



FLORIDA  
INTERNATIONAL  
UNIVERSITY



Graduate Student Appreciation Week

# Scholarly Forum

Presentation Abstracts

March 31 – April 1, 2014

9am – 5pm

CBC 232-235

**GPSC** GRADUATE &  
PROFESSIONAL STUDENT  
COMMITTEE

**FIU** Student  
Government  
Association

FLORIDA INTERNATIONAL UNIVERSITY

## **Schedule by category**

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## **Physics Presentations**

*March 31, 2014, 9:00am – 11:00am*

### ROOM B

- 9:00am – 9:15am      Trisha Ashley  
The HI Chronicles of LITTLE THINGS BCDs  
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Experimentally Investigating Fusion Plasma Instabilities using Protons  
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Synthesis and thermoelectric property of Ca and In-doped n-type Bi<sub>85</sub>Sb<sub>15</sub> alloy  
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- 10:20am – 10:35am    Purushottam Tiwari  
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Alpha to Beta conformational change in CTD of Rfah using Molecular Dynamics  
Simulation  
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**The HI Chronicles of LITTLE THINGS BCDs**Trisha Ashley

9:00am – 9:15am

Blue compact dwarf (BCD) galaxies are gas-rich galaxies with intense and concentrated star formation. A simple explanation for their burst of star formation is an external disturbance, yet there are BCDs that appear to be isolated and thus are not likely to have been perturbed by an external force. I have studied the atomic hydrogen (HI) data of six apparently isolated BCDs in an attempt to understand what has triggered their starburst. HI observations allow us to trace the gas in galaxies which, when disturbed, can form regions of high density that can gravitationally collapse to form stars. This research is part of the Very Large Array HI survey, LITTLE THINGS (<http://www2.lowell.edu/users/dah/littlethings/>) and makes use of the high velocity and high angular resolution of LITTLE THINGS data to explore the detailed kinematics and morphology of the HI gas in each galaxy. I have also collected HI data from the Green Bank Telescope to explore the diffuse HI environments of the BCDs. I show that these galaxies have likely been externally perturbed and highlight several of their interesting HI properties.

**Experimentally Investigating Fusion Plasma Instabilities using Protons**Ramona V. Perez

9:20am – 9:35am

Devices called tokamaks use strong magnetic fields to create and confine a toroidal-shaped plasma, a hot ionized gaseous mixture of charged particles in which nuclear fusion reactions occur. Creating and maintaining these fusion plasmas involves a precarious balance of a multitude of parameters, a task made more difficult by dynamical instabilities occurring within them. A thorough understanding of the causes and effects of these instabilities is critical in order to understand and control these plasmas and the nuclear fusion reactions that take place within them. A compact, four-channel system of collimated and uniquely oriented surface barrier detectors was designed and constructed to study these instabilities. It was installed and operated at the Mega Amp Spherical Tokamak of the Culham Center for Fusion Energy in Culham, the United Kingdom, from August to September 2013. This instrument detects hydrogen isotopes emitted as products of nuclear fusion reactions in the plasma and the analysis of the recorded detector signals made it possible to determine particle production rates as a function of time. From these measurements one can gain insight into the nuclear fusion reaction rates at different locations inside of the plasma and their evolution in time. Reaction profiles, reaction rates as a function of radial distance in the plasma, will be fitted to the data before and after different plasma instabilities. A time resolution of down to one millisecond will make it possible to observe effects of different plasma instabilities, such as so-called fishbones and sawteeth, on the reaction rates.

**Synthesis and thermoelectric property of Ca and In-doped n-type Bi<sub>85</sub>Sb<sub>15</sub> alloy**

Kamal Kadel, Wenzhi Li, Giri Joshi, Zhifeng Ren

9:40am – 9:55am

In the present work / we investigated the thermo-electric properties of undoped Bi<sub>85</sub>Sb<sub>15</sub> and different Ca-doped Bi<sub>85</sub>Sb<sub>15</sub>Ca<sub>x</sub> ( $x=0.5, 2, \text{ and } 5$ ) and In-doped Bi<sub>85</sub>Sb<sub>15</sub>In<sub>x</sub> ( $x=0.5, 2$ ) alloys synthesized via arc-melting first and followed by ball milling and hot pressing. Effect of different Ca and In doping levels on transport properties of Bi<sub>85</sub>Sb<sub>15</sub> alloys has been investigated. It is found that thermal conductivity decreases with increasing Ca and decreasing In. Electrical transport measurements show that power factor increases with doping level of Ca up to Bi<sub>85</sub>Sb<sub>15</sub>Ca<sub>2</sub> and then decreases yielding the maximum power factor of  $3.8 \times 10^{-3} \text{ Wm}^{-1}\text{K}^{-2}$  and  $zT$  of 0.39 at room temperature for Bi<sub>85</sub>Sb<sub>15</sub>Ca<sub>2</sub>. For indium doping, power factor decreases with doping level from 0.5 to 2, yielding the maximum  $zT$  value of 0.37 at room temperature for Bi<sub>85</sub>Sb<sub>15</sub>In<sub>0.5</sub>. In this work, calcium doping in Bi<sub>85</sub>Sb<sub>15</sub> alloy is found to yield better thermoelectric property than indium doping.

**Structural Transitions and Aggregation in Amyloidogenic Proteins**

Timothy Steckmann, Bernard Gerstman, Prem Chapagain

10:00am – 10:15am

Amyloid fibrils are a common component in many debilitating human neurological diseases such as Alzheimer's and Parkinson's. A detailed molecular-level understanding of the formation process of amyloid fibrils is crucial for developing methods to slow down or prevent these horrific diseases. Alpha-helix to beta-sheet structural transformation is commonly observed in the process of fibril formation. We performed replica-exchange molecular dynamics simulations of structural transformations in an engineered model peptide cc-beta. Several sets of simulations with different number of cc-beta monomers were considered. Conversion of alpha-helix monomers to beta strands and the aggregation of beta strand monomers into sheets were analyzed as a function of the system size. Hydrogen bond analysis was performed and the beta-aggregate structures were characterized by a nematic order parameter.

**Quartz nanopipettes: platform for quantitative study protein-protein interaction**

Purushottam Tiwari, Y. Darici, X.W. Wang and J. He

10:20am – 10:35am

Quartz nanopipettes are chemically modified for the study of molecular interaction between human neuroglobin (hNgb) and cytochrome c (Cyt c) within attoliter sensing volume. As suggested by finite element based numerical simulations the ionic current is very sensitive to variation in surface charge near the pore orifice. The concentration dependent current change was obtained when the hNgb immobilized nanopipette tip was exposed to different Cyt c concentrations in bath solution. Based on this current change, the equilibrium dissociation constant (KD) was derived for Cyt c-hNgb interactions and this value matched very well with the KD value from surface plasmon resonance (SPR) measurements. Weak concentration dependence current change was observed for hNgb binding to Lysozyme (Lsz), which does not show specific binding to hNgb. Our results demonstrate the potential application of quartz nanopipettes for the quantitative study of protein-protein interaction.

**Alpha to Beta conformational change in CTD of RfaH using Molecular Dynamics Simulation**

Jeevan GC, Prem P. Chapagain, Bernard S. Gerstman

10:40am – 10:55am

The C-terminal domain (CTD) of the transcription anti-terminator RfaH folds to an  $\alpha$ -helix bundle when it interacts with its N-terminal domain (NTD) but it undergoes an all- $\alpha$  to all- $\beta$  conformational transformation when it does not interact with the NTD. The RfaH-CTD in the all- $\alpha$  topology is involved in suppressing transcription whereas in the all- $\beta$  topology it is involved in stimulating translation by recruiting a ribosome to an mRNA. Since the conformational transformation in RfaH-CTD gives it a different function, it is labeled as a transformer protein, a class which may eventually include many other functional proteins. The structure and function of RfaH is of interest for its own sake, as well as for the value it may serve as a model system for investigating structural transformations in general. We have combined molecular dynamics simulations with free-energy landscape and transfer entropy calculations to elucidate the details of the RfaH-CTD transformation process.

## **Bio & Geo Presentations**

*March 31, 2014, 9:00am – 1:00pm*

*Block 1 – Room A*

9:00am – 9:15am

Gregory Gonzalez  
Interweaving Wet | Land  
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9:20am – 9:35am

Stephanie Long  
Analysis of bridge construction as a hydrological restoration technique for  
Everglades National Park, FL, USA using hydrological numerical modeling  
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9:40am – 9:55am

Hari Kandel  
Does Development in South Florida Impact Thunderstorm Intensity? - A Radar  
Based Inquisition  
Page 10

*20 min break*

*Block 2 -ROOM A*

10:20am – 10:35am

Jaeson Clayborn  
Sea Level Rise versus Habitat Enhancement for the Schaus' Swallowtail Butterfly  
(*Heracles aristodemus ponceanus*), a Paradox?  
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10:40am – 10:55am

Juliana Corrales  
Modeling a Phosphorus Credit Trading Program in an Agricultural Watershed  
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11:00am – 11:15am

Yosmel Sanchez-Hernandez  
Mechanisms of enhanced carbon sequestration and organic matter preservation in  
an early Cretaceous extensional basin  
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*10 min break*

*Block 3 -ROOM A*

- 11:30am – 11:45am Ketaki Deshpande  
Genetic analysis of the “wild” horses inhabiting Ochoco National Forest  
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- 11:50am – 12:05pm Deepthi Nori  
The role of alkaline lysis and pressure cycling technology in DNA recovery from mixtures  
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- 12:10pm – 12:25pm Ana Paula Benaduce  
Neonatal UV exposure leads to melanomagenesis in K5-Edn3 mice  
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- 12:30pm – 12:45pm Ramon Salazar  
How do leaf traits and structure of West Indian dry forest change along precipitation gradients?  
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- 12:50pm – 1:05pm Lauren Barth  
Nest Use of the Key Largo Woodrat (*Neotoma floridana smalli*)  
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**Interweaving Wet | Land**Gregory Gonzalez

9:00am – 9:15am

The defiance of water defines the clashing, yet intermingled, relationship of Miami with its surrounding bodies of water. Interposed between the Everglades and Biscayne Bay, the development of the city has interrupted the natural flow of water of southeast Florida. The area's historical wetlands were drained for habitation and agriculture. Florida International University has grown from a single building to a large network of streets, pathways, parking lots, and buildings which were developed to ease the flow of people and vehicles. These impervious elements have consumed the land that once managed water naturally resulting in excessive flooding. The proposed master plan promotes reclaiming land and reverting it to micro-wetland ecosystems as a direct response to these issues. These wetlands would provide catchment of excess water and runoff, cleansing, and groundwater recharge. Furthermore, the university would be a focal point for community education regarding different types of South Florida ecosystems from cypress swamps to hardwood hammocks. To promote aquifer recharge, the reclamation also includes reducing impervious surfaces, such as asphalt streets and parking lots, through permeable solutions and reintroducing a variety of native species that have less maintenance and irrigation requirements. Simply, the proposal aims to create a network of connections using wetlands as a basis to interweave the campus with nature in order to manage storm-water.

**Analysis of bridge construction as a hydrological restoration technique for Everglades National Park, FL, USA using hydrological numerical modeling**Stephanie Long

9:20am – 9:35am

Since the construction of Tamiami Trail in the 1920's, overland flow to the Florida Everglades has decreased significantly, impacting ecosystems from the wetlands to the estuary. As part of the effort to return flows to the historical levels, several changes to the existing water management structures have been implemented or are in the design phase. A physical numerical model of Everglades National Park hydrology was developed using MIKE SHE/MIKE 11 software to review the effect of these structure changes and evaluate the potential impact of restoration efforts. The baseline, or pre-construction, model shows good performance on a variety of metrics at various locations throughout the model domain. Model simulations show that the newly constructed 1-mile bridge along Tamiami Trail will increase water delivery to Northeast Shark Slough (NESS) by about 8.8%. The 1-mile bridge plus the proposed 2.6-mile bridge will increase flows by 10.5% from the baseline flow. These simulations also show an increase of flow to the eastern canals by less than 1% for each scenario, demonstrating that restoration efforts on Tamiami Trail will have a minimal impact on canal operations and flood management. Raised overland water levels of about 1.5 to 13.4 cm in NESS can be achieved by forcing L-29 canal levels higher by 0.5 ft (0.1524 m).

**Does Development in South Florida Impact Thunderstorm Intensity? - A Radar Based Inquisition**

Hari Kandel, Assefa Melesse

9:40am – 9:55am

Thunderstorms are high intensity rainfall events that contribute significantly towards the total summer rainfall in south Florida. Since the source of energy for thunderstorms hails from surface heating, the surface cover properties profoundly influence the spatial pattern and intensity of thunderstorms. This study aims to analyze the spatial and temporal variation in thunderstorm density and intensity dictated by land cover change in south Florida. Radar reflectivity above 40 dBZ has been considered as the thunderstorm type rainfall. Above threshold base radar reflectivity of WSR -88D from Miami station (KAMX) during 1995 to 2012 for three afternoon hours from three summer months (June- August) is analyzed for two spatial units: entire south Florida, and eastern south Florida representing dominantly natural and highly modified areas respectively. The results indicate that urbanization, wetland drainage and agricultural expansion fuels and intensify convection thereby increasing the density and intensity of thunderstorms.

**Sea Level Rise versus Habitat Enhancement for the Schaus' Swallowtail Butterfly (*Heraclides aristodemus ponceanus*), a Paradox?**

Jaeson Clayborn, Dr. Suzanne Koptur, Dr. Kevin Whelan

10:20am – 10:35am

The Schaus' swallowtail (*Heraclides aristodemus ponceanus*) is a federally endangered butterfly in the United States restricted to coastal hardwood hammocks in the Florida Keys. Coastal hardwood hammocks are vulnerable to severe storms, hurricanes, human development, and rising sea levels. The Schaus' swallowtail habitat enhancement project in Biscayne National Park designated five restored sites to increase the number of hostplants for the Schaus' swallowtail. Hostplant mortality was significantly higher at Adams Key than Elliott Key. Soil samples revealed higher salt content at the restored sites in Adams Key than Elliott Key. Sea level rise (SLR) projections from the United States Army Corps of Engineers speculate SLR ranging from 1.6 – 4.9 ft. by year 2100. Maps using GIS were generated to infer habitat loss with slow (1.6 ft.), intermediate (3.3 ft.), and fast scenarios (4.9 ft.). If projected SLR followed the fast scenario, only an estimated 25% of hardwood hammock would be left intact. Adams Key restored sites are most at-risk losing significant habitat at slow and intermediate SLR projections. Elliott Key is considered the source island for the Schaus' swallowtail, which is less at-risk compared to the other islands. More effort should be devoted to protecting and enhancing Elliott Key to shield the Schaus' swallowtail from extinction.

