents were asked if they discontinued WTS during the 12 months before the survey. Weighted percentages, adjusted odds ratios (aOR) and their 95% confidence intervals (CI) were reported. Results Among all countries participated in GYTS, 12 Middle Eastern countries/territories (Saudi Arabia, Egypt, Morocco, Tunisia, Libya, Lebanon, Sudan, Syria, West Bank, Kuwait, Jordan, and Oman) administered survey questions that evaluated discontinuation of WTS during the past 12 months. Among those with complete data on WTS discontinuation (N=4,328), 45% discontinued WTS in the past 12 months. WTS discontinuation was lowest in Saudi Arabia (37.86%) and Lebanon (39.03%), and highest in Egypt (58.05%) and Tunisia (54.6%). Those whose mothers only smoke cigarettes (aOR=0.42, 95% CI: 0.18-0.97, p=0.04), both parents smoke waterpipe (aOR=0.49, 95% CI: 0.25-0.95, p=0.03), having household members other than their parents who smoke waterpipe (aOR= 0.72, 95% CI: 0.52-0.99, p=0.04), having friends who smoke waterpipe (aOR= 0.41, 95% CI: 0.21-0.79, p=0.009), and girls (aOR= 0.70, 95% CI: 0.50-0.98, p=0.03) were less likely to discontinue WTS in the past 12 months. Seeing anti-smoking messages on billboards (aOR= 2.18, 95% CI: 1.56-3.05, p<0.001), or when attending sports events (aOR= 2.60, 95%CI: 1.63-4.15, p<0.001) were associated with higher discontinuation of WTS during the past 12 months. Conclusions Tobacco control programs should include families and peers in order to maximize discontinuation of WTS among adolescents. Educating adolescents about the harmful effects of WTS using school curricula and the media can help them discontinue WTS.

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A novel epigenetic marker for chronic alcohol abuse: H4K12ac

Tiyash Parira

According to World Health Organization, 2014 Global Status Report on alcohol and health, 3.3 million deaths occurred due to alcohol abuse, a cause which is avoidable. Since effects of alcohol abuse are multi-faceted, researchers have explored markers for it to aid in early detection of such an addiction. Previous studies have found certain biological and genetic markers for it, however, none so far have been studied in the periphery, body's immune system. Our objective for this study was to find an epigenetic marker for chronic alcohol abuse. This is an in-vitro study where monocyte derived dendritic cells were obtained from commercially available buffy coats and were treated chronically (5 days) with ethanol 0.2% (corresponding to 200 mg/dL of alcohol in blood as previously studied in chronic alcohol users). Gene expression of class 1 histone deacetylases (HDAC's) were checked by qPCR and total histone H3 and H4 quantitation and modification measurements were carried out. Functionality of the cells were assessed by checking endocytic capability of the cells. Ethanol treated cells were incubated in an alcohol-incubator to minimize evaporation and ethanol replenished every 24 hours. Results show a reduction in gene expression of HDAC 1 and 2 after 5 days of chronic alcohol treatment. No change in H3 quantification and modification was seen, however, H4 acetylation on lysine at position 12 (H4K12ac) showed a significant increase for chronic alcohol treatment when compared to control. Functionality of the cells when measured by endocytosis assay revealed that chronic alcohol treatment (0.2% for 5 days) lowers the endocytic capability of the dendritic cells, hampering their major function of antigen presentation which initiates with endocytosis of foreign antigens. To summarize, chronic alcohol treatment lowers expression of the histone deacetylases (HDAC1 and 2) leading to increased acetylation at the 12 lysine on histone H4, overall compromising the cell's functionality as effective antigen presenters. This brings into light the epigenetic modulations that is induced by chronic alcohol treatments and leads us to believe this can be used as an epigenetic marker for the same. Supported by NIAAA grant # R00AA021264 and Presidential Fellowship, UGS, FIU.

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Combined BH3 and Metabolic Profiling as a Method to Define Therapeutic Response and Resistance in Grade IV Astrocytomas

Angel Chinea

Background and Significance: Grade IV astrocytomas, formerly known as glioblastoma multiforme (GBM), are the most common primary brain tumors and have the highest mortality. The therapeutic standard for managing this malignancy remains a combination of surgery and chemotherapy; however, there is no cure, nor have there been any significant advancement in the clinical approach to GBM. This study aims to better understand the molecular and metabolic characteristics of GBM-derived cell lines to better define treatment groups and potentially identify new avenues for therapy. This study utilized continuous, commercially-available cell lines U87, U118, A172, and H4 (originally derived from patient Grade IV astrocytomas), and examined the concentrations of Bcl-2 family proteins on mitochondria and metabolic activity for each of the cell lines. The measures were correlated to IC50 values for temozolamide (TMZ). Results: Western blot analysis of pro-survival and pro-apoptotic Bcl-2 proteins revealed that U118 and U87 expressed high levels of Bcl-2, while A172 had increased Bcl-xL expression. Interestingly, Bcl-2 and Bcl-xL were not detected in H4 cells. Incidentally, pro-apoptotic BH3-only protein (Bid, Bim, Puma, etc.) levels were increased in H4 and A172 when compared to the U118 and U87 cell lines. Metabolic analysis of the cell lines revealed that U118 cells were a glutaminolytic, while U87, A172, and H4 were classified as glycolytic. We assessed cellular viability in the presence of increasing doses of TMZ for each cell line. We found that U118 cells were the most resistant followed by U87, A172, and H4 respectively. Interestingly, MGMT levels did not influence chemo-responsiveness in these cell lines. Conclusion: We found that Bcl-2 protein profiling was a useful means to determine therapeutic response and resistance. This was further enhanced by metabolic stratification, wherein glycolytic cells were shown to be more sensitive TMZ than glutaminolytic cells that may possess more stable mitochondria. In the immediate future, we will expand the number of cell lines in our study and increase the cellular profiling to include mitochondrial dynamics as well. Using these approaches, we will produce a method to define GBM responses and outcomes based on their mitochondrial and metabolic context.

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An Oral Health Educational Program on Knowledge in Caregivers of Preschool Children

Gabriella Riccio

Background: Tooth decay affects most children by the age of five, and poor oral health (OH) in preschool children can have several detrimental outcomes. These outcomes include pain, mastication difficulties, diminished nutritional intake leading to weight loss, speech impairments, developmental delays, and eventually negative systemic effects. Significance: This study will provide a model of nursing education for caregivers on the importance and promotion of good OH in preschool children. Purpose/Aims: The purpose of this study is to explore the effects of an oral health educational program (OHEP) on knowledge in caregivers of preschool children and to promote good OH behaviors among caregivers of preschool children; thus improving OH outcomes. Methods/Innovation: The OHEP is an innovative PowerPoint-style musical program, with the aim of enhancing knowledge retention in caregivers. The OHEP not only provides information on the devastating outcomes of poor OH during the preschool years, but also on preventive OH behaviors and practices. Caregivers completed a demographic questionnaire, a knowledge pre-test, viewed the OHEP, and completed the knowledge post-test. There will be two additional post-tests given two weeks apart to evaluate knowledge retention. Results: It is anticipated that the post-test scores will be higher than the pre-test scores after the OHEP. Conclusion: If the OHEP identifies effective knowledge retention, it will be available for nurses to implement in various health care settings; thereby promoting oral health knowledge and health promoting behaviors throughout this vulnerable population and the community.

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Health Literacy Workshop for Seniors: Adapting HeLP MN Seniors for South Florida

Ileana Herrin

Health literacy skills can positively affect health care outcomes throughout the lifespan, particularly among the elderly population. As occupational therapy students, we learn the importance of promoting health and engagement in one's occupations. We are aware that an important occupation of seniors is managing healthcare and therefore should make every effort to educate the elderly so they become more health literate. Objective: Our project targeted older adults both English and Spanish speaking in Miami-Dade in order to effectively increase health literacy within the diverse community of South Florida through the use of an adapted workshop. Method: We adapted HeLP MN Seniors by incorporating aspects of NIH Seniors: Talking with your Doctor and Miami based resources to create a more condensed informal workshop. We presented 6 workshops at 5 sites across South Florida, 2 of which were conducted entirely in Spanish. Information regarding the effectiveness of the workshop was based on participant reports and written comments. Results: Workshops were well received at each center, and each workshop catered to the needs of the individuals at that particular center. Discussions at each center varied and in addition what is discussed in the presentation, topics included shingles, low-back pain, double-booking appointments, seeking second opinions, and sleep patterns. Contribution/Significance: Health Literacy for Seniors contributes to society by offering the aging population in South Florida tips on preparing for healthcare appointments, sharing information with the healthcare provider, and knowing what to do following the appointment. This information is important, as it empowers seniors to take control of their own health and healthcare. Broader Impact: By empowering seniors to take control of their health and healthcare needs, we are providing the aging population of South Florida with the opportunity to become or remain more independent and live a more fulfilling life. Additionally, due to the nature of the workshop and its adaptability, the workshop can be adapted to fit the needs of other populations in South Florida, such as families with children with special needs or individuals who have had a stroke. This will lead to a greater awareness and understanding of healthcare within different populations.