**Modeling a Phosphorus Credit Trading Program in an Agricultural Watershed**

Juliana Corrales, G. Melodie Naja, Mahadev G. Bhat, and Fernando Miralles-Wilhelm

10:40am – 10:55am

Water quality and economic models were linked to assess the economic and environmental benefits of implementing a phosphorus credit trading program in an agricultural sub-basin of Lake Okeechobee watershed, Florida, United States. The water quality model determined the effects of rainfall, land use type, and agricultural management practices on the amount of total phosphorus (TP) discharged. TP loadings generated at the farm level, reaching the nearby streams, and attenuated to the sub-basin outlet from all sources within the sub-basin, were estimated at 106.4, 91, and 85 mtons/yr, respectively. Almost 95% of the TP loadings reaching the nearby streams were attributed to agriculture sources and only 1.2% originated from urban areas, accounting for a combined TP load of 87.9 mtons/yr. In order to compare a Least-Cost Abatement approach to a Command-and-Control approach, the most cost effective cap of 30% TP reduction was selected and the individual allocation was set at a TP load target of 1.6 kg/ha/yr (at the nearby stream level). The Least-Cost Abatement approach generated a potential cost savings of 27% (\$1.3 million per year), based on an optimal credit price of \$179. Dairies (major buyer), ornamentals, row crops, and sod farms were identified as potential credit buyers, whereas citrus, improved pastures (major seller), and urban areas were identified as potential credit sellers. Almost 81% of the TP credits available for trading were exchanged. The methodology presented here can be adapted to deal with different forms of trading sources, contaminants, or other technologies and management practices.

**Mechanisms of enhanced carbon sequestration and organic matter preservation in an early Cretaceous extensional basin**

Yosmel Sanchez-Hernandez and Florentin J-M.R. Maurrasse

11:00am – 11:15am

Enhanced organic matter preservation in marginal basins across the western Tethys during Barremian - Aptian has been primarily related to basin geometry, intensified bio-productivity and an oxygen deficient water column. Recent publications provide insights on the evolution and paleoenvironmental response of such complex geologic domains, but comprehensive studies are required for a more detailed characterization. / In the present work we use the tectonic and geometric reconstruction of a semi-enclosed extensional basin from the south-eastern Pyrenees coupled with carbon geochemistry (TIC, TOC,  $\delta^{13}\text{C}_{\text{org}}$ ), biomarker analysis, trace and major elements, clay and bulk mineral content, micropaleontology, and lithostratigraphy to evaluate the depositional environment of the Organyà Basin conducive of enhanced organic carbon preservation (TOC > 0.5%) from the latest Barremian to the earliest Aptian. / The results indicate that a deepening phase of the Organyà Basin concomitant with intensified primary productivity induced a shift in the sedimentation pattern and impacted the oxygen levels in the water column through organic matter respiration and limited ventilation of bottom waters. Faunal assemblages attest for the existence of benthic stressful conditions whereas trace element enrichment and pyrite distribution confirm the presence of a chemically reducing phase. Rock-eval and n-alkanes analyses revealed high maturity and autochthonous origin of the OM. Major elements concentration and mineralogical distribution suggest prevailing fertile waters as a consequence of sustained terrestrial input (~30% non-carbonate components) whereas high carbonate (up to ~89 %) and organic carbon content (up to 1.7 %) confirm intensified carbon sequestration.

**Genetic analysis of the “wild” horses inhabiting Ochoco National Forest**

Ketaki Deshpande, Natalie Leyva and DeEtta Kay Mills

11:30am – 11:45am

Wild horses inhabiting the Ochoco National Forest, Oregon are thought to be one of the few remaining wild mustang herds still roaming North America. Protected by the Wild Horse and Burro Act of 1971, wild horses are iconic symbols of America’s past. Feral horses are distinct not only because of their adaptation to the wild but also because of their mixed ancestry. We employed a non-invasive sampling method of captive and wild horses from the Big Summit herd, needed in order to census the population and determine genetic relatedness. Hair samples serendipitously collected from trees within the Big Summit Wild Horse Territory range as well as captive wild horses were used. 98 individuals from the Big Summit herd and adjacent herd management areas were profiled. The deficiency of heterozygosity, a deviation from Hardy-Weinberg equilibrium coupled with a low inbreeding coefficient in the population suggests a rudimentary “island population“ phenomenon. Majority of the HMA herd relationships were those of close kin. Horses with unknown origins considered the active gene pool of the Ochoco population were observed to be more closely related with individuals sampled in the same vicinity versus those from the captured adopted out Ochoco stock. These findings advise a critical balance between conservation of rangelands, protection and management of the wild horses and the natural ecology of their habitats. We imply supplementing traditional visual census with genetic analyses to enhance management and conservation efforts as DNA analysis can depict the genetic health and inbreeding status of these horses.

**The role of alkaline lysis and pressure cycling technology in DNA recovery from mixtures**

Deepthi Nori, MFS; Bruce R. McCord, Ph.D

11:50am – 12:05pm

Sexual assault cases are plagued by challenges in sample analysis due to the presence of tissue from multiple contributors. The mixture is often overwhelmed by the female epithelial cells which makes generating a clean male DNA profile very difficult. The objective of this study is development of a method using pressure cycling technology (PCT) combined with reagents to selectively disrupt sperm or epithelial cells and recover DNA. The extraction procedure is performed utilizing the Barocycler® NEP 2320 (Pressure Biosciences Inc. ,South Easton, MA). Another goal of this study was to enhance sample recovery from cotton swabs. Cotton swabs are often used to collect evidence in a crime scene but the inefficient sample recovery from this substrate has been the subject of numerous studies in the past. In order to enhance DNA recovery and hence improve downstream genetic analysis, the effect of alkaline lysis on sample recovery from cotton swabs was studied. Preliminary results indicate that the application of pressure cycling technology, in the presence of appropriate buffers, can result in 50-60% recovery of male DNA from mixtures. These observations were reproduced with mixtures on cotton swabs where six times more male DNA was recovered compared to female epithelial DNA. Our results indicate a significant increase in DNA recoveries from cotton swabs with an increase in selectivity for sperm DNA recovery. Careful optimization of parameters including NaOH concentration, incubation time and temperature resulted in 5-6 fold enhancement in the relative ratio of sperm DNA in these mixtures.

**Neonatal UV exposure leads to melanomagenesis in K5-Edn3 mice**

Ana Paula Benaduce, Deannys Batista, Gabriel Grilo, Karen Jorge, Diana Cardero, Lidia Kos

12:10pm – 12:25pm

Melanoma, the most dangerous form of skin cancer, results from the transformation of melanocytes. Environmental factors, such as UV radiation, and genetic factors are known to influence melanomagenesis. The Nucleotide Excision Repair (NER) pathway repairs photoproducts induced by UV radiation; the Xpa protein has an important role in this pathway. Mice deficient in Xpa show high sensitivity to UV light, leading to skin cancer development; but not melanoma. The Endothelin3 (Edn3) signaling pathway is essential for proliferation, survival and migration of melanocyte precursor cells, and has been implicated in melanoma progression. This study aims to develop a UV-dependent melanoma mouse model that combines Xpa deficiency with the over-activation of the Edn3 pathway. Transgenic mice over-expressing Edn3 under the control of the keratin5 promoter (K5-Edn3) and carrying a targeted mutation in Xpa were exposed to a single suberythral neonatal dose of UV radiation and monitored for melanoma development. Histomorphology and immunostaining were used to confirm the melanocytic origin of primary skin tumors and metastases. Melanoma was only found in animals with the K5-Edn3 transgene. The penetrance of lesions was higher in animals that were Xpa null (60%, n=10) when compared to Xpa heterozygous (46.3%, n=13) or Xpa wild type (18.7%, n=16). Additionally, mice with disrupted NER tended to acquire their lesions at an earlier time. Animals with melanoma lesions presented enlarged and hyperpigmented lymph nodes that were diagnosed as local metastases. These results indicate that UV radiation exposure, together with over-activation of the Edn3 pathway can lead to melanomagenesis in mice.

**How do leaf traits and structure of West Indian dry forest change along precipitation gradients?**

Ramon Salazar-Ortiz

12:30pm – 12:45pm

Besides water availability and natural disturbances, tropical dry forest structure has been related to nutrient limitation. Nutrient availability may be closely related to moisture and the dissolution of phosphorus in calcareous substrate. The leaf N and P and SLA, traits related to plant growth, change with the nutrient limitation alleviation along a precipitation gradient. This study measures soil available nutrients, leaf trait variation of four species, and forest productivity/tree height along two precipitation gradients in Puerto Rico and S. Florida, and helps to understand N and P limitation of tropical dry forest species.

**Nest Use of the Key Largo Woodrat (*Neotoma floridana smalli*)**

Lauren J. Barth, Jennifer S. Rehage, Michael Ross, Joshua Diamond

12:50pm – 1:05pm

Protecting endangered species like Key Largo woodrats (*Neotoma floridana smalli*) is an important step towards preserving biodiversity. Although most of the woodrat's remaining tropical hardwood hammock habitat has been protected by government authorities, development on the island prevents the expansion of their range and thus limits woodrat recovery. However if we could improve habitat quality within the existing habitat, then the same area may be able to support a larger and more stable population of Key Largo woodrats. By identifying elements of habitat that are essential for woodrats, we may be able to guide management to preserve those elements and improve habitat quality. Several studies have tried to determine Key Largo woodrat preferences, and all have in some way relied on somewhat biased live-trapping data. However, woodrats are noted for building multiple, large stick-based nests throughout their territories, which serve as places to rest, store food, and raise young. The locations of these nests have been shown in other woodrat species to indicate habitat preferences. By systematically locating nests, assessing their occupancy, and gathering associated habitat characteristics, we might be able to determine if woodrats prefer areas associated with particular habitat characteristics. Nest distribution was mapped using line transect surveys, and nest occupancy was evaluated using remote cameras. Analysis of nest distribution and occupancy rates can then determine if woodrat habitat preference is associated with forest age, nest substrate, proximity to abandoned roads, or fine-scale forest structure. Preliminary results indicate an association with man-made nest substrate and abandoned roads.

## Chemistry Presentations

*March 31, 2014, 12:40pm – 4:40pm*

*Block 1 Room B*

12:40pm – 12:55pm

Alan McKenzie

Explosives Characterization and Separation from complex mixtures using Trapped Ion Mobility Spectrometry- Mass Spectrometry  
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1:00pm – 1:15pm

Kelley Peters

Development of Paper Microfluidic Devices for the Rapid, On-Site Detection of Improvised Explosives  
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1:20pm – 1:35pm

Rhett Williamson

Characterization and Discrimination of Printing Inks for Forensic Document Analysis  
Page 20

1:40pm – 1:55pm

Michelle Cerreta

Detection Canine Field Accuracy to Flowers Producing Methyl Benzoate, a Cocaine Odorant  
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*10 min break*

*Block 2- ROOM B*

2:10pm – 2:25pm

Paolo Benigni

Development of gas-phase analytical methods for increased sensitivity in the molecular characterization of crude oils  
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2:30pm – 2:45pm

Eladio Mendez

Aggregation and photoluminescent tuning of conjugated polymer nanoparticles for biological applications  
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2:50pm – 3:05pm

Juan Camilo Molano Arevalo

Conformational dynamics of Flavin Adenine Dinucleotide: solution vs gas-phase  
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3:10pm – 3:25pm

Kendra Adams

Starvation-induced changes in the lipid composition of Dictyostelium discoideum cells  
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*10 min break*

*Block 3- ROOM B*

3:40pm – 3:55pm

Alyssa Garabedian

Molecular differentiation of Escherichia coli strains as a function of antibiotic stress

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4:00pm – 4:15pm

Cen Zhao

Photodegradation of iodinated X-ray contrast medium iopamidol by  $\text{Fe}^{3+}$ /oxalate system with the composition of  $\text{H}_2\text{O}_2$

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4:20pm – 4:35pm

Meng Xu

Bypass of a 5',8-cyclo-2'-deoxynucleoside by DNA polymerase  $\beta$  leads to trinucleotide repeat deletion

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**Explosives Characterization and Separation from complex mixtures using Trapped Ion Mobility Spectrometry- Mass Spectrometry**

Alan Mckenzie, John Daniel DeBord, Mark Ridgeway, Melvin Park, Gary Eiceman and Francisco Fernandez-Lima

12:40pm – 12:55pm

In the present study, trapped ion mobility spectrometry coupled to mass spectrometry (TIMS-MS) and theoretical calculations have been used to study the tridimensional space of explosive compounds with different adduct forms. The unique capability of TIMS-MS for the separation and identification of trace amount of explosive compounds from complex mixtures with commonly known interferences is demonstrated. In particular, collision cross sections were measured for five standard explosive compounds (e.g., DNT, TNT RDX, HMX and PETN) and their adduct forms. It is shown that the use of solution dopants (e.g., ammonium salts) increases the confidence value and selectivity for the detection of explosive compounds. For the first time, the molecular ion relative stability of the different adduct forms was studied using single molecule, gas-phase ion-neutral kinetic measurements.

**Development of Paper Microfluidic Devices for the Rapid, On-Site Detection of Improvised Explosives**

Kelley L. Peters, BS; Inge Corbin, BS; Micale Kaufman; Kyle Zeribe; Bruce McCord, Ph.D

1:00pm – 1:15pm

In recent years there had been a dramatic increase in the use of improvised explosives. These materials have a wide range of volatility, polarity, and composition, so multiple analyses must be run in a lab in order to identify the explosive material. This process increases the amount of time before any information on the identity of the explosive can be provided to on-site personnel. Therefore, military and law enforcement personnel need a rapid, inexpensive, simple method in order to identify these types of materials in the field. / The use of paper microfluidics ( $\mu$ PADs) allows for the development of very inexpensive devices based on designs printed in wax-based ink on chromatography paper. These wax channels can direct liquid samples toward individual sections of the paper containing colorimetric test reagents. Based on the design, one device can perform five simultaneous analyses while costing only pennies. / Two different  $\mu$ PADs have been designed for the detection of multiple components in an improvised explosive, such as flash powders and other inorganic explosives, along with high explosives and peroxides. The inorganic explosive  $\mu$ PAD is capable of detecting chlorate, perchlorate, ammonium, nitrate, and nitrite while the high/organic explosives  $\mu$ PAD is capable of detecting nitroaromatics, nitroamines, H<sub>2</sub>O<sub>2</sub>, and urea nitrate. Limits of detection range from 750 ppm to 15 ppm with an average of 250 ppm. The development of this paper based sensor will allow law enforcement and military personnel a simple, reliable device for the presumptive testing of unknown evidence in the field.

**Characterization and Discrimination of Printing Inks for Forensic Document Analysis**

Rhett Williamson, Anna Raeva, José Almirall

1:20pm – 1:35pm

With the advent of improved and widely accessible printing technology, the rate of criminal activity involving printed questioned documents has greatly increased. The analysis of printing inks sparks great interest among forensic document examiners whose interests are to develop security countermeasures against possible counterfeiting. Conventional forensic document analysis is based on the examination of physical differences and defects in printed documents' inks. This type of analysis disregards chemical differences, handicapping the examiner's ability to universally discriminate printed documents. / In this project, the use of a combination of techniques for printed document analysis is proposed, which include direct analysis in real time mass spectrometry (DART-MS), pyrolysis gas chromatography mass spectrometry (Py-GC-MS), and attenuated total reflectance Fourier transform infrared spectroscopy (ATR-FTR). The chemical information obtained will be used to establish chemical fingerprints for different classes of ink. The fusion of these data will provide more comprehensive chemical information than conventional physical examination, and can be used to distinguish inks from different sources and associate common inks from the same source.

**Detection Canine Field Accuracy to Flowers Producing Methyl Benzoate, a Cocaine Odorant**

Michelle Cerreta, B.S., Kenneth G. Furton, Ph.D.