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A Socioeconomic Analysis of the Trends and Challenges in Health Poverty Reduction in Bangladesh

Nazmul Islam

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Room C

School gardening with a twist using fish: Encouraging educators to adopt aquaponics in the classroom

Jaeson Clayborn

Aquaponic gardening integrates fish farming and soil-less (hydroponic) crop production in a highly productive system that conserves water by recirculating nutrient-rich fish effluent as fertilizer for horticultural crops. In the classroom, an aquaponic system can be inexpensively constructed and maintained to provide elementary, middle, and high-school students unique opportunities that promote experiential learning in science and engineering in the context of ecological sustainability and social responsibility. In order to evaluate the willingness of teachers to incorporate aquaponics in the classroom, we engaged 14 first-year and veteran women educators from the Miami-Dade Alpha Lambda chapter of the Alpha Delta Kappa organization in a 5 week aquaponics project. All 14 participants completed a pre-test to gauge prior knowledge and participated in an interactive introductory aquaponics lecture. Members of the experimental group (N1=7) each constructed and maintained a small-scale aquaponic system (25_gal) and participated in a simple plant growth experiment. Members of the control group (N0=7) did not participate in construction, maintenance or the experiment. All participants completed post-tests and exit interviews. Both groups scored significantly higher on the post-test, but there was no significant difference in results between groups. In the exit interviews, compared to the control group, participants from the experimental group expressed a greater likelihood to use an aquaponic system at home or in the classroom, believed the system was easy to maintain, and strongly agreed it would help students with math and science. The results of this small study demonstrated that the conceptual framework and low-cost scheme we presented to educators encouraged them to use aquaponics as an educational tool.

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Examining the Effect of Technology Usage on Multiple Physics Outcomes

Jonathan Mahadeo

Technology has become more central to the teaching and learning of physics. These technologies include calculators, computer resources (e.g. simulations, online social networks, homework systems), and response systems (e.g. clickers). Drawing on data from a large scale national survey study with responses from 1955 students who had taken physics, we examined the effect of technology usage on students' physics identity, physics grades, and STEM career interest. Using Multivariate Matching, we compared groups who experienced or did not experience a particular technology and were matched on background. We found that high technological saturation had a significant positive effect on physics identity. Computer simulations had a positive effect on both physics identity and STEM career interest. Finally, science videos had a significant positive effect on physics grades but a negative effect on STEM career interest. We will discuss these results as well as supplementary qualitative data on how teachers use these technologies.

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The Effects of Oral Administration of Math Assessments for Students with ADHD

Kaitlynn Penner

Attention-deficit/hyperactivity disorder (ADHD) is a widespread disorder among young children affecting up to 9% of the population (Sinha, Sagar, Mehta, 2008). It hinders social, educational, and behavioral normality through symptoms of inattention, hyperactivity, and impulsivity from childhood into adulthood (Biederman, Petty, Evans, Small, & Faraone, 2010). The disorder prohibits the normal development of executive functioning skills. This encompasses anything that relates to the mental controls that permit humans to solve problems, plan, and behave appropriately (Sinha, et al., 2008). This leads to a variety of obstacles relating to academia. Therefore, in respects to mathematics, a significant research need is the exploration of various accommodations including the oral administration of tests, especially those with multiple choice or word problems (Tindal & Ketterlin-Geller, 2004). The purpose of this study is to determine the effects of oral administration of assessments in comparison to traditional administration for students with ADHD. It also will look to compare the difference in effects of this form of testing on typically developing, same-aged peers with those students diagnosed with ADHD. The investigation is in a sixth grade, pre algebra math classroom and done on a succession of three assessments the math problems will be read aloud, having the students transcribe them themselves, before solving the problem. The problems will be administered one at a time and the students will complete each problem before being read the next problem. Though the data has not yet been collected and analyzed in full, the literature reviewed and the research methodology point towards the improvement of test scores based on the intervention plan. Notable data and analysis will include the score of assessments, mistakes made (i.e. type of problem), the comparison of scores of the pretest and the assessments during the intervention, and the comparison of types of errors made on the pretest in relation to those during the intervention. Regardless of the findings, this research will be useful for the future of education for students with ADHD. As it is a point of further investigation, it is the hopes that testing accommodations continue to be explored. With the improvement of test scores, the use of oral administration should become a more widely practiced strategy for educators of atypical learners. Further studies should be done on this topic in other content areas and with students of other disability categories.