1:40pm – 1:55pm

In recent years, canine detection has been under much scrutiny. Previous research has shown that detection canines do not induce an alert response to the illicit substance, but to specific components comprised of the substance's signature odor profile. During the 2013 Supreme Court case, *State of Florida v. Joelis Jardines*, it was stated that if a canine alerts to the active odor signature that the canine associates with the contraband, and not the contraband itself, the canine's accuracy and selectivity is under question, especially since many of these compounds have been found in common household products. Specifically, methyl benzoate, the sweet smelling volatile organic compound (VOC) associated with cocaine, has recently been found to be the most abundant compound produced by popular flowers, such as snapdragons (*Antirrhinum*), as a means of attracting pollinators. Therefore, the question arose whether a canine would falsely alert to a snapdragon flower bed or bouquet if a canine alerts to methyl benzoate. The purpose of this study was to examine the VOCs released from various types of newly grown snapdragon flowers, primarily methyl benzoate, and assess its potential at eliciting a false alert from specially trained detector canines. A canine's ability to distinguish between unfamiliar pools of odor which slightly resemble the illicit substance, like those produced by snapdragon flowers, as well as the potential of a false alert in a similar field scenario, was examined.

**Development of gas-phase analytical methods for increased sensitivity in the molecular characterization of crude oils**

Paolo Benigni, John Daniel DeBord, Christopher Thompson, Piero Gardinali, and Francisco Fernandez-Lima

2:10pm – 2:35pm

Tens of thousands of chemically distinct organic compositions with concentrations ranging over more than four orders of magnitude are commonly encountered in crude oil samples. In turn, crude oil derived applications typically require a method for rapid screening and accurate identification of heteroatom classes (e.g., non-covalent multimers and distributions of heteroatoms, rings, and double bonds). Common practice limits the description of these complex mixtures to the identification and quantification of a limited number of a priori selected compounds. In the present work, we showed the advantages of high resolution mass spectrometry coupled to gas-phase separation and atmospheric pressure laser ionization (APLI) for the screening of complex mixtures of heteroatoms hydrocarbons. Three crude oil NIST standards were studied: petroleum crude oil (1528), heavy sweet crude oil (2722), and organics from shale oil (1580). Results show that gas-phase, pre-separation increases (>2 fold) the ionization probability and signal-to-noise of lower concentration fractions, while identification is restricted to the number of volatiles that can be generated. For example, a better coverage is obtained in the  $m/z=100-500$  range (> 6000 compounds identified) using gas-phase separation prior ionization, while during direct infusion molecules in the  $m/z = 500-900$  range are detected. In both cases, single compound identification was performed using high resolution Fourier Transform Ion Cyclotron Resonance Mass Spectrometry (FT ICR MS) with sub ppm resolution and the different heteroatom classes were analyzed based on the Kendrick mass defect the heteroatom/carbon ratio.

**Aggregation and photoluminescent tuning of conjugated polymer nanoparticles for biological applications**

Eladio Mendez and Joong Ho Moon

2:40pm – 2:55pm

Background/Specific Aim: Semiconducting conjugated polymer nanoparticles (CPNs) are emerging fluorescent biomaterials for cellular labelling, sensing, therapeutics, and delivery of biological substances. Conjugated polymers (CPs) demonstrate excellent photophysical properties, such as high molar absorptivity, quantum yield, and energy transfer efficiency, making them suitable for various biological applications. However, due to the hydrophobic nature of CPs, and their subsequent aggregation, most of these desirable photophysical properties are lost during the aggregation process in aqueous media. Understanding how to modulate and stabilize polymer aggregation via incorporation of hydrophobic side chains and backbone segments is paramount to improving the CPN's photophysical properties and improving their labelling efficacy. Methods: We monitored the effect of incorporating hydrophobic alkyl side chain and cyano-containing poly-paravinylen (PPV) backbone segments on the photophysical properties and nanoparticle stability of poly-paraphenylene ethynylene (PPE) CPNs. The CPNs were purified using dialysis, and photophysical properties were monitored using UV-Vis and fluorescence spectroscopy. Results: We observed a significant red-shift in emission as PPV units were incorporated into the PPE backbone. Alkyl chains were incorporated to facilitate nanoparticle formation and thereby increase nanoparticle stability. Conclusion: Our findings demonstrate how simple chemical modifications can have a profound effect on the photophysical and colloidal stability of CPNs. / This work has been supported by NIH (SC1GM092778) and NIH/NIGMS-RISE (R25 GM61347;EM).

**Conformational dynamics of Flavin Adenine Dinucleotide: solution vs gas-phase**

Juan Camilo Molano-Arevalo; Diana R. Hernandez; Walter Gonzales; Jaroslava Miksovska; Mark E. Ridgeway, Melvin A. Park, and Francisco Fernandez-Lima

2:50pm – 3:05pm

Flavin adenine dinucleotide (FAD) is involved in important metabolic reactions of several organisms and is known that changes conformation under different biological conditions. In the present work, we study FAD conformational changes in solution and in gas phase by measuring the fluorescence decay time and collisional cross section as a function of the solvent conditions (organic content) and gas-phase collisional partner (e.g., N<sub>2</sub> mixed with methanol, ethanol and acetonitrile). Results showed that multiple conformations are present in the solution and gas-phase depending on solution conditions and the molecular ion observed (e.g., [M+H]<sup>+</sup> or [M+Na]<sup>+</sup>), and that relative abundances between the conformations can be tailored by the gas-phase collisional partner. Candidate structures for each conformation observed are proposed using molecular dynamics.

**Starvation-induced changes in the lipid composition of Dictyostelium discoideum cells**

Kendra Adams, John D. DeBord, Christopher J. Thompson, Richard H. Gomer, and Francisco Fernandez-Lima

3:10pm – 3:25pm

Dictyostelium discoideum cells are good biological models because they alternate between single cell to multicellular organisms in their biological cycle. When feeding on bacteria, the cells are singular and growing; however, when starved; they aggregate into a multicellular body. In the present work, wild type Dictyostelium cells were studied at the mature phase (growing) and after 6 hours of starvation (starved) to characterize the macromolecular differentiation that occurs between these two stages. In particular, high-resolution mass spectrometry (Matrix Assisted Laser Desorption Ionization, MALDI, Fourier Transform-Ion Cyclotron Resonance Mass Spectrometry) was used to identify the molecular changes associated with the cell starvation with emphasis in lipid and peptide identification. Analysis was performed using two MALDI matrices (2,5-dihydroxybenzoic acid, DHB, and  $\alpha$ -Cyano-4-hydroxycinnamic acid, CHCA) in positive and negative ionization mode. Statistical analysis based on molecular expression (fold and p-value) permitted the identification of common and characteristic molecular ions specific to each biological stage. This work provided the methodology towards in situ single cell molecular differentiation studies of Dictyostelium discoideum cells.

**Molecular differentiation of Escherichia coli strains as a function of antibiotic stress**

Alyssa Garabedian, Emily R. Schenk, Diana R. Hernandez, Yuk-Ching Tse-Dinh, and Francisco Fernandez-Lima

3:40pm – 3:55pm

Recent antibiotic resistance in bacteria is a major concern to our health, safety and security. In the present work, changes that occur at the cellular level, for three Escherichia coli strains, as a function of antibiotic exposure (norfloxacin, a quinolone) were studied. In particular, changes in an E. coli wild type strain (MG1655) and an isogenic pair (DPB635 and DPB636) pre- and post-stress were analyzed using mass spectrometry (time-of-flight mass spectrometry, TOF-SIMS) in order to generate in situ biological markers for strain differentiation and evaluate strain response to a stress challenge. Differences in molecular expression were correlated with stress response in bacteria, and molecular ions common and characteristic to pre- and post-stress for each strain were identified. This study serves as a proof concept for later in situ mass spectrometry imaging studies utilizing E. coli.

**Photodegradation of iodinated X-ray contrast medium iopamidol by  $\text{Fe}^{3+}$ /oxalate system with the composition of  $\text{H}_2\text{O}_2$** 

Cen Zhao, Kevin O'Shea

4:00pm – 4:15pm

Iodinated x-ray medium (ICM) compounds are widely used pharmaceuticals for intravascular administration to enhance the imaging of the organs or blood vessel during diagnostic tests. ICM have received attention due to its presence in wastewater effluents, surface water and even in drinking water supplies. Although ICM have not shown any specific health effects on humans, precautionary and prediction are necessary because of its contribution to organic halogen compound adsorbable on activated carbon (AOX). Iron based treatments and oxidative processes have received considerable attention for the remediation of a wide variety of pollutants. In this study, Fe(III)-oxalate/ $\text{H}_2\text{O}_2$  photochemical system was employed for the remediation of iopamidol a model compound for ICM. Detailed studies were conducted to elucidate the influences of Fe(III), oxalate concentrations and pH values. The formation rates of hydroxyl radical ( $\bullet\text{OH}$ ) and superoxide anion radical ( $\text{O}_2\text{-}\bullet$ ) were determined by using coumarin and nitroblue tetrazolium dichloride (NBT) as the probes under UV (350 nm) and visible light (450 nm) irradiation. Photodegradation mechanisms of iopamidol are underway to determine the degradation pathways and identify the by-products.

**Bypass of a 5',8-cyclo-2'-deoxynucleoside by DNA polymerase  $\beta$  leads to trinucleotide repeat deletion**

Meng Xu, Zhongliang Jiang, Michail Terzidis, Annalisa Masi, Chryssostomos Chatgililoglu and Yuan Liu

4:20pm – 4:35pm

5',8-cyclo-2'-deoxynucleosides such as a 5',8-cyclo-dA or 5',8-cyclo-dG are common forms of oxidized DNA base lesions that are usually induced by hydroxyl radicals produced via endogenous and environmental oxidative stress as well as ionizing radiation. 5',8-cyclo-deoxynucleosides can only be repaired by nucleic excision repair, but with a low efficiency. In addition, the base lesions are poorly bypassed by translesion DNA polymerases. This subsequently results in the accumulation of the damage in the genomic DNA that can severely inhibit DNA synthesis by DNA polymerases during DNA replication and repair, thereby causing mutations and genome instability. Trinucleotide repeats (TNR) are tandem repeats of Gs, As and Cs, thus they are susceptible to oxidative DNA damage that include 5',8-cyclo-deoxynucleosides. We previously found that an oxidized DNA base lesion can induce TNR deletion and expansion that are associated with prostate cancer and neurodegeneration. These are mediated by bypass of a TNR hairpin by DNA polymerase  $\beta$  (pol  $\beta$ ) during DNA base excision repair (BER) in a damage position-dependent manner. In this study, we asked if pol  $\beta$  can mediate TNR instability via its bypassing of an oxidized 5',8-cyclonucleoside, 5',8-cyclo-dA in a CAG repeat tract. We made the first discovery that pol  $\beta$  efficiently bypassed both 5'R,8-cyclo-dA and 5'S,8-cyclo-dA in a (CAG)<sub>10</sub> tract. This exclusively resulted in a CTG repeat deletion. We further demonstrated that the repeat deletion was caused by the looping out of the 5',8-cyclo-dA lesion on the template strand during pol  $\beta$  bypass synthesis. Moreover, we found that pol  $\beta$  bypass of the template 5',8-cyclo-dA resulted in repair deletion products with different sizes, suggesting the formation of damage-containing template loops with different sizes that subsequently facilitates the polymerase to skip the damage. Our results indicate that pol  $\beta$  bypass of a 5',8-cyclo-deoxynucleoside lesion can induce TNR deletion.

## Engineering Presentations

*March 31, 2014, 11:10am – 4:30pm*

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- 11:10am – 11:25am    Chowdhury Al-Amin  
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- 11:30am – 11:45am    Raju Sinha  
Tunable THz Source Based on Nonlinear Optical Micro-Ring Resonator  
Page 29
- 11:50am – 12:05pm    Sadegh Behdad  
In Situ Tensile Testing of Aluminum-Carbon Nanotube Composites  
Page 29
- 12:10pm – 12:25pm    Muhammad Khan  
Design of A Software-Defined RFID Generic Sensing Platform (GSP-tag)  
Towards the Future Internet of Things (IoT)  
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*Lunch Break*

*Block 2- ROOM A*

- 1:20pm – 1:35pm    Saman Sargolzaei  
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Functional Connectivity Network  
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- 1:40pm – 1:55pm    Yinchen Song  
A concurrent fMRI and EEG Study of Epileptogenesis in a Rat Model of Focal  
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- 2:00pm – 2:15pm    Rupak Dua  
Cartilage-Cartilage Integration Improvements using Hydroxyapatite: Healthy  
versus Osteoarthritic Conditions  
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- 2:20pm – 2:35pm    Jaimit Parikh  
Modeling localized calcium signals in vascular cells.  
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Seeing is Not Believing: Visual Verifications through Liveness Analysis using  
Mobile Devices  
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*10 min break*

*Block 3 – ROOM A*

3:10pm – 3:25pm

Nida Azhar

Does Information and Communication Technology (ICT) Facilitates Integrated Project Delivery (IPD) in Public Sector Construction?

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3:30pm – 3:45pm

Khandker Ishtiaq

Data driven approach in Ecological Engineering: Identification of Dominant drivers and modeling of GreenHouse Gases

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3:50pm – 4:05pm

Mehrnoosh Mahmoudi

The Effect of Conditional Pulsed flow and Sediment Transport in Wetland Bed Morphology: Case Study in Loxahatchee Impoundment Landscape Assessment

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4:10pm – 4:30pm

Maryam Asghari Mooneghi

Large-Scale Testing on Wind Uplift of Roof Pavers

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**MOS2-Graphene Interface Characterization and its application towards MESFET**Chowdhury Al-Amin

11:10am – 11:25am

MOS2 is a semiconductor material classified as a transition metal dichalcogenide consisting of hexagonal planar lattice of Mo atoms sandwiched between two similar lattices of S atoms with intralayer covalent bonding and a direct bandgap of 1.8 eV. It is a promising 2-D electronic material suitable for FETs with high on-off ratio. On the other hand, Graphene is another promising 2-D material without bandgap having high residual carrier concentration and mobility suitable for high frequency analog devices. In this work we have simulated and experimentally investigated the characteristics of the interface between Graphene and MOS2. Our simulations supported by experimental results show that Graphene on top of MOS2 forms a Schottky interface. We simulated and analytically calculated the current-voltage characteristics and barrier height of the interface which were in a good agreement with our experimental results. Based on the characteristics of the interface found from our experiment as well as from simulation, we proposed a Metal - Semiconductor Field Effect Transistor (MESFET) with MOS2 as channel material and Graphene as the gate. The DC and RF characteristics of the MESFET were estimated from analytical calculation and numerical simulation technique. We also explored the possibility of RF performance improvement of this FET using additional capacitively coupled contacts at the access regions and did estimation and extensive analysis of the improvement using analytical and numerical techniques.

**Tunable THz Source Based on Nonlinear Optical Micro-Ring Resonator**

Raju Sinha, Mustafa Karabiyik, Chowdhury Al-Amin, Phani K. Vabbina, Nezhil Pala

11:30am – 11:45am

We theoretically investigated and designed a tunable, compact THz emitter in 1-10 THz range based on a nonlinear optical micro-ring resonator. The lack of tunable THz source operating at room temperature is still one of the major impediments for the applications of THz radiation. According to difference frequency generation (DFG) phenomenon, two narrowband laser beams of slightly different frequencies incident upon a noncentrosymmetric material produces an electromagnetic wave with the frequency equal to the difference between the two input frequencies. / / The proposed device on an insulated SiO<sub>2</sub> substrate consists of a nonlinear optical ring resonator on top of another ring waveguide capable of sustaining THz modes. A pair of Si optical waveguides is coupled to the nonlinear micro-ring in order to carry the two input optical waves. Another pair of Si THz waveguides is placed beneath the input optical waveguides to couple out the generated THz radiation from the ring to receiver antenna. Both optical and THz waveguides are engineered optimally with necessary effective mode indices in order to satisfy the phase matching condition. We presented the simulation results of our proposed device using a commercial FDTD simulation tool. We defined the optical nonlinearity by setting the  $\chi(2)$  value as  $2.5 \times 10^{-17}$  F/V in the top ring. A distinguished THz peak coincident exactly with the theoretical calculations involving DFG is observed in frequency spectrum of electric field in the ring. Our device has the potential to enable tunable, compact THz emitters and on-chip integrated spectrometers.