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The impact of Technology

Toni Ann Maloney

In classrooms today, for some teachers, technology has become a very popular and integral tool. It has proven to be very beneficial for both students with or without disabilities, and teachers across various classroom settings. According to Fichten, Asuncion, and Scapin (2014), toward the end of the 1990s there was a lot of concern and discussion about the accessibility of mainstream e-learning technologies and the availability of assistive technologies in education. Although technology in the classroom has been trending, it has not always been widely accepted by some teachers. Bozdoğan and Ozin (2014) state that pressure to prioritize teaching with technology has become so demanding due to the advancements in educational use of technology. Further studies conducted by Bozdoğan and Ozin (2014) indicated results that suggest that the perceived use of computers, experience and confidence play significant role while lack of knowledge and skills, technical problems and lack of confidence negatively influence information and communication technologies self-efficacy. There is still some hesitation by teachers to adopt the incorporation of this method of instructing to their daily instruction. In addition to the lack of teachers' experience, as far as technology in the classroom is concerned, there are other factors that impact students' ability to access technology in the classroom. This topic is of extreme significance as it impacts not only typically developing Kindergarten students, but also those with disabilities. It also cannot be ignored that the world is becoming extremely technology driven. As the world adapts more and more to the digital age, the options and tools available for use in the classroom is expanding at an increasing rate. There is no doubt that the increased use of technology in schools have changed the way children learn and has also impacted the process of teaching by enhancing the material being taught.

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Exploring the Similarities between Different Languages; English, Spanish, Arabic, and Farsi

Jose Morcillo

Languages of different countries, which are geographically or culturally near to each other, have many words similarities. There are many words of different languages which seems they are phonetically different, however, they have the same roots. The goal of this study is to investigate the similarities between four languages and the main two objectives are to investigate the similarities in terms of both vocabulary and grammar. After a comprehensive literature review and review of the languages corpus, for the languages that are available, a couple of tables are provided to show the similarities in words roots. Moreover, similarities between grammars in different languages are explained. All in all, this study is to show the similarities between the different languages and in further studies more words can be added to tables of this study.

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Understanding Centrality: Investigating Student Outcomes within a Classroom Social Network

Eric Williams

Collaborative learning environments in undergraduate introductory physics courses, such as those promoted by Modeling Instruction (MI), influence both student performance and student social interactions. Because collaborative learning is inherently a social activity, we applied Network Analysis methods to examine student social interactions within the classroom using a survey administered periodically in class. We then calculated centrality, which is a family of measures that quantify how connected or "central" a particular student is within the classroom social network. In order to understand what centrality means in this context, we investigated the relationships among centrality, student demographics, and student outcomes in a large-scale MI classroom with 70 students and 6 instructors. We addressed two research questions: "Is centrality predicted by sex, ethnicity, incoming GPA, or Force-Motion Concept Evaluation (FMCE) pre-score?" and "Does centrality predict FMCE gain or final grade in course?" A series of linear regressions showed that centrality can be predicted by sex and incoming GPA, and is a predictor of FMCE gain.

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In search of distinct graduate admission strategies in physics: An exploratory study using topological data analysis

Jacqueline Doyle

Every year, graduate admissions processes determine which applicants are admitted to doctoral programs in physics around the country, and which are not. Despite their importance, relatively little is known about how admissions decisions are made and the normative practices surrounding them. In the current work, we adapt topological data methods (general techniques for cluster identification and relation) to look for the existence of distinct admissions strategies that institutions use in their admissions decisions. We analyze data drawn from a recent survey of faculty (graduate directors, etc) responsible for doctoral admissions, conducted in conjunction with the APS Bridge Program, which includes responses from individuals at over 85% of the active doctoral programs in the U.S. Our results suggest the existence of two distinct but similar groups of modest size, which differ in their strategies by their approach to the use of student grades and prior research experiences

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Neural Mechanisms for Reasoning and Problem Solving as Revealed by Meta-Analytic Co-Activation Modeling of Posterior Medial Cortex

Emily Boeving

The posterior medial cortex is typically characterized by its distinctive task-induced deactivation pattern, and is widely recognized as a primary node of the default mode network (DMN). However, in a recent study of physics-based problem solving, we observed a posterior medial cluster comprised of the dorsal posterior cingulate cortex and retrosplenial cortex (dPCC/RSC) that displayed increased activity during physics problem solving after 13 weeks of instruction, suggesting modulation by education experience and a role for dPCC/RSC in the development of critical thinking skills. Beyond DMN deactivations, previous studies have suggested that the dPCC plays an important but unknown role in cognition, while the RSC's contribution to cognition remains equivocal. To better understand the function of the dPCC/RSC and enhance interpretation of its post-course activity modulation, we performed meta-analytic co-activation modeling (MACM) to identify brain regions it functionally interacts with across many neuroimaging tasks. We then delineated behavioral phenomena associated with the dPCC/RSC employing database-driven (BrainMap) statistically rigorous forward and reverse inference analyses . We searched the BrainMap database, a large repository of neuroimaging results, to identify studies that reported at least one activation coordinate in the dPCC/RSC seed region of interest and then extracted coordinates of all foci that co-activated with the seed, limiting this extraction to studies of healthy participants and excluding deactivations. This search yielded 283 experiments with 3,864 brain activation foci; MACM was performed on these coordinate data using the activation likelihood estimation algorithm ($P<0.05$). MACM connectivity patterns indicated robust co-activation of the dPCC/RSC seed across multiple commonly observed large-scale brain networks, including regions of the DMN, salience network, and subcortical network. Although forward and reverse inference revealed an association with social cognitive tasks, which was expected for a DMN node, additional functional characterization revealed an association with reasoning and memory processes. These outcomes build upon previous work suggesting that the dPCC/RSC plays a critical role in linking multiple functionally distinct brain networks whose coordinate interactions contribute to optimal cognitive function, particularly in regulating attentional processes. Overall, our results suggest the dPCC/RSC may be important in understanding the neural mechanisms supporting reasoning and problem solving.

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A Study of Undergraduate Students' Use of Technology at FIU

Amanda Gauzens

A qualitative study was conducted to investigate the use of technology by undergraduate students at Florida International University (FIU). Forty student interviews were conducted, 20 female students and 20 male students. Students were asked questions about their technology usage, such as: "How do you use technology for academic purposes," What kinds of technological devices do you use," "What software and applications do you use?" Students' were also asked questions about the usage of technology in classrooms and the university's technology resources. The data gathered from these interviews are currently being analyzed and will be available for presentation for this conference. Preliminary findings suggest that FIU students use their phones and computers as their primary technology tools. In addition, the majority of the students in this study use Microsoft Office programs and internet search engines as their main software applications. At the conclusion of the data analysis, the study will provide an overview of technology usage on campus for the purposes of teaching and learning.

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Why Instructors Certify/ Do Not Certify Courses

Shara Gonzalez

Quality Matters is a faculty-centered, peer review process designed to certify the quality of online and blended courses based on standards that promote best practices and procedures. One way to ensure the quality of an online course is to design it for review and certification with Quality Matters. Instructional Designers and other staff involved with online learning sometimes approach faculty to certify a course/courses with a limited understanding of the course development and certification experience from the instructor's perspective. This disconnect can cause less courses to be certified due to a lack of understanding. This project aims to present the perspective of instructors who chose to and chose not to certify their online course(s) with Quality Matters via participant interviews so that individuals who work with instructors towards certification can adjust their approach and assist more instructors to certify courses. This project aims to identify reasons faculty members certify or do not certify their online courses with Quality Matters. The researcher will identify faculty members who have and who have not had their courses certified with Quality Matters within the last five years. The researcher will secure and conduct in-person interviews with full-time and part-time faculty members who meet the criteria for the study. The interview protocol consists of about 25 qualitative and quantitative questions, not including follow-up. Recruitment for interviews will take place via phone, email, and in person. The interviews will be recorded and analyzed using qualitative techniques. The interviews for this project are currently being conducted and the results are not yet available. The knowledge gained from this research project will provide faculty members' perspectives on quality online course development and help Instructional Designers to understand the issues their collaborators face. This understanding may help Instructional Designers and involved with online learning to improve their approach to the topic of quality online course development. The results of this research can benefit those involved with online course development in general. The audience can learn what instructors like and dislike about the development process and use that information to adjust the approach to course development.

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Fast-Paced Society:
Influence of Societal Structure on Eating Habits and Physical Activities

Alicia Sneij

Intro: The US is becoming more overweight with 1/3rd of the population being classified as obese. A study conducted by Jackson et al. has shown that lifestyle plays a big role in eating behaviors and physical activities. They found that various lifestyle factors (living at home, etc.) influenced the eating behaviors and physical activity of university students. They also found that fast food consumption was significantly related to lower physical activity levels. In our study, we investigated the attitudes, beliefs and perceptions of eating habits and physical activities in regards to obesity. Methods: To investigate the attitudes, beliefs and perceptions about eating habits and physical activities, focus groups and in-depth interviews were conducted: • Focus Groups: 6 focus groups (n=40) were conducted consisting of 23 undergraduate and 17 graduate students from Florida International University (FIU). • In-depth interviews: 11 in-depth interviews were conducted to validate our findings in the focus groups regarding the same topic. • Transcription: All focus groups and in-depth interviews were transcribed verbatim for analyses. • Analyses: Codes were created, highlighted and counted, which were used to identify emerging themes. The themes were connected to form an overarching relationship. Results: The concept of "Time" was mentioned 89 times followed by "Fast food" 58 times, "Abundance of food" 46 times, and "Fast-paced society" 35 times in the transcripts. Conclusions: Our results show the code "Fast paced society" being mentioned the least in the focus groups and in-depth interviews; however, our analyses demonstrate the underlying effect of "Fast-paced society" on "Time", "Abundance of food" and "Fast food". An overarching relationship began to appear between "Fast paced society" and its effect on "Time", "Abundance of food" and "Fast Food". Due to the nature of a fast-paced society, it limits the time available to cultivate healthy behavioral habits, such as home cooking and physical activity. As a result, a fast food culture began to grow, with more fast-food restaurants providing quicker and cheaper options. This made fast food more abundant and available compared to healthier counterparts. Our analyses show that the main influence on eating habits and physical activities is societal structure.