**In Situ Tensile Testing of Aluminum-Carbon Nanotube Composites**

Sadegh Behdad, Benjamin Boesl, Debrupa Lahiri, Arvind Agarwal

11:50am – 12:05pm

This paper reports in situ tensile testing of sintered Aluminum and Aluminum-Carbon nanotube composites. The composites, containing 1 vol.% of CNT were fabricated by spark plasma sintering of Aluminum and long Carbon nanotubes (25-30 Microns). Very high processing speed of spark plasma sintering can decrease the formation of thermodynamically stable aluminum carbide, which can decrease the effect of adding nanosized carbon reinforcement otherwise. Addition of carbon nanotube reinforcement led to 40% increase in tensile strength and 65% enhancement of stiffness. The failure mechanism was investigated by in situ scanning electron microscopy. Direct observation inside electron microscope during the tensile testing showed that pullout of the Carbon nanotubes is the main failure mechanism. Telescopic sliding of CNT walls was also imaged which is an additional mechanism resulting in further strengthening of the aluminum matrix.

**Design of A Software-Defined RFID Generic Sensing Platform (GSP-tag) Towards the Future Internet of Things (IoT)**

Muhammad S Khan and Hai Deng

12:10pm – 12:25pm

This article presents the design of a semi-passive UHF RFID tag working as a Generic Sensing Platform (GSP). This tag platform can be dynamically switched between two basic sensing modes: Data logging mode and Continuous data transmitting mode. A standard set of Gen2 ‘Write’ commands (i.e. G2Write=3, 1, FFFF), issued from any commercially available Gen2 reader, can switch between the modes. In this design, for the sensor data and other information communication between the backend server and the tag, an innovative EPC ID based data communication strategy is implemented. To accommodate and manage the high volume of data acquired from the tag sensors, a novel complete memory management scheme is also implemented in the software design. Finally this tag has been deployed in an experimental the Internet of Things (IoT) setup mimicking supply chain scenario, to evaluate its performance as an end-user node.

**Scalp EEG based Epileptic Classification using Graph Theory Applied on Functional Connectivity Network**

Saman Sargolzaei, Mercedes Cabrerizo, Mohammed Goryawala, Anas Salah Eddin and Malek Adjouadi

1:20pm – 1:35pm

The proposed technique establishes a novel framework for the classification of scalp EEG data into epileptic and normal control using functional connectivity networks (FCNs). These FCNs are used to extract three different sets of topological features based on density, distance, and spectral metrics. Using these features, a uniquely constructed vector defining a given subject’s FCN is fed into the K-means clustering process to classify each subject as either epileptic or control. This vector can be augmented to include the rater’s opinion. With the inclusion of the rater’s opinion, the use of the Generalized Linear Method reveals which of the features in the augmented vector are essential in the classification process. Results demonstrate the existence of statistically significant changes in the FCN of epileptic patients compared to those of control subjects ( $p < 0.05$ ). Furthermore, clustering results demonstrate the ability to delineate the two groups with an initial accuracy of 87.5%. With the inclusion of the rater’s opinion, the leave-one-out cross validation showed a significant increase in the classification accuracy which reached 96.87%. The use of the GLM method proved effective in the feature selection process, which reduced both the dimensionality of the feature vector and the computational requirements of the classification process.

**A concurrent fMRI and EEG Study of Epileptogenesis in a Rat Model of Focal Cortical Dysplasia**

Yinchen Song, Jihye Bae, Abhay Deshmukh, Basavaraju G Sanganahalli, Fahmeed Hyder, Jorge J Riera

1:40pm – 1:55pm

Interictal epileptiform discharges (IEDs), morphological patterns of which include spikes (20-70 ms in duration) and sharp-waves (70-200 ms in duration), have been considered as biomarkers of epileptogenesis. IED-triggered fMRI recording technique is believed to improve the localization of the epileptogenic regions in patients undergoing neurosurgery. However, the performance of this methodology to localize epileptic lesions in patients with focal cortical dysplasia (FCD) has not yet been evaluated using preclinical models. To that end, we used twenty-five Wistar rats with FCDs created by a “double hit” method, which relies on pilocarpine for the establishment of the chronic epilepsy. We performed single-channel EEG and fMRI concurrent recordings using a 9.4 T MRI scanner at Yale University. Spikes and sharp-waves were detected by automatic thresholding on artifact-free EEG signals. Identified IED events were classified into different clusters and used as regressors in the SPM toolbox to localize brain areas with BOLD activations and deactivations locked to specific types of IEDs. Along with the expected BOLD activations within the limbic system associated with pilocarpine-induced models, we found activations in cortical regions. Furthermore, we observed deactivations in BOLD signals very close to the activated cortical regions in several cases. We hypothesize that regions with IED-triggered activations and/or deactivations in BOLD signals are related to FCD lesions and epileptogenesis. The source locations of IEDs identified from high-resolution 32-channel scalp EEG recordings using a self-designed EEG-cap, performed separately for validation purpose, coincided with those brain regions with activations and/or deactivations in BOLD signals.

**Cartilage-Cartilage Integration Improvements using Hydroxyapatite: Healthy versus Osteoarthritic Conditions**

Rupak Dua

2:00pm – 2:15pm

Articular cartilage defects are the end result of knee injuries. Among regenerative strategies that have been implemented to treat these defects, engineered cartilage has shown great promise. However approaches to improve upon integration outcomes for the engineered construct to surrounding host tissues, i.e., the subchondral bone and adjacent native articular cartilage are severely lacking. We previously reported on the use of Hydroxyapatite (HA) nanoparticles to promote engineered cartilage to bone matrix integration. Here, by employing a similar strategy, we investigated the effectiveness of integrating tissue engineered cartilage derived from HBMSC's to healthy as well as diseased cartilage mimics in an in vitro engineered tissue model system. Improvement in integration using HA was specifically assessed via the integration strength between marrow stem-cell secreted tissue engineered cartilage and healthy and diseased cartilage matrix derived from human chondrocytes. At the same time, we also evaluated the phenotypic stability of the marrow cell-derived engineered cartilage at locations distal and proximal to the interface. We found that there was a significantly higher ( $p < 0.05$ ) interfacial shear strength in the tissue engineered cartilage derived from HBMSC with HA particles underlying with diseased cartilage mimics as compared to the without HA counterparts. These findings indicate the utility of using HA particles in treating osteochondral or chondral lesions.

**Modeling localized calcium signals in vascular cells**Jaimit Parikh

2:20pm – 2:35pm

Localized calcium ( $\text{Ca}^{2+}$ ) events like sparks, puffs and sparklets (localized  $\text{Ca}^{2+}$  release through membrane receptor channels like TRPV4) have often been documented in vascular cells. Theoretical modeling can provide quantitative insights and improve our understanding of these  $\text{Ca}^{2+}$  events. Hence, we developed detailed finite element cellular models of  $\text{Ca}^{2+}$  dynamics, membrane electrophysiology and NO signaling in smooth muscle and endothelial cells. These models include myoendothelial projections with localized IP3 receptors, eNOS,  $\text{Ca}^{2+}$  activated potassium (IKCa) and TRPV4 channels. Localized EC  $\text{Ca}^{2+}$  mobilization is induced during SM stimulation in the myoendothelial projections which enables an endothelial feedback response that moderates SMC constriction. Myoendothelial IP3 -diffusion is more likely than  $\text{Ca}^{2+}$  to mediate this response. Activation of TRPV4 channels also results in localized calcium increase with typical concentrations exceeding 100nM and a spatial spread of few  $\mu\text{m}$ . Sparklet characteristics are affected by a variety of factors including open time of the channel, cooperative gating, calcium diffusivity and channel conductance. These localized  $\text{Ca}^{2+}$  events can initiate endothelium-derived hyperpolarizing (EDH) and relaxatory (EDRF) signals (by activating local IKCa channels and eNOS) modulating vascular tone. The model explores the relative importance of EDRF and EDHF pathways and parameters that regulate their activity in response to the local  $\text{Ca}^{2+}$  mobilization.

**Seeing is Not Believing: Visual Verifications through Liveness Analysis using Mobile Devices**Mahmudur Rahman, Umut Topkara, Bogdan Carbunar

2:40pm – 2:55pm

The visual information captured with camera-equipped mobile devices has greatly appreciated in value and importance as a result of their ubiquitous and connected nature. Today, banking customers expect to be able to deposit checks using mobile devices, and broadcasting videos from camera phones uploaded by unknown users is admissible on news networks. We present Movee, a system that addresses the fundamental question of whether the visual stream coming into a mobile app from the camera of the device can be trusted to be untampered with, live data, before it can be used for a variety of purposes. Movee is a novel approach to video liveness analysis for mobile devices. It is based on measuring the consistency between the data from the accelerometer sensor and the inferred motion from the captured video. Contrary to existing algorithms, Movee has the unique strength of not depending on the audio track. Our experiments on real user data have shown that Movee achieves 8% Equal Error Rate.

**Does Information and Communication Technology (ICT) Facilitates Integrated Project Delivery (IPD) in Public Sector Construction?**

Nida Azhar

3:10pm – 3:25pm

In this study, relation between IPD and ICT has been investigated for the public sector owners by analyzing their perspectives. Current research lacks how project owners, a key stakeholder determining the type of project delivery system, perceive IPD. Additionally no research has been done so far to determine the relationship between IPD and the degree of ICT use and type of ICT use (internal and external organizational uses). This study attempts to fill this gap. Data has been collected through online survey from public sector owners. Data has been analyzed to answer two research questions addressing the perception of IPD characteristics on the project delivery effectiveness and perception that ICT fosters IPD. The perception about the impact of ICT use on IPD is further investigated by the degree and type of ICT use.

**Data driven approach in Ecological Engineering: Identification of Dominant drivers and modeling of GreenHouse Gases**

Khandker S. Ishtiaq and Omar I. Abdul-Aziz

3:30pm – 3:45pm

Systematic data-driven approach in ecological engineering can aid the model building for robust estimation along with the identification of the dominant drivers. We analyzed observational data (level 2; 30 minutes interval) of eight US deciduous forests in AmeriFLUX Network to quantitatively link the dominant ecosystem-scale environmental drivers/fluxes with the canopy level vertical CO<sub>2</sub> exchanges. Multivariate Principal Component Analysis and Factor Analysis were applied to identify data groupings and determine comparative rankings of participatory variables. Explanatory partial least square regressions were performed to estimate the relative weights of dominant climatic and environmental stressors of CO<sub>2</sub> flux dynamics. Radiation and heat flux components demonstrated strong linkages with the half-hourly carbon flux exchanges at all sites, whereas variables representing temperature component showed low to moderate linkages with carbon flux. Terrestrial radiation and heat flux variables showed around 2 to 6 times stronger linkages than that of the temperature variables. Aerodynamic and velocity drivers were mostly weakly connected with the carbon flux exchanges. Finally, by incorporating complex non-linear associations among dominant drivers and CO<sub>2</sub> fluxes, application of a multilayer, back propagation algorithm in artificial neural network provides the estimation of carbon fluxes with very high degree of accuracy. / This research shows the potential of developing robust predictive models for precise estimation of Green House Gases across several spatio-temporal scales.

**The Effect of Conditional Pulsed flow and Sediment Transport in Wetland Bed Morphology: Case Study in Loxahatchee Impoundment Landscape Assessment**

Mehrnoosh Mahmoudi, Fernando Miralles-Wilhelm, Reinaldo Garcia

3:50pm – 4:05pm

A two-dimensional numerical model of sediment transport has been developed to explain the spatiotemporal distribution of the suspended particles and how it dictates the bed elevation changes in wetlands with high vegetation density and low topographic gradient during a conditional pulsed flow. The transport model is based on the two-dimensional vertically averaged advection-dispersion equation, which has been solved numerically using finite difference scheme. The model is tested for a pulsed flow condition and applied to the study in Loxahatchee Impoundment Landscape Assessment (LILA), which is located in Boynton Beach, Florida. The results show that small scale changes in bed elevation happen during a single pulsed flow application when the hydrologic conditions are favorable. These changes in bed elevation however, may not be enough to maintain the wetland bed morphology particularly in area of wetlands dominated by features such as ridge and slough in the Everglades. The results of this modeling attempt can provide a better understanding of whether implementing conditional pulse flow pulsed flow can help to improve restoration effort in the Everglades ridge and slough landscape.

**Large-Scale Testing on Wind Uplift of Roof Pavers**

Maryam Asghari Mooneghi, Peter Irwin, Arindam Gan Chowdhury

4:10pm – 4:25pm

Hurricanes are among the most costly natural hazards to impact residential constructions. In hurricane winds materials such as tiles and roof pavers are frequently ripped off. The building then becomes vulnerable to considerable additional damage through water infiltration and interior damage. Also, the wind-borne debris causes extensive damage to buildings downwind. Roof cladding like roof pavers are not well dealt with in the existing building codes. This paper presents a large-scale experimental study for investigating the wind loading on roof pavers on the flat roof of a low-rise building. The experiments were performed in Wall of Wind, a large-scale hurricane testing facility at Florida International University. Experiments included wind blow-off tests and pressure measurements. The effects of the pavers' edge-gap to spacer height ratio and the parapet height on the wind performance of roof pavers were investigated. Results showed that increasing the edge-gap to spacer height ratio parameter decreases the net pressure by enhancing pressure equalization between top and bottom surfaces. Increasing the parapet height reduces the worst suctions. Guidelines on the resolution and location of pressure taps were provided for better capturing the effects of conical vortices on the roof. Based on the information gathered in the current tests and review of literature, guidelines suitable for codes and standards were developed for design of roof pavers against hurricane wind forces.

## Engineering Posters

*March 31, 2014, 10:30am – 12:30pm*

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**Electric Vehicle Parking Lots Allocation in the Smart Distribution Network**

Mohammadhadi Amini, Arif Islam

In this study, firstly, a probabilistic modeling of EVs' behavior will be introduced. Secondly, reliability-constraint / optimum allocation of EVs' parking lots will be proposed. The validation will be done on IEEE standard distribution test network.

**System-of-System Modeling of Sustainability in Urban Infrastructure**

Mostafa Batouli and Ali Mostafavi

Urban infrastructures encompass a significant part of sustainable development debate. Thus, there is a growing need for a holistic approach for quantitative assessment of environmental sustainability to foster robust policy analysis pertaining to urban infrastructure systems. However, the existing approaches for urban sustainability assessment suffer from three major shortcomings, including the lack of consideration of: (1) the complex adaptive behaviors of stakeholders, (2) the human-infrastructure interactions, and (3) the impacts of infrastructure performance conditions. This research investigates the hypothesis that sustainability in urban infrastructure is an emergent property as a result of the coupling effect between: (1) the performance of infrastructure assets and built environment facilities, and (2) the dynamic behavior of the stakeholders. A novel framework based on a system-of-systems approach is created to capture the interconnections between stakeholders' behaviors, infrastructure performance, and environmental impacts. A novel computational simulation methodology is created for implementation of the proposed framework. The methodology includes three interrelated modules: (1) Module of Behavioral considerations that models the dynamic behaviors of urban decision-makers and users, (2) Module of Infrastructure Performance that models the condition behavior of infrastructure, and (3) Module of Environmental Assessment that adopts an innovative method called Performance-Adjusted Accrual Accounting Life Cycle Assessment to evaluate environmental implications of different policy options. The proposed framework and simulation methodology provide an innovative tool for ex-ante investigation of policies related to environmental sustainability in urban infrastructure. A case study of Miami urban area will be used to demonstrate the application of the proposed framework and the methodology.

## **A Comprehensive Framework for Traffic Incident Management Program Planning and Assessment**

Md Sakoat Hossan, Dr. Xia Jin

This research presents a comprehensive framework in traffic incident management (TIM) covering major components and key elements that contribute to the success of a TIM program. The proposed framework starts with three broad categories in strategic, tactical, and support components and then expands with detailed elements that are essential to accomplish the goals for each component. The strategic component focuses on establishing and promoting the institutional, organizational and financial contexts, while the support component addresses the information and communication aspects of TIM. Both are critical to the performance of the tactical component, which covers the core activities in incident clearance and traffic management. The framework builds upon Federal guidance in terms of major components and strategies in TIM, while add more structured details and perspectives that serve as the basic guidelines in TIM program planning and assessment. This research also presents a case study that links Florida Department of Transportation (FDOT) District Four's TIM practices in reference with the framework. It can be seen as examples of (best) practices for each sub-element in the framework. Also, it shows the role of the framework in providing guidance for program planning and assessment.

## **SimuleICon: A Simulation-based Multi-objective Decision-support Tool for Sustainable Building Design**

Peeraya Inyim, Yimin Zhu

The significance of sustainable construction in the architecture-engineering-construction (AEC) industry has been identified and emphasized in a wide range of research. Construction projects are complex endeavors with many professionals and parties from different disciplines trying to meet multiple project objectives that are often different and conflicting. This complexity is compounded by the introduction and development of sustainable construction concepts into a construction project. SimuleICon or Simulation of Environmental Impact of Construction is a simulation-based tool that can aid construction professionals in the decision-making process during the design phase of a building. This tool optimizes the selection of materials, components, and construction methods. Currently, SimuleICon is built in MATLAB environment in order to take advantage of its functions and toolboxes and it considers three main objectives, which are construction time, cost, and environmental impact, in term of carbon emission, for building life cycle. SimuleICon uses Monte Carlo simulation to account for uncertainty and availability of data, and uses energy simulation to estimate environmental impact during operating phase. Furthermore, the search of optimal design solutions at the building level entails the consideration of millions of possible solutions; genetic algorithms are used as optimization technique. SimuleICon can present a wide range of possible optimal or near optimal solutions from which construction professionals may choose the most appropriate solution to meet the project goals.

## **Performance Assessment of Artificial Neural Network Classifier for Predicting Movement and Laterality of Deep Brain Local Field Potential**

Mohammad S Islam

Human voluntary and involuntary movement and subsequent laterality are closely related with neural synchrony of brain which is an indispensable part of Brain Machine Interface (BMI) research. The objective of this study, therefore aimed to decode deep brain local field potentials (LFPs) related to movements and its laterality, left or right sided visually cued movements. Frequency related components were extracted using the wavelet packet transform (WPT). Signal features were computed as the instantaneous power of each component using the Hilbert Transform with defined windows for motor response. Finally, classification was performed for predicting movement (Event vs. Rest) and its laterality (Left vs. Right) state using Feed forward Back propagation based Artificial Neural Network (FBANN). Classification performance was evaluated using 10-fold cross validation technique to identify the robustness. After optimizing parameters, overall average correct classification rate reached to  $94.26 \pm 4.3\%$  for movement and  $85.62 \pm 8.90\%$  for laterality. Considering the classification accuracy, sensitivity, specificity and the area under the receiver operating characteristic (ROC) curve, FBANN classifier successfully achieved better than chance level. The proposed modality and computational process may promisingly effective and powerful method for improving BMI applications.

## **Silicon-based Lab-on-chip Device for Acoustic Focusing Applications**

Kamran Moradi

Acoustic focusing and separations is a growing field of research since it is an efficient and continuous method for particle manipulation in microfluidic systems. Using microfabrication, microfluidic devices driven by an acoustic resonator were used to focus a suspension of microparticles of various properties. By simple adjustments in frequencies/amplitudes and channel geometries, various focusing patterns and alignments were controlled. This approach led to the separation of particles of contrasting sizes, shapes, densities, porosities, and compressibilities. In this study we present the findings of the manipulation of microsized particles and propose a mechanism for the separation nano- and molecular dimension particles using a similar platform.

### **Resting State Functional Connectivity Based on Principal Component Transformation of Cortical fMRI Measurements**

Saman Sargolzaei, Anas Salah Eddin, Mercedes Cabrerizo, and Malek Adjouadi

Functional brain connectivity on the basis of fMRI time series analysis is a promising research endeavor in the study of the brain in its normal state as well as under different pathologies and neurological disorders. This study introduces a new approach to constructing rest-state connectivity networks interconnection with less amount of need to a-priori assumption and without setting any specific threshold. These network topologies are shown to reflect well the fMRI measurements. This data-driven solution at constructing fMRI based connectivity networks considers the brain as a network of networks, and defines smallest sub-network as the regions of interest made from structural segmentation of cortical areas of the brain. Principal components (PC) of these defined sub-networks are used to gauge patterns of interconnections in the hierarchy of brain networks based on a geometrical concept. Experimental evaluations were conducted on resting state fMRI recordings of a group of healthy subjects. Results of this / study support the assertion that resting state networks and default mode networks can be potentially derived without the need of either threshold or a-priori considerations

### **Optimal Resource Utilization of Construction Portfolio through Modeling the Daily-changing Nature of Uncertainties**

Reza Sheykhi; Wallied Orabi, PhD

Risks are inherent in construction and therefore needs to be incorporated in construction project planning. To this end, existing stochastic planning models use historical activity duration data to model time uncertainties and simulate project durations. This approach does not take into consideration the impact of day-to-day changes on time-related risk factors (e.g. weather, labor availability, and trade coordination) and their associated uncertainties. Therefore, simulation of crew productivity can provide a more accurate representation of these time-related uncertainties. This paper therefore presents the development of a new stochastic planning model that uses historical crew productivity data to simulate both activity and project durations. The model uses Monte Carlo simulation with beta distributions to capture day-to-day and shift-to-shift changes in crew productivity. The model also employs Genetic Algorithm optimization method to find optimum planning solutions regarding alternative resource availability and overtime policy scenarios. In addition, the model also considers the impact of sharing a limited pool of resources on the construction duration of a portfolio of projects rather than single projects.

**Opportunities on the State Highway System to Generate Revenue or Offset Expenditures for the State of Florida**

Nahid Vesali Mahmoud, Mehmet Emre BAyraktar

The Florida Department of Transportation (FDOT), along with most other state DOTs, is increasingly challenged by inadequate funding from traditional motor fuel taxes. Inadequate funding from motor fuel taxes together with increased demand for transportation and increasing maintenance needs resulting from an aging highway system have resulted in significant funding problems for state highway agencies. / As state DOTs seek solutions to funding issues, their attention has turned to identifying alternative and innovative sources of revenue and cost savings. One potential source of new revenue and cost savings that has gained recent attention is value extraction from highway rights-of-way (ROW). Non-traditional functions such as using highway ROW to harvest energy from renewable sources and leasing of ROW to utilities can be considered as alternative revenue resource for DOTs. / This research first established an inventory of viable value extraction projects, which provided FDOT with a complete set of choices related to the non-traditional use of highway rights-of-way. Among these choices, three project types including (i) solar photovoltaic, (ii) LED lighting, and (iii) haying or planting in highway rights-of-way are selected as potential options for FDOT. Then the legal framework affecting implementation of value extraction projects is analyzed. In the next step case studies are conducted to collect additional data, and finally a tool for feasibility screening of the three value extraction projects is developed.

**Integrated Performance Assessment in Complex Construction Projects: A System-of-Systems Approach**

Jin Zhu, and Ali Mostafavi

The objective of this project is to create an integrated methodology for performance assessment of complex construction projects. Cost overruns, time delays, and quality deficiencies have remained major challenges in construction projects affecting the efficiency of investments and sustainability of infrastructure systems. The existing knowledge related to construction performance assessment is mainly based on top-down approaches that attribute performance to the individual constituents of construction projects. A key element missing is an integrative theory of performance assessment based on consideration of dynamic behaviors, interdependencies and uncertainties in construction projects. In this research, project performance is investigated at the interface between the project emergent properties and the environment of uncertainty. Certain emergent properties (such as absorptive capacity, adaptive capacity, and restorative capacity) exist in construction project organizations which arise as a result of interactions between different human agents, resources, information, activities, and processes. These emergent properties represent the ability of a project organization to cope with uncertainties. The environment of uncertainty (such as static complexity, dynamic complexity, and unforeseen conditions) defines the environment in which a project organization operates that could give rise to risk events. The research objective will be achieved by adopting a system-of-systems approach and creating a multi-paradigm computational simulation model. A bottom-up simulation approach, using a hybrid agent-based/discrete-event/system-dynamics model, is formulated for predictive evaluation and proactive management of performance in complex construction projects. The preliminary findings demonstrate the capability of the proposed framework in enhancing the assessment of performance in construction projects.

## **Physical Sciences Posters**

*March 31, 2014, 3:00pm – 5:00pm*

### ROOM C

- Fanchen Bao Genetic Diversity Survey of *Chrysomya megacephala* In Florida Using Amplified Fragment Length Polymorphism  
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- Natalie Damaso Detection by Single Strand Conformation Polymorphisms using a Novel Polymer for Complex DNA Mixtures  
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- Priyanka Kushwaha Analysis of Biolog microplates to profile microbial community across Black band samples  
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- Lauren Colón-Crespo Evaluation of Human Scent As Possible Classification Evidence  
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- Erika Doctor Development of a Supported Liquid Extraction Method for Benzodiazepines in Urine with Surface-Enhanced Raman Spectroscopy Detection  
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- Seongshin Gwak Separation and Identification of Synthetic Cathinones Using GC/MS, GC/MS/MS and ESI-IMS-MS  
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- Kiran Subedi Forensic analysis of printing inks using tandem LIBS and LA-ICP-MS  
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- Srikanth Banda Protein Interactions of Type IA DNA Topoisomerases  
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- Qingxuan Zhou Acetylation Modification of *E. coli* Topoisomerase I  
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- Nan Cao Targeting Topoisomerase III in protozoan parasite *Trypanosoma brucei*  
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- Sarah Dhalla Analysis of Kepler Lightcurves Using the KRM Jet Model  
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- Vanessa Mendez A Virtual Model for Development of Macular Pigment in the Macaque Retina  
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### **Genetic Diversity Survey of *Chrysomya megacephala* In Florida Using Amplified Fragment Length Polymorphism**

Fanchen Bao, Jeffrey Wells

The forensic utility of a carrion insect can be in part a function of its population genetic structure. We conducted the first genetic structure survey of *Chrysomya megacephala*, a forensically important blow fly, in Florida. Amplified Fragment Length Polymorphism (AFLP) profiles were generated from fly samples collected at 14 populations across Florida and one in Mobile, Alabama. AMOVA based on 585 loci revealed that variation was significant among samples ( $\Phi_{PR} = 0.077$ ,  $P = 0.001$ ), but negligible among geographic regions (Panhandle, North Florida, South Florida,  $\Phi_{RT} = 0.003$ ,  $P = 0.072$ ). A Mantel test showed a significant but negligible correlation between genetic and geographic distances ( $R^2 = 0.041$ ,  $P = 0.038$ ). The relative relatedness coefficient calculated for each sample showed that flies arriving at a bait at the same time were likely to be close relatives (mean  $r = 0.0805 \pm 0.0116$ ). This finding was consistent with earlier studies in *Phormia regina* and *Lucilia sericata*, and suggest that this population genetic pattern, which underlies a genetic method for reconstructing the postmortem relocation of a corpse, is likely to be widespread in forensically important calliphorid flies.

### **Detection by Single Strand Conformation Polymorphisms using a Novel Polymer for Complex DNA Mixtures**

Natalie Damaso, Lauren Martin, Priyanka Kushwaha, and DeEtta Mills

DNA sequencing/metagenomic analyses are the highest resolution used to characterize microbial communities. However, not all analyses need that depth of resolution, so often community profiling using commercial polymers such as POP-4 are employed. However, the true community diversity is underestimated because analyses are based on number of bases in the amplicon. Taxonomically unrelated organisms produce the same length amplicon but have different nucleotide sequences. F-108 polymer has the ability to separate same length amplicons by sequence polymorphisms—a single strand conformation polymorphism (SSCP) method. Optimization of the F-108 polymer was conducted using an ABI 310 genetic analyzer and capillary electrophoresis (CE) with four model organisms that produce the same length amplicon for the 16S rRNA gene hypervariable domain V3 but have variable nucleotide content. F-108 was capable of simultaneously differentiating the four model organisms. Once optimized, a complex microbial mat community was resolved and confirmed by pyrosequencing. Unlike POP-4, F-108 did not underestimate the true community diversity. In addition equine samples were analyzed for single nucleotide polymorphisms (SNPs) that had the same STR length on POP-4, but different SNPs. The F108 polymer was able to distinguish heterozygous and homozygous individuals for the melanocortin receptor 1 (MC1R) coat color gene.

**Analysis of Biolog microplates to profile microbial community across Black band samples**

Priyanka Kushwaha and DeEtta Mills

Biolog phenotypic microarray microplates are used to analyze microbial community profiles across various environmental samples. This method assesses the community profiles based on their ability to utilize various substrates such as carbon, nitrogen, phosphorous, and sulfur. Black band disease (BBD) affects corals all around the world and has been classified as a polymicrobial disease comprising of cyanobacteria, sulfate reducing bacteria, sulfur oxidizing bacteria and heterotrophic bacteria. Therefore, phenotypic profiling is a rapid technique to screen these communities. The objective of this study was to profile the bacterial communities from samples collected from BBD infected coral, surface mucopolysaccharide layer (SML) of a healthy colony, and SML from the healthy portion of the BBD infected coral (HSML). Samples belonged to the coral species *Montastraea cavernosa* from the Florida Keys and 100  $\mu$ l of each of the samples was inoculated into the microplates after dispersing the samples in artificial sea water. Modulus™ Microplate Multimode Reader was used to collect absorbance at 600 nm on days 0, 1, 2, 3, 4, and 7. The absorbance readings were normalized to generate heat maps using R programming language. While significant differences were observed in carbon, phosphorous, and sulfur utilization across BBD ( $P < 0.05$ ) with relation to control HSML communities on day 3, nitrogen, phosphorous, and sulfur consumption were significantly different between HSML ( $P < 0.05$ ) and SML on day 7. Preliminary results from the phenotypic arrays will further aid in deciphering the role of microbial communities in the geochemical cycles (C, N, P, and S) across BBD samples.

**Evaluation of Human Scent As Possible Classification Evidence**

Lauren J. Colón-Crespo, B.Sc., Danay Herrera-Hernández, Howard Holness, Ph.D., Abuzar Kabir, Ph.D., Kenneth G. Furton, Ph.D., Aixing Fan, Ph.D., and Laurence Du-Thumm, Ph.D.