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The Latinization of the United States

Sonia Arteche

This paper reviews the research done since the year 2000 in relation to migratory movements and population trends in the Miami-Dade area, specifically the city of Doral. The primary focus will be on the possible use of the concept of "Transculturation" vs Assimilation as a framework to study the Latinization process of the area. Transculturation creates a new Hispanic ethnic group in the United States that has a direct effect in the process of Latinization. Within the Transculturation framework, the emphasis will be on the use of immigrant population, economic and cultural variables as possible measures of the level of Latinization for Doral city in Miami Dade. This study follows the empirical method and it includes both quantitative and qualitative research. There are several basic questions that the concept of Latinization attempts to answer: To what extent is the Hispanic culture present in a given geographical area? Will this culture pass the test of time and become the main culture to which newcomers have to assimilate into in that specific area? Will the strong cultural hold fade away in the third and fourth generations of Hispanics thus moving from a Latinized society to a multicultural one? Is Latinization part of multiculturalism? The final goal of this initial research is to establish the basis, if there are any, for a more in depth study of the process of Latinization in the United States.

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The Four Problems of Mind-Uploading

Antonina Kulchitskaya

Advocates of transhumanism envision a future in which we achieve immortality by "mind-uploading" our consciousness and identity onto digital substrates. Utilizing functionalist (and sometimes dualistic) accounts of the mind, the roadmap towards this goal involves high-resolution brain scanning followed by programming the scanned brain to "wake up" in a virtual environment. There are several philosophical challenges that must be overcome for the success of such a program. I investigate and analyze the challenges to mind-uploading in the following categories: (a) problems from emergence and embodiment; (b) problems from computability; (c) problems from functionalism; and (d) problems from personal identity. The challenges from computability, emergence and embodiment could potentially be adjusted for, albeit with great difficulty. The resolution to challenges from functionalism and especially personal identity has a weaker prognosis. I present the assumptions under which the proponents of mind-uploading operate, review the classical philosophical approaches that challenge these assumptions, and analyze their synthesis.

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Influence of Leadership on Job Satisfaction--- The Moderating Effects of Follower Individual-Level Masculinity–Femininity Values

Zhongyan Chen

The study chose 12 groups of leaders and their followers and divided the workers according to three different leadership style (Authoritarian Leadership , Participative Leadership , Laissez-Faire Leadership) and divided their followers into masculinity-feminity orientation. The study also examined whether employee individual-level masculinity-feminity values moderate the relationship between leadership styles and employee job satisfactions. Overall, the research provided support for the impact of individual level masculinity-feminity on follower reactions to various leadership behaviors. The findings indicated that followers who scored high on feminine orientation perceived a weaker relationship between all leadership behaviors and job performance. Followers with more masculine values associated more perceptions of job performance with Participative Leadership and view leaders' authoritarian and Laissez-Faire behaviors as less important for performance at job.

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Implementing a CRM Solution

M. Cristina Ramirez

2013 was a crucial year for Gaumard Scientific. The company was adjusting to an increasing number of territory sales managers. In addition, customer information was becoming less readily available. The main bottleneck was the spread of information across different systems and formats, making it difficult for users to access when needed. The combination of these two issues moved upper management to request the implementation of a customer relationship management (CRM) software. The CRM's objectives were to: improve supervision of territory sales managers by measuring sales team's efforts, develop better customer service by expanding communication between customer service and sales, and increase sales by making account information readily available for the sales team. The first step in the implementation was to identify all sources of customer contact data ranging from excel files to repairs and accounting databases. A purge was then performed to remove duplicates and eliminate entry errors. The next step was to convert the clean data into a format compatible with the CRM database and import the information in the new system. Testing of common practices ensued, followed by more complex scenarios. The findings of the first round of testing were then used to improve database structure and initial setup. This feedback loop was continued several times until the product was ready for launch. By consolidating customer data, sales and customer service are better informed resulting in better communication with customers. Management of sales representatives also improved generating higher sales numbers. A CRM implementation is never fully complete because there is always room for feature enhancement. However, the benefits the company has experienced have provided a quick return of investment. Perhaps the biggest contribution of this project has been the ability to proactively fix potential problem areas before they get too big. Management can now make informed decisions about the direction of the company, in particular sales and marketing. Because no two CRM implementations are exactly the same, there is a need to connect to other CRM users to share success stories and best practices. Personalized input drives developers to improve the technology in the market.