Past work evaluating human scent has shown that it can be used to differentiate individuals based on their characteristic volatile organic compounds (VOCs), making it a useful form of forensic evidence. This has aided in the resolution of court cases by providing investigators with the ability to associate victims and offenders based on human scent left at crime scenes. In the present research we investigate whether human scent can also be employed to classify individuals that share traits which contribute to their scent profiles and cause them to display similarities. Such similarities can be used to categorize individuals and exclude or include them as part of specific groups. For example, the determination of differences in body odor among individuals of different age groups may result in a powerful new tool that can assist in crime investigations where the subjects may be quickly excluded or included as a potential suspect. / / In this study, individuals from different age groups were recruited, their body odor was sampled and their characteristic VOC profiles were analyzed by Headspace Solid Phase Microextraction Gas Chromatography-Mass Spectrometry (SPME-GC-MS). Once collected, the profiles obtained were evaluated to determine which components provided information on how age could be used as a criterion for the categorization of individuals based on their VOC profile. This presentation will emphasize the way in which information obtained from the combination of features in a VOC profile could be employed to highlight links between individuals that share specific traits (age). These results will, not only, enhance the amount of information that can be obtained during the evaluation of human scent, but also provide a broader perspective on how human scent may be used as a powerful tool for classifying individuals into groups.

**Development of a Supported Liquid Extraction Method for Benzodiazepines in Urine with Surface-Enhanced Raman Spectroscopy Detection**

Erika L. Doctor, MS and Bruce McCord, PhD

Benzodiazepines are among the most prescribed compounds and are commonly present in many toxicological screens. Currently these compounds are predominantly analyzed using immunoassay techniques; however more specific screening methods are needed. This project shows the applicability of surface enhanced Raman spectroscopy as a method for the analysis and detection of benzodiazepines. The procedure involves mixing urine extracts with gold nanoparticles and aggregating agents for trace detection of these compounds and their metabolites. The optimization of various parameters of this technique as well as its application to screening urine samples will be discussed / Eleven different benzodiazepines and metabolites were examined. Previous work by this laboratory has shown that for benzodiazepines an aggregate solution made of MgCl<sub>2</sub> prepared at a concentration of 1.67 M provided the highest signal intensity at the lowest drug concentration and thus was used in this study. A supported liquid extraction method specific for benzodiazepines was used. The method investigated was found to allow for the detection of a wide variety of benzodiazepines and their metabolites. The presence of individualizing spectral peaks provides a high degree of specificity for sample determination. The technique is sensitive with a limit of detection of 5 ng/mL and linear over several orders of magnitude for the drugs chosen. This method has shown the applicability of SERS for the detection of trace quantities of benzodiazepines in toxicological samples as well as the optimization of the technique over a wide range of compounds.

**Separation and Identification of Synthetic Cathinones Using GC/MS, GC/MS/MS and ESI-IMS-MS**

Seongshin Gwak, Luis E. Arroyo-Mora and Jose R. Almirall

Cathinone is the main component of the khat plant which produces a stimulating effect similar to amphetamines<sup>1</sup>. The ease of online availability of a number of the synthetic cathinones, also known as legal highs or bath salts, have led to increased use and abuse over the past few years<sup>2</sup>. In this study, 6 synthetic cathinones, mephedrone (4-MMC), flephedrone (3-FMC), 4-methylethcathinone (4-MEC), methedrone (bk-PMMA), methylone (bk-MDMA) and 3,4-methylenedioxypropylvalerone (MDPV), were analyzed using a commercially available electrospray ionization-ion mobility spectrometer-mass spectrometer (ESI-IMS-MS), a gas chromatograph-mass spectrometer (GC-MS) using electron ionization (EI) and a GC-MS Triple Quadrupole (QQQ) with both EI and chemical ionization (CI) modes. One of the advantages of using the softer CI and ESI ionization sources is the creation of molecular ions of the easily fragmented compounds and, in the case of ESI, the ability to analyze nonvolatile compounds and ionize compounds in the liquid phase<sup>3</sup>. We report a fast and selective method that can be used to unambiguously identify this increasingly important class of drugs. A high-resolution IMS was used to separate mixtures of these synthetic cathinones within less than 20 ms. The limits of detection were determined and good separations from two-compound mixtures were achieved with typical concentrations of MDPV and other compounds (20:100 ppm), and methylone and other compounds (20:100 ppm) using ESI-IMS-MS. The analysis of these cathinones was also carried out using GC-MS, which is currently the standard technique used in forensic laboratories, to compare with ESI-IMS-MS. In addition, GC-QQQ-MS with EI and CI modes was used to determine the identification of fragmented ions from these cathinones. The analysis of several actual seized police case samples was also performed using same instruments to illustrate the utility of the developed IMS-MS and GC-QQQ-MS methods.

**Forensic analysis of printing inks using tandem LIBS and LA-ICP-MS**

Kiran Subedi, Dr. Tatiana Trejos and Dr. José R. Almirall

Results previously reported by our group have demonstrated that elemental analysis, using either LA-ICP-MS or LIBS, can be used for the chemical characterization of materials of forensic interest including the discrimination between materials originating from different sources and the association of materials known to originate from the same source. In this study, a tandem LIBS/LA-ICP-MS system that combines the benefits of both LIBS and LA-ICP-MS was evaluated for the characterization of samples of printing inks (toners and inkjets). The performance of both laser ablation methods is presented. A subset of 9 black laser toners and 10 (CMYK) inkjet samples originating from different manufacturing sources were analyzed to evaluate the discrimination capability of the tandem method. These samples were selected because they exhibited a very similar profile by LA-ICP-MS even though typical discrimination between different ink sources is found to be > 99% for both types of inks. Additional discrimination was achieved by combining the elemental results from the LIBS analysis to the LA-ICP-MS analysis in the tandem technique, enhancing the overall discrimination capability. The LIBS measurements of the Ca, Fe, K, Si signals, in particular improved the discrimination for this specific set of ink samples previously shown to exhibit very similar LA-ICP-MS profiles of isotopes. The combination of these two techniques in a single set up provided a better discrimination of the printing inks with two distinct fingerprint spectra providing information from atomic/ionic emissions and isotopic composition (m/z) for each ink sample.

**Protein Interactions of Type IA DNA Topoisomerases**

Srikanth Banda; Yuk Ching Tse-Dinh

Type IA topoisomerases are ubiquitous enzymes that are involved in the relaxation of negatively supercoiled DNA through a transient single strand break. All life forms, spanning from bacteria to archaea and higher eukaryotes utilize the activities of these enzymes. Mammalian cells have two representatives of type IA topoisomerase: DNA topoisomerase III $\alpha$ , III $\beta$  whereas the bacterial type IA enzymes are classified as DNA topoisomerase I, III. Structural studies of type IA topoisomerase have revealed two domains: a conserved catalytic N-terminal domain involved in the breaking-rejoining of DNA, and a C-terminal domain highly variable in size and sequence. The C-terminal domain is believed to be involved in interactions with other cellular proteins. The interacting protein partner defines the physiological role of the topoisomerase activity. According to recently reported findings, the in-vivo role of the human type IA topoisomerases is dependent on the proteins they interact with rather than their intrinsic structure or sequence. Pull down approach, immunoprecipitation techniques are being optimized to isolate novel binding partners of type IA topoisomerases for identification using Mass Spectrometry. The identification the potential binding partners of type IA topoisomerases will be followed up by studies of the physiological relevance of these interactions.

**Acetylation Modification of E. coli Topoisomerase I**Qingxuan Zhou

Lysine acetylation is a reversible post-translational modification, which brings an acetyl group to the lysine to neutralize the positive charge of this amino acid residue and affect its interactions. The function of lysine acetylation in mammalian cells has been demonstrated to influence chromatin structure and cellular processes including RNA splicing, DNA damage and repair, and metabolism. However, the function of lysine acetylation modification in prokaryotic cells remains largely unknown. Recent proteomics studies demonstrated the high abundance of acetylated proteins and lysine acetylation sites in *Escherichia coli*, suggesting a broad effect of lysine acetylation in regulating bacterial function. / *E. coli* topoisomerase I has been shown to be acetylated at multiple lysines. This ubiquitous topoisomerase plays an important role in maintaining the optimal level of DNA supercoiling required for cell growth. The significance of lysine acetylation on topoisomerase I in *E. coli* is being investigated with a set of *E. coli* mutant strains with deletion of either lysine acetylase or lysine deacetylase gene. Topoisomerase I catalytic activity in cell lysates and supercoiling level of reporter plasmid are being measured to assess the global effect of lysine acetylation on DNA topology. Immunoprecipitation assay will detect the amount of acetylated topoisomerase I in both exponential phase and stationary phase. Site-directed mutagenesis of lysine residues targeted by acetylase activity will further determine the potential effect of lysine acetylation on the function of topoisomerase.

**Targeting Topoisomerase III in protozoan parasite *Trypanosoma brucei***Nan Cao

DNA topoisomerases are essential enzymes that are involved in DNA replication, recombination, transcriptional and repair processes. These enzymes are ubiquitous in both eukaryotes and prokaryotes. Topoisomerases are known targets for antitumor and antimicrobial drugs used in the clinic, and continue to be investigated for discovery of new therapeutic agents. Generally, DNA topoisomerases are divided into type I topoisomerases and type II topoisomerases. Type I topoisomerase regulate DNA topology by a single-stranded DNA passage mechanism. Type II topoisomerase modify DNA topology by a double-stranded DNA passage mechanism, which is ATP-dependent. *Trypanosoma brucei* causes the fatal disease, African trypanosomiasis in humans and new non-toxic therapy is much needed. . In this project, we focus on two genes in *Trypanosoma brucei brucei* strain 927 that encode the type IA topoisomerase III $\alpha$  and topoisomerase III $\beta$ . The full length PCR products from genes encoding these two *T. brucei* topoisomerases have been cloned into *Escherichia coli* plasmid vector and will be used to construct expression clones of *T. brucei* topoisomerase III enzymes. We will use in vitro enzyme-based and in vivo cell based assays to select compounds, which have inhibiting effect on *T. brucei* topoisomerase III. These inhibitors are potential lead candidates for new drugs with antiparasitic effect, which could be used in African trypanosomiasis treatment in future.

**Analysis of Kepler Lightcurves Using the KRM Jet Model**

Sarah M. Dhalla, James R. Webb, Douglas H. Laurence, Gopal Bhatta

From 2010-2013, Kepler monitored the optical emission from four active galactic nuclei (AGNs) with high resolution. We use the KRM (Kirk, Reiger, Mastichiadis) model proposed by Kirk et al. (1998) to analyze the micro-variations seen in these Kepler AGN. The turbulent jet model assumes that when a shock wave passes through the turbulent jet of a Blazar, each turbulent cell encountered produces a pulse of emission whose size and shape depend on cell size, the local density enhancement, and the magnetic field strength. From this analysis we infer some of the important parameters of the turbulent flow of the jet.

**A Virtual Model for Development of Macular Pigment in the Macaque Retina**

Vanesa Mendez; Landrum, John T.; Cao, Yisi; Neuringer, Martha

Purpose: Creation of a virtual model of macular pigment development from a data set of carotenoid levels in macaque retinas was undertaken to provide insight into the metabolic origin of R,S-zeaxanthin and the time-line of accumulation of the macular carotenoids. Methods: Macaque retinas were collected post-mortem from animals at the Oregon Primate Research Center. Sections were 2, 4, or 8 mm punches centered on the macula. Analysis of retinal sections for carotenoids was performed quantitatively by reversed-phase HPLC using UV-vis detection. Separation of zeaxanthin isomers was carried out using chiral column HPLC. Results: A linear regression fit for each of the macular carotenoids in retinal sections from macaques ranging in age from 133 days gestation to >10 years yields equations for the quantitative levels of carotenoids, lutein, R,R-zeaxanthin, R,S-zeaxanthin, S,S-zeaxanthin as a function of age. All carotenoid levels were shown to increase with increasing age but differential rates of increase were observed which lead to a variation in carotenoid ratios with age. Conclusions: Ratios of carotenoids vary with increasing age in the retina and are well modeled by a linear fit of individual carotenoid levels within retinal sections. Regression data for the levels of R,S-zeaxanthin are consistent with conclusion that this carotenoid is absent from the retina prior to birth and is formed in the retina from lutein. The rate of accumulation R,R-zeaxanthin in the macula is greater than that of the other carotenoids.

## Social Sciences (Psychology) Presentations

*April 1, 2014, 9:00am – 12:00pm*

*Block 1- ROOM A*

9:00am – 9:15am

Alan Meca

Ethnic and American Identity Development in Recently Immigrated Hispanic Adolescents and their Caregivers

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9:20am – 9:35am

Jillian Rivard

The Immediate and Delayed Impact of Pre-Interview Preparation on Eyewitness Recall in an Investigative Interview

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9:40am – 9:55am

Andrea Arndorfer

Using witnesses' memory for lineup fillers to postdict identification accuracy: Does memory quality moderate the effect?

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10:00am – 10:15am

Jenna Kieckhaefer

Examining effects of building rapport and change in interviewer on witness memory accuracy and suggestibility

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*10 min break*

*Block 2- ROOM A*

10:30am – 10:45am

Maya Boustani

Staff Perspective on foster care youth sexual health needs

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10:50am – 11:05am

Kathy Sias

The enmeshment of social policy strategies with the treatment of intimate partner violence

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11:10am – 11:25am

Dana Hirn

Examining law enforcement decision-making and lineup practices

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11:30am – 11:45am

Anthony Ward

Working Memory and Autonomic Nervous System Regulation in Children with Attention-Deficit/Hyperactivity Disorder

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11:50am – 12:05pm

Andre Maharaj

Kinectera: Utilizing an Automated Motion Sensor System to Record and Analyze Modeled Replications of Stereotypy

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**Ethnic and American Identity Development in Recently Immigrated Hispanic Adolescents and their Caregivers**

Alan Meca, Seth J. Schwartz, & Dionne P. Stephens

9:00am – 9:15am

Given the role ethnic identity has as a protective factor against the effects of discrimination, research longitudinally examining ethnic identity has become of increased importance (Umaña-Taylor, 2011). However, successful identity development must incorporate elements from one's ethnic group and the U.S. (Berry, 1980). Despite this, relatively few studies have evaluated both identity processes (Schwartz et al., 2012). The current study, using an archival sample of 301 recently immigrated Hispanic families collected, sought to address this and several other gaps in the literature by examining growth trends in recently immigrated Hispanic adolescents' and their caregivers' ethnic and American identity. Results indicated significant growth in adolescents' American identity. While some differences were found across site and nationality, evidence suggested recently immigrated Hispanic adolescents were becoming more bicultural. Results found significant decline in caregivers' ethnic identity which future studies should further examine. Implications for future investigation are discussed.

**The Immediate and Delayed Impact of Pre-Interview Preparation on Eyewitness Recall in an Investigative Interview**Jillian Rivard

9:20am – 9:35am

A wealth of research on expectancy effects and confirmation bias suggests that investigative interviewers with pre-conceived notions about a crime may bias an interview in the direction of expectations preconceptions (e.g., Rosenthal & Rubin, 1978; Snyder & Swann, 1978), yet many interviewing protocols recommend that interviewers review available case information prior to conducting a witness interview. Recent research suggests that interviewers who are 'blind' to case details elicit more correct details than pre-informed interviewers (Rivard, Schreiber Compo, & Pena, under review). The current study investigated whether (a) this effect is moderated by cautionary interviewer instructions to avoid suggestive questions and (b) the effects of pre-interview information extend beyond the immediate context of the interview to a later recall session. Five hundred and forty four undergraduate students (272 pairs of participants) participated in this 3-part study, which employed a 3 (preparation type: blind vs. correctly informed vs. incorrectly informed) X 2 (instructions to avoid suggestive questions: present vs. absent) between-participants factorial design. Preliminary results are consistent with previous research and reveal that interviewers with no prior case knowledge elicit significantly more correct details from witnesses during an investigative interview compared to those who reviewed correct or incorrect case summaries. However, after a 2 week delay, witnesses of pre-informed interviewers recalled more correct information than witnesses of blind interviewers, suggesting a potential delayed advantage of pre-informed interviewing. Cautionary instructions to avoid suggestive questions had no impact on witness recall. Results will be discussed in terms of theoretical and applied implications.

**Using witnesses' memory for lineup fillers to postdict identification accuracy: Does memory quality moderate the effect?**

Andrea Arndorfer, Steve Charman

9:40am – 9:55am

Recently, a novel, theoretically-derived postdictor of eyewitness identification accuracy has been discovered: The more lineup fillers a witness remembers having viewed, the more likely that witness was to have made a false identification (Charman & Cahill, 2012). However, attempts to replicate the effect have failed. The failure to replicate the basic memory for fillers effect could have emerged for a variety of reasons as the follow-up studies deviated from the original study procedures in a number of ways. One distinction between the original study and the follow-up studies, is the duration of exposure to the perpetrator. Thus, the failure to replicate may be due to deficits in witness memory strength. The current study examined the effect of perpetrator exposure duration on witnesses' subsequent memory for the lineup fillers. The current study attempts to more closely mimic the original study by creating a similar exposure duration condition while subsequently manipulating exposure duration (i.e., short [5 s], medium [20 s], and long [40 s]) to examine whether this factor moderates the memory for fillers effect. Given some of the procedural differences between the original Charman & Cahill (2012) methodology and the methodology used in the follow-up studies (e.g., differences in time delay, witness memory strength, etc.), it is imperative to find the specific conditions that promote or inhibit the effect. The present study is an attempt to determine whether exposure duration (i.e., to the perpetrator) moderates the effect. Preliminary analyses suggest some trends in support of our hypotheses.

**Examining effects of building rapport and change in interviewer on witness memory accuracy and suggestibility**

Jenna Kieckhaefer and Nadja Schreiber Compo

10:00am – 10:15am

Rapport-building involves the development of a trusting and comfortable relationship between interviewer and witness. All leading adult and child witness interview guidelines, such as the NIJ Guidelines, Cognitive Interview, and the NICHD interviewing protocol, suggest the use of rapport-building at the beginning of an investigative interview to increase the quantity and quality of witness recall (e.g., Fisher & Geiselman, 1992; Poole & Lamb, 1998; Technical Working Group on Eyewitness Evidence, 1999). Despite these recommendations, there is little empirical research to substantiate this assumption, including the effect of the specific interviewer and rapport's effect on recall accuracy. The present study examined the effects of rapport-building on witness accuracy in response to open-ended questions asked a week after viewing a mock crime video and building rapport. Mirroring ecologically valid police interviewer practices, the same or a different interviewer who built rapport (day one) interviewed the same mock witness a week later. Preliminary results suggest that participants report many inaccurate details in all rapport conditions. However, contrary to all study hypotheses and previous research, there were no significant differences for either the rapport or change in interviewer independent variables on primary dependent measures of witness accuracy. Implications of results, including the effect of rapport across different interviewers, will be discussed, as well as the importance and need of more research to better understand under which conditions rapport-building is beneficial when interviewing adult witnesses. Since the week delay is a likely culprit for the study's largely null results, research is currently underway which removes the week delay, that should offer interesting insights beyond the current results.

**Staff Perspective on foster care youth sexual health needs**

Maya Boustani

10:30am – 10:45am

Nearly half a million children live in foster care (Foster care statistics 2009, 2011); approximately 60% are female, and 30% are teens exhibiting high levels of risky sexual behaviors. They are sexually active at a younger age than their peers, 30% report not using protection, and 15% report a history of STDs (Love, McIntosh, Rosst, & KristenTertzakian, 2005). Despite progress in reducing teen pregnancy nationwide (Hamilton B. E., 2013), pregnancy rates among foster care girls remain high, more than double those of their peers (Becker & Barth, 2000; Leonard, 2013; Polit, 1989). Qualitative interviews with staff who work with foster care youth indicate that foster care youth experience ambivalent desire for pregnancy, including many perceived advantages to teen pregnancy.

**The enmeshment of social policy strategies with the treatment of intimate partner violence**Kathy Sias

10:50am – 11:05am

Traditional intimate partner violence (IPV) advocates have successfully positioned themselves to influence policy and funding resources to assist female victims. Their persistence and commitment to this issue has unarguably driven the declines in IPV from 1970 through the mid-1990s. However, their biases have resulted in an approach that while effective in addressing cultural values has proven ineffective in addressing IPV in one's current relationship. Research does not support the premise that a man's gender role stereotyping results in IPV behaviors or that a woman's use of IPV is limited to self-defense. Yet, traditional IPV theory dismisses the standard clinical approach that addresses risk factors to reduce unwanted behavior. The correlations between IPV and individual risk factors are strong and promising from a treatment standpoint (for mild-moderate IPV): alcohol usage and other mental health issues, couple distress, reciprocal IPV, and emotional regulation issues as a consequence of adverse life experiences (trauma). Rather than relying on arrest and subsequently utilizing an ineffective treatment approach, further reductions in IPV would be enhanced by developing treatment strategies informed by research conducted since 1980: thereby untangling social policy strategies from individual treatment strategies. A stakeholder analysis used in business provides visibility into how the strategies that catapulted the issue of IPV into cultural awareness is addressing only one segment of couples who are experiencing IPV. This has resulted in the development of stereotypes that are projected onto any individual who has engaged in IPV behaviors resulting in ongoing missed opportunities to develop violence free families.

**Examining law enforcement decision-making and lineup practices**

Dana Hirn, Melissa Kavetski, Steve Charman

11:10am – 11:25am

There are few pieces of evidence more powerful in a court of law than the identification of a defendant by a witness. However, law enforcement decision-making for the use of various lineup construction and administration techniques has yet to be explored. This study sought to identify why law enforcement professionals decide to use or not use best-practice and poor lineup techniques. Participants were presented with a link to an online survey. The sample of sworn law enforcement professionals (N = 121) from 24 states was mostly male (94.7% male) and Caucasian (91.9%). Participants' mean age was 46.24 and average time in law enforcement was 16.97 years. The majority of participants reported their rank as investigator/detective (59.9%). Participants were presented with various lineup techniques and asked to rate the effectiveness and their use of each technique. Participants also explained their decision-making as to their use of each technique. When asked why participants do not use best-practice techniques, participants most frequently cited department policy guidelines and academy/field training (98%, 86%, respectively). Participants also rated the techniques they used most frequently as being effective at eliciting an identification of guilty suspects and avoiding identifications of innocent suspects. These findings suggest the most effective ways to implement the use of best-practice lineup techniques is through the use of departmental mandates and training.

**Working Memory and Autonomic Nervous System Regulation in Children with Attention-Deficit/Hyperactivity Disorder**

Anthony R. Ward, Erica D. Musser, Gabriella Alarcon, Joel T. Nigg

11:30am – 11:45am

Attention deficit/hyperactivity disorder (ADHD) is among the most prevalent neurodevelopmental disorder in school-age children. Neuropsychological findings over the past 20 plus years have implicated executive function (EF) deficits as a mechanism of impairment. Arguably the most robust finding in this literature is reduced working memory ability (WM), a core component of EF. However, the same meta-analyses also show that up to half of individual children with ADHD fall within a normative range, indicating marked neuropsychological heterogeneity. Therefore, continued research on potential moderators is needed to disentangle this variability. In a related but largely separate literature, associations between particular autonomic regulation profiles (as measured by respiratory sinus arrhythmia; RSA) and ADHD have been found. Additionally, influential theoretical models and neuroimaging studies suggest that a common neural network supports heart-rate regulation and certain cognitive functions (including working memory). However, the potential interaction of these variables in relation to ADHD has not been examined. The present study examined RSA and WM in children with and without ADHD. Based on previous empirical studies, our group examined and replicated a significant effect of poorer spatial WM ability in ADHD children compared to controls and differences in baseline RSA between groups. Additionally, we found a significant moderation of the ADHD-WM effect by altered RSA reactivity during the WM task, whereby children with poor WM and blunted RSA reactivity were rated as having more symptoms of ADHD.

**Kinectera: Utilizing an Automated Motion Sensor System to Record and Analyze Modeled Replications of Stereotypy**

Andre Maharaj, Anibal Gutierrez and Steven Cadavid

11:50am – 12:05pm

Repetitive or stereotypic physical behaviors are frequently detected in children with Autism Spectrum Disorder (ASD). These behaviors do not appear to be either reactionary or maintained by environmental consequences. While traditional methods of measuring stereotypy have utilized paper and pencil techniques, the Kinect™ sensor from Microsoft provides an impartial automated system via which these movements may be detected. Software designed to record and export the sensor data was used to analyze the modeled performance of body rocking from side-to-side and front-to-back, as well as hand flapping, with the aim of identifying behavior patterns relevant to children with ASD. A standard configuration of each behavior was selected, with a predetermined threshold value, and a dynamic time warping algorithm was applied to identify relevant patterns. The data obtained indicated that the system correctly identified 90% of side-to-side rocking, 90% of hand flapping and 100% of front-to-back rocking, with a highly restrictive threshold value of 20 degrees along the x, y and z axes, respectively. The results imply a proof of concept, demonstrating the possibility of an accessible automated solution to the monitoring and identification of physical stereotypic behavior.

## **Health Sciences Presentations**

*April 1, 2014, 9:20am – 11:30am*

*Block 1- ROOM B*

9:20am – 9:35am

Soumyadeep Mukherjee

Mental health and substance use among US adults: An analysis of 2011 Behavioral Risk Factor Surveillance Survey  
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Rana Jaber

Waterpipe as a gateway to cigarette smoking initiation among adolescents; a three years longitudinal study  
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Raed Bahelah

Alcohol consumption and control policies in the Eastern Mediterranean  
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*Block 2- ROOM B*

10:30am – 10:45am

Joel Exebio

Use of Homeostatic Model Assessment indexes for the identification of metabolic syndrome and insulin resistance among Cuban-Americans: a cross sectional study  
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Sahar Ajabshir

Serum 25-hydroxy vitamin D is associated with blood total cholesterol and diastolic blood pressure in a young multi-ethnic group living in South Florida  
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11:10am – 11:25am

Eli Karlin

The “big pharma” cost curve  
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**Mental health and substance use among US adults: An analysis of 2011 Behavioral Risk Factor Surveillance Survey**Soumyadeep Mukherjee

9:20am – 9:35am

**BACKGROUND:** The mental health effects of tobacco and alcohol use have been evaluated far less frequently compared to their effects on physical health. This study explores the relationship of using these substances and having poor mental health. **METHODS:** This study used the entire 2011 Behavioral Risk Factor Surveillance System (BRFSS) dataset collected from adults aged 18 years or more in United States. Chi-Square tests, bivariate and multivariable logistic regressions were done to look at the associations. **RESULTS:** 31.5% of the 496702 adults reported that their mental health was not good for 1 or more days in the previous month. Current everyday smokers (Adjusted Odds Ratio[AOR]: 1.32; 95% Confidence Intervals [CI] : 1.27, 1.37), binge drinkers (AOR: 1.25; 95% CI: 1.20, 1.30) and those who had at least 1 occasion of drinking alcoholic beverage in the previous 30 days (AOR:1.15; 95% CI: 1.12-1.19) had higher odds of having poor mental health after adjusting for all other factors. Females were more likely to report mental distress (AOR: 1.62; 95% CI: 1.57, 1.67) compared to males. Poor physical health increased the odds of mental distress. Those having higher income, those who were married at the time of survey, the elderly and Asians had significantly lower odds of reporting mental distress. **CONCLUSION:** Tobacco and alcohol use, especially binge drinking can predict poor mental health, and vice versa. Public health interventions to address them simultaneously might be useful.

**Waterpipe as a gateway to cigarette smoking initiation among adolescents; a three years longitudinal study**

Rana Jaber, MPH, Yousef Khader, BDS, PhD, Fawaz Mzayek, MD, PhD, Wasim Maziak, MD, PhD.

9:40am – 9:55am

Abstract / Objective: To evaluate the gateway hypothesis that waterpipe smoking provides a bridge to subsequent initiation of cigarette smoking among cigarette naïve adolescents. / Methods: A total of 1454 cigarette naïve participants were drawn from the Irbid longitudinal study of smoking behavior. This is a school-based study of 19 randomly selected schools in Irbid, Jordan with 1781 seventh-graders who were enrolled at baseline (2008) and completed the study questionnaire of smoking behavior annually through 2011 (4 time points). Grouped-time survival analysis was used to compare the risk of subsequent initiation of cigarette smoking between waterpipe smokers (n=298) and never smokers (n= 1156) using Hazard Ratio [HR] and 95% Confidence Interval [95%CI]. / Results: The 12-month risk of initiating cigarette smoking among waterpipe smokers was significantly higher than that for never smokers, (HR: 2.05 [95%CI: 1.82-2.30]). This effect persisted after adjusting for potential confounders (HR: 1.67 [95% CI: 1.46-1.92]). The relationship between waterpipe smoking and the subsequent initiation of cigarette smoking was dose dependent; the 12-month probability of initiating cigarette smoking was more than double for those who smoked waterpipe more than one time per week compared to never smokers (21% versus 9%), which proved a very strong linear trend (P < 0.001). / Conclusions: We provided the first evidence that waterpipe smoking can be a gateway to cigarette initiation among c

**Alcohol consumption and control policies in the Eastern Mediterranean**Raed Bahelah, Ziyad Ben Taleb, Soumyadeep Mukherjee, Dudith Pierre-Victor

10:00am – 10:15am

**INTRODUCTION** Although the Eastern Mediterranean Region (EMR) has the lowest prevalence and disease burden of alcohol worldwide, available evidence shows alcohol represents a public health threat especially among youth. **METHODS** The WHO Global alcohol and health database "GISAH" was the main source for the data obtained in this review supplied with different WHO alcohol reports, literature review on the epidemiology and policy of alcohol in the region **RESULTS** The prevalence of alcohol consumption among the general population is heterogeneous and ranging from 0.5% in Egypt to 35.6% in Lebanon with alcohol dependence rates of 0.2% in Egypt to 7.3% in Iran. Among those who drink, 6-11 liters of pure alcohol are consumed per adult drinker per year. Lifetime alcohol consumption among university students is high and ranges from 16.6% in Jordan, 70.8% in Lebanon, 9.6% - 45.7% in Iran, and 10% - 82.4% in Turkey. Alcohol dependence is higher among this age group as well. Approximately 9% of Lebanese university students were alcohol dependent. Most countries in the region have no written national alcohol policy. Additionally, no country has integrated alcohol into substance use program and only one country has integrated alcohol into mental health program **CONCLUSIONS** The exact epidemiology and drinking patterns are not well known. Quality research is required to collect accurate information about alcohol epidemiology for the establishment of evidence-based policy guidelines.