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The Dynamics of Financing Restoration Projects

Ramses Latiff

Historic preservation movements around the world have been influential in preserving, con-serving and protecting the heritage of cultural landmarks, landscapes, objects and the built en-vironment. Through time many historic sites were damaged, tourists were known to chip off pieces of rock or carve their initials into walls without any concern for what had been meticu-lously built and cared for. Local Citizens, craftsmen, architects, botanist artists and many other people with an understanding of the value of history and its built form would form entities, laws and regulations that would make Historic Preservation what it is today. It began by raising social awareness for the protection of heritage through campaigns to parliament for legislation that would protect ancient monuments and has been transformed into an extensive defender of the built form. With the efforts to protect the historical built environment came the struggle to generate funding and be able to protect these cultural landmarks. Finance plays a role in everything, many issues arise with the intention of preservation, protection and maintenance. Who takes on the responsibility of preservation and manages the process of preservation is in itself a cumber-some activity. A variety of financial, political and personal scenarios highlight the aspects of this historical preservation. Financial effects of historic preservation in contemporary society are demonstrated by an in depth view of the timeline surrounding The Miami Marine stadium. From the moment the city of Miami indicates the structure is due for demolition to when a preservation group is formed to protect its fate. The process of protection and preservation has been extensive and has taken decades of work and financial investment. Of note, special perspective is given to these studies by incorporating expert opinions from professionals in the field. These experts have extensive awareness in the research area and intimate knowledge of the study examined.

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Ideologizing of Tradition

Hassan Vaezi

Ideologizing of Tradition Abstract For a long time, there had been a strong conflict between current religious tradition which is in Iran and Muslim countries, and the modernity which has come from Occident. There have been many Intellectuals that tried to find a solution for this conflict. This paper seeks to study the relationship between ideology and tradition and to find out how a tradition turns into an ideology. Hannah Arendt believes that there is a very close relationship between tradition, Ideology, and authority. According to Arendt, the attempt to replace religion with ideology is considered as one of the obvious phenomena of modernity era. Here comes one of the tricks of governments (Especially Governments in the Middle East) for keeping the power and surviving more through making tradition ideological. By making public sphere limited based on their interests, the governments make from tradition and religion the ideology which can realize their own aims and interests. In this paper, I will explain how a tradition becomes an ideology or how a tradition is ideologized. In Iran and some Muslim countries, tradition has a very close relationship with religion, and most of the time, both of them consider same. In this paper, I want to use the political thought of some Iranian and western thinkers, and also to show the influence of Hannah Arendt's political thought on some totalitarian regimes, such as Iran. We can say that after the Iranian revolution in 1979, the Iranian government could achieve to its interests through ideologizing of tradition. Keywords: Tradition; Ideology; Religion; Modernization, Totalitarian Regime. Hassan Vaezi PhD Student in Political Science at FIU HVAEZ001@FIU.EDU (786)532-5282

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Biopsychosocial Risk and Protective Factors for Disordered Eating in Hispanics

Jessica Saunders

Problem Statement: The prevalence rates of disordered eating in Hispanic populations are estimated at approximately 10%, similar to the rates identified in Caucasian samples. However, the unique biopsychosocial risk and protective factors for the development of an eating disorder remain understudied in such populations. Research Objectives: The purpose of the current study was to explore the relationship among the pre-identified risk and protective factors of body esteem, diet self-efficacy, intuitive eating, restrictive tendencies, and disordered eating in an ethnically and racially diverse sample, using the structural equation modeling framework. Research Methodology: Participants included 400 college students (80% female; 63% Hispanic, 20% Non-Hispanic Caucasian, 10% African American, 7% Other) between the ages of 18 and 30 (M = 20.93, SD = 2.80), who provided demographic information and completed a measure of diet self-efficacy (DIET-SE), intuitive eating (Intuitive Eating Scale; IES-2), body esteem and physical self-concept (Physical Self-Description Questionnaire; PSDQ), restrictive eating tendencies (ORTO-15), and eating disorder risk and symptomology (Eating Attitudes Test; EAT- 26). Results: The results indicated that fourteen percent of the sample met the recommended clinical cut- off for elevated eating disorder risk. The proposed model fit the data adequately, and illustrated the positive mediating effect of intuitive eating and negative mediating effect of restrictive tendencies on the relationship between diet self-efficacy and eating disorder risk, and the predictive value of body esteem on both of these paths. Significance & Broader Impacts: The findings support the importance of emphasizing body esteem, intuitive eating and anti-diet approaches in eating disorder prevention programs, particularly in previously understudied minority populations.

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Is Engaged Buddhism a product of its time? A reading of Thich Nhat Hanh through Freud,marx, and Said

David St John

Engaged Buddhism is argued to be both a product of the time of its inception and a Western interpretation of Buddhism from outside the tradition, and as a pre-existing Buddhist model from those within the tradition. Thich Nhat Hanh, who is viewed as the founder of Engaged Buddhism, argues that the values of meditation and mindfulness utilized within Engaged Buddhism have always existed in the Buddhist world view. That Engaged Buddhism is simply a reaffirmation of those beliefs affirmed through the traditional Buddhist belief of compassionate care. Utilizing models of study given through Freud, Marx and Said I look at the way in which Engaged Buddhism represents their tradition. Why the importance of internal representation and the world events at the time of the inception of Engaged Buddhism lend value to the way in which Engaged Buddhism presents itself in the greater world. This becomes key in understanding the way in which Thich Nhat Hanh chooses to present the language of Engaged Buddhism to mediate it through Traditional Buddhism. Marx and Freud talk about the creation of a religion through cultural and social pressures that are being reacted to. Engaged Buddhism came to rise at a time of significant violence in war in the early to mid-20th century. With the height of the creation occurring during the era of the Vietnam war. Said through Orientalism gives a means to look at the way in which representation is key to understanding a tradition. This is used to look at the way in which the texts of the Engaged Buddhist tradition are written and presented to bridge the gap between the ideals of Traditional and Engaged Buddhism. Utilizing the models presented here I will be showing a new way to understand the language and belief structures of Engaged Buddhism and the ways in which they aim to present the tradition through the ideas in Traditional Buddhism. Understanding the way in which Engaged Buddhism is being presented from within begins to show the navigation for legitimacy within the world of Buddhism.

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Epistemological Analysis of Traditionalist and Reformist Discourses Pertaining to Islamic Feminism in Iran

Meisam Vahedi

Epistemological Analysis of Traditionalist and Reformist Discourses Pertaining to Islamic Feminism in Iran Abstract: Islamic feminism has as much dimension as Western feminism does; each Islamic country in the Middle East has its own interpretation of Islamic feminism. Discussing women`s rights within an Islamic context in Iran passed a route different from other Islamic countries. Islamic feminism is defined here as the radical rethinking of religious and sacred texts from a feminist perspective. This trend of rethinking sacred texts from a feminist perspective is unparalleled in the history of Islamic law. Notwithstanding the impact of Western feminism on the Iranian discourses, central to the development of Islamic feminism is the development of the reformist movement in Iran. Iranian reformism aims not only to review Islamic laws regarding various aspects of human life including women`s issues, but also to challenge the philosophical foundation of these laws from a modern perspective. Despite social and political gains for Iranian women in recent years, the main to women's equality is traditionalist epistemology in religious law. Using documentary research method, this research will outline the duality of reformist and traditionalist epistemological foundations of women's rights discourses in Iran. The two main questions this research will answer are: How has an Islamic feminist discourse in Iran developed from the reformist movement? What are the epistemological foundations of traditionalist and reformist discourses regarding women`s issues and gender rights? The conflict between reformists and traditionalists is based on a fundamental difference of philosophy underlying on understanding the role of women based on rights versus duties and corresponding notions of justice and equality. Reformists speak of "human rights", while traditionalists speak of "human duties". Also, while reformists believe that employing justice in Islamic laws requires absolute equality regarding both men and women`s rights, traditionalists present a different interpretation of the notion of justice. They believe that since men and women have natural and inborn differences, two separate kinds of laws are needed to regulate their lives; only in this way, can true justice toward for women be achieved. Key words: Islamic feminism, Iran, reformist movement, traditionalist discourse, reformist discourse, Islamic sacred texts, rights and duties, justice.

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Advancing our Understanding of Aging Prisoners: Intersections of Policy, Practice, and Research

Andreja Lukic

As a result of drug enforcement policies and demographic population trends, elderly inmate prison populations have increased in the US by more than 130% since the 1980s (Maschi et al, 2013) and by 2030, it is expected that about a third of the prison population will be classified as "elderly" (Gross, 2007). The complexities and costs of providing care for a growing older prison population has created unique challenges and elevating costs for states. The average yearly cost for an elderly inmate is projected at approximately $69,000 per year, almost three times more than an "average" inmate. (Mauer et al, 2004). Despite the growing concern of a growing older prisoner population, research has not fully explored the experiences and unique needs of aging prisoners. This paper will review recent trends in policy and service delivery that present opportunities for studying adults who are aging within the prison system, including: specialized units for aging inmates, increasing infrastructure for hospice care services within prisons, and specialized services for this population. It will also present continued challenges for researching aging inmates. Finally, implications and recommendations will be discussed on how such opportunities and challenges should be incorporated to a research agenda that may advance knowledge, policy, and practice within the prison system.

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