**Use of Homeostatic Model Assessment indexes for the identification of metabolic syndrome and insulin resistance among Cuban-Americans: a cross sectional study**Joel Exebio, Sahar Ajabshir, Gustavo Zarini, Joan Vaccaro, Fatma Huffman

10:30am – 10:45am

**Background:** The hyperinsulinemic euglycemic clamp is the gold standard to determine insulin resistance. However, it is not practical. The Homeostatic Model Assessment indexes may be used as indirect measures of insulin resistance. The aim of the present study was to determine cut off points for HOMA-1 and HOMA-2 for identifying insulin resistance and metabolic syndrome among a Cuban-American population. / **Methods:** Subjects without diabetes residing in South Florida were enrolled (N=146, aged 37 to 83 years). The HOMA1-IR and HOMA2-IR 90th percentile in the healthy group (n=75) was used as the cut-off point for insulin resistance. A ROC curve was constructed to determine the cut-off point for metabolic syndrome. / **Results:** HOMA1-IR was associated with BMI, central obesity, and triglycerides (P<0.05). HOMA2-IR was associated with BMI, central obesity, total cholesterol, HDL-cholesterol and LDL-cholesterol (P<0.05). The cut-off points for insulin resistance for HOMA-1 and HOMA-2 were >3.95 and >2.20 and for metabolic syndrome were >2.98 (63.4% sensitivity and 73.3% specificity) and >1.55 (60.6% sensitivity and 66.7% specificity), respectively. / **Conclusion:** HOMA cut-off points may be used as a screening tool to identify insulin resistance and metabolic syndrome among Cuban-Americans living in South Florida.

**Serum 25-hydroxy vitamin D is associated with blood total cholesterol and diastolic blood pressure in a young multi-ethnic group living in South Florida.**

Sahar Ajabshir, Joel Exebio, Gustavo Zarini, Ali Nayer, Joan Vaccaro, Lemia Shaban, Fatma Huffman

10:50am – 11:05am

**Objective:** The aim of this study was to investigate the relationship between serum 25-hydroxy vitamin D, total cholesterol and blood pressure (BP) among young multi-ethnic participants living in South Florida. / **Methods:** This cross-sectional study included 80 young adults, males (n=42) and females (n=38), ages 18-36 years recruited from Florida International University campus. Serum 25-hydroxy vitamin D and TC were measured by ELISA method. Systolic and diastolic BPs were measured by an automated monitor. Weekly total sun exposure and daily vitamin D intake were calculated from validated sun exposure and food frequency questionnaires respectively. A multi-linear regression model was run, adjusting for age, gender, body mass index, systolic BP, daily vitamin D intake, total weekly sun exposure and tobacco use. / **Results:** Total cholesterol (P= 0.020) and diastolic blood pressure (P= 0.025) were negatively associated with serum 25-hydroxy vitamin D. This association remained significant after controlling for covariates (B= -0.074, P=.045 for total cholesterol, B= -0.421, P= -0.018 for diastolic blood pressure). The model explained 18.4% of the variation in serum 25-hydroxy vitamin D. / **Conclusion:** The results of this study suggest that high total blood cholesterol and diastolic blood pressure may be associated to low serum 25-hydroxy vitamin D level. Interventions are needed to confirm these results.

**The “big pharma” cost curve**

Eli Karlin, MD.

It can be argued that research and development is the lifeblood of a pharmaceutical company. Developing the latest medicines can give pharmaceutical companies such a large edge over their competitors that it is worth the industry estimated average cost of more than \$800 million. However with the cost of developing new drugs being so high, we lack the funds needed to retain certain drugs that are necessary for use in the health field. Financially these drugs are no longer viable and healthcare organizations must turn to other less effective medicines. Currently the existing business model cannot cope. The aim of this business abstract will be to increase profitability of existing pharmaceutical companies by looking at medicines previously seen as too expensive to produce due to R&D needs. This business plan would first, establish the need for the previous medications in the current market. Second, apply a new business model that includes reaching the customer, differentiating the product from the current variety and marginally increase pricing to offset the cost of producing and focus on selling. Third, create a subsidiary company that would have zero research and development overhead.

## Humanities Presentations

*April 1, 2014, 1:10pm – 4:50pm*

*Block 1- ROOM B*

1:10pm – 1:25pm

Remy Dou

R.I.S.E.U.P - The Role of Interactions on the Self-Efficacy of Underrepresented Populations in Physics

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1:30pm – 1:45pm

Yu Zhang

On English Language Arts Curriculum Design from the Perspective of Common Core Standards

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1:50pm – 2:05pm

Xuan Jiang

Young English Learners' Perception of the Use of the Picture-Word Inductive Model in their English Classes in China

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2:10pm – 2:25pm

Binod Nainabasti

Informal formation of learning communities and its reflection on learning

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*10 min break*

*Block 2 – ROOM B*

2:40pm – 2:55pm

Chaundra Whitehead

Adult Basic Education in a Not-so-Basic Age: The Implications of Technology for Adult Literacy Development

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3:00pm – 3:15pm

Feng Li

The Effectiveness of Modeling Instruction on the Academic Achievement and Learning Attitudes of Undergraduate Students in an Introductory Biology Lab Class

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3:20pm – 3:35pm

Seth Manthey

Undergraduate General Biology Students' Attitudes Towards Biology

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*Block 3- ROOM B*

3:50pm – 4:05pm

David Vitt

Spatial Network Differences and the Extensive Margins in Retail and Wholesale:  
A Structural Analysis

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4:10pm – 4:25pm

Ellen Randolph

Masonry and Antimasonry (1820-1840): Identity and Religious Conflict

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4:30pm – 4:45pm

Svetlana Tyutina

We Are What We Eat: Orientalization of the Image of Mexico in the Early  
Colonial Writings

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**R.I.S.E.U.P - The Role of Interactions on the Self-Efficacy of Underrepresented Populations in Physics**Remy Dou

1:10pm – 1:25pm

While much attention has been placed on improving student academic performance in STEM fields, content knowledge alone does not produce STEM professionals; persisting in a STEM career is a complex process involving interconnected motivational and behavioral factors, such as self-efficacy, outcome expectations, and social interactions. Lead by a framework grounded in Social Cognitive Career Theory, I describe my dissertation research design, which aims to explore the social nuances of self-efficacy (SE) development in women and minorities via vicarious learning and social persuasion. More specifically, I seek to examine the ramifications of social interactions in formal classroom environments with regard to the development of SE and outcome expectations among undergraduate students taking introductory Physics courses at Florida International University. Studies of FIU's reformed Physics courses, primarily Modeling Instruction, have shown that students not only acquire more content knowledge, but their attitudes toward physics improve. A recent study at FIU revealed that women taking Modeling Instruction courses exhibit significant increases in SE, suggesting that the increase may be related to social mechanisms. I will use Social Network Analysis (SNA) to facilitate the visualization of student interactions (i.e. ties) and measure the characteristics of those ties. I welcome feedback from the community with regard to research design, methodology, and data analysis.

**On English Language Arts Curriculum Design from the Perspective of Common Core Standards**Yu Zhang

1:30pm – 1:45pm

The purpose of this presentation is to generalize an effective curriculum pattern in English Language Arts through introducing fundamental components in Common Core Standards. By analyzing the key considerations in designing curriculum in English Language Arts in relation to the Common Core Standards, it attempts to demonstrate readers an effective English curriculum design is the one that embodies language and literature together, considers students' special needs and their various language levels, incorporates all of essential language arts components as a whole, provides a convincing rationale in content material selection, and invites students, teachers, and educators' participation in curriculum design. / This presentation has three sections. In the first section, it provides a general review of Common Core Standards in English Language Arts, which mainly discusses the key design considerations of Common Core Curriculum in English Language Arts and analyzes its design limitations. In the second section, from the implications of the Common Core Curriculum Pattern, it defines English Language Arts Curriculum, presents curriculum planning participants in English Language Arts, and summarizes basic procedures in designing English Language Arts Curriculum. Finally, it concludes that the characteristics of an effective curriculum in English Language Arts.

**Young English Learners' Perception of the Use of the Picture-Word Inductive Model in their English Classes in China**Xuan Jiang

1:50pm – 2:05pm

English has been taught as a core and compulsory subject in China for decades. In recent years, the demand for English in China has increased dramatically. China now has the largest English-learning population. The traditional English-teaching method cannot continue to be the only approach nowadays because it merely focuses on reading, grammar and translation. The Picture-Word Inductive Model (PWIM), as a new pedagogical method using pictures and inductive thinking, may benefit English learners in China. The purpose of this four-month-long exploratory study was to investigate what the young English learners (4th graders and 7th graders) perceive the use of the Picture-Word Inductive Model, which was implemented in their English classes for the first time. By deploying class observations, questionnaires with open-ended questions and interviews, the researcher sought the answers to the two research questions: (a) What are student participants' perceptions of PWIM as to its strengths and weaknesses? (b) To what level do participants believe that PWIM has an effect on their English learning? The study found that the students welcomed PWIM greatly, listed many of its cognitive and affective strengths and few weaknesses. The participants strongly believed that PWIM has a great positive affect on their English learning. In addition, researcher also found other main themes, for instance, peer learning, teacher-student interactions, extensive after-school English classes, and so on.

**Informal formation of learning communities and its reflection on learning**Binod Nainabasti, David T. Brookes

2:10pm – 2:25pm

This study seeks to understand the patterns of formation of informal learning communities outside the classroom from the students of a calculus-based introductory college physics class that is a studio-format course implementing the Investigative Science Learning Environment (ISLE) curriculum. We build up a network pattern among students from the self-reported data about who works with whom every week during the whole semester and analyze the network centrality through social network analysis software UCINET. Our study also analyzes the relationship between students' network positions as they work together in groups outside the classroom with their interactions in the classroom, performance on exams and gain in conceptual understanding.

**Adult Basic Education in a Not-so-Basic Age: The Implications of Technology for Adult Literacy Development**

Chaundra L. Whitehead

2:40pm – 2:55pm

Twenty years ago education practices involving technology varied from those of the current age. Technology in the most colloquial sense refers to computers and related devices. The purpose of this paper is to explore the advantages of integrating computer literacy into adult basic education and literacy programs by employing e-learning, online technology, or virtual schools, in order to increase job readiness and enable improvement of other forms of literacy. This research will present information on the adult basic education student, summarize computer, technological and digital literacy, demonstrate some of the uses of technology in literacy instruction, and conclude by making a viable connection between literacy and technology. The summary will also examine some of the barriers preventing achievement of technological literacy and implications for expanding access to technology for the purposes of adult literacy and basic education. This basis of this paper is to investigate how technological literacy is necessary in order to improve the overall literacy and learning of adult basic education student. It is reasonable to consider using e-learning, internet, and other learning technologies to increase the reach of educational services for ABE, GED, Literacy and ESOL learners, but it can be nearly impossible to employ this tool if the students are not prepared to access it. Can the technology connect in a productive manner to efficiently improve literacy and basic education instruction for adult learners?

**The Effectiveness of Modeling Instruction on the Academic Achievement and Learning Attitudes of Undergraduate Students in an Introductory Biology Lab Class**Feng Li

3:00pm – 3:15pm

Undergraduate students have been concerned as lacking positive learning attitude (particularly intrinsic motivation) in biology classes. As a consequence, their low-achieving academic performances and the impact on future career aspirations are a big concern in the research on biology education. Modeling Instruction (MI) has been developed and introduced to physics education for decades, being successful and productive in the field. It has also been successfully applied to high school biology education. In this study, the effectiveness of MI to non-biology-major undergraduate students (mainly with pre-nursing major) in an introductory biology lab class will be investigated. Students in two lab sections of Introductory Microbiology at Florida International University with the same instructor will be selected to participate in this research, one as an experimental group and the other as a control group. A microbiology concept inventory will be developed to test students' conceptual understanding of the course. Colorado Learning Attitudes about Science Survey for Biology (CLASS-Bio) will be employed as the instrument to test students' learning attitudes towards biology. After pre-tests of both academic achievement and learning attitudes of students in the beginning of the semester, MI will be implemented for each microbiology experiment in the experimental group as the intervention for 14 weeks. At the end of the semester, post-tests will be conducted, using the two tests again. Data will be statistically analyzed to reveal whether MI can improve students' academic performance and/or learning attitudes significantly, and whether the academic achievement of students correlates with their learning attitudes.

**Undergraduate General Biology Students' Attitudes Towards Biology**Seth Manthey

3:20pm – 3:35pm

I present the results from our ongoing work to study undergraduate General Biology I. These results were collected using the Maryland Biology Expectations Survey (MBEX), which looks at students' attitudes and epistemologies about biology. Using pre-instruction and post-instruction attitudinal shifts to compare two different types of instruction, it provides insight to one aspect (attitudes about biology) important to Biology Education Researchers and science education researchers more broadly. Establishing a baseline of data is essential to explore the efficacy of any reform effort that is to be part of the larger national effort in reforming undergraduate biology education as seen by the AAAS's Vision and Change.

**Spatial Network Differences and the Extensive Margins in Retail and Wholesale: A Structural Analysis**David Vitt

3:50pm – 4:05pm

This paper derives inspiration for an estimating equation for retail market concentration from a geographical trade model on the Salop circle with IRTS manufacturers and retailers as in the Eckel 2009 model. The effect of interest was the degree to which increased consumer mobility is associated with consolidation in retail and wholesale. Exogenous variation in consumer mobility over time was proxied by extensive and intensive measures of internet use across states. Extensive measures included the absolute access rates and the density of users per square mile. The intensive internet measure, relative search frequency for "porn" at Google, proxies the propensity of a state's citizens to use the internet. Industry-state observations at the 4 digit NAICS level were used over a period of 5 years. Evidence collected suggests that increasing these measures consolidated relatively more sectors than it bolstered. The empirical observation that industries are differently sensitive to changes in consumer mobility is explored. I also test a second comparative static, the sensitivity of industries to internal growth, and connect the results to the endogenous fixed costs literature on natural oligopoly.

**Masonry and Antimasonry (1820-1840): Identity and Religious Conflict**Ellen Randolph

4:10pm – 4:25pm

In 1826, William Morgan, an ex-Mason from Batavia, New York, was kidnapped and presumably murdered by local Masons in an attempt to prevent him from publishing ritual secrets. The kidnappers were brought to trial but continuous resistance and interference from Masons and their supporters resulted in few convictions. Aggravated by the pattern of crime and cover-up, public outrage over this injustice quickly broadened into criticism of Masonry as an institution. This criticism took many forms but ultimately led to the formation in 1828 of the Antimasonic Party, the first significant third party in American politics. Historians have typically focused on the development of the Antimasonic Party and its contributions to Republicanism and later reform movements rather than on the origins and characteristics of early Antimasonry. Historians who did address early Antimasonry claimed that public reaction had little significance in itself, being either hysterical frenzy or conspiratorial paranoia as suggested by the religious language and bombastic style of Antimasonic literature. Although public outrage focused at first on the case as a local instance of murder and conspiracy, it quickly transformed into an ideological battle between the Republican ideal of religious tolerance and the evangelical hope for a Christian nation. This interesting 20-slide presentation (derived from a 30-page graduate paper) will focus on the religious aspects of both the kidnapping and the public response, with stress on the ways in which in-group dynamics led to religious violence and social conflict.

**We Are What We Eat: Orientalization of the Image of Mexico in the Early Colonial Writings**

Svetlana V. Tyutina

4:30pm – 4:45pm

The much debated term of Orientalism, originated in Edward Said's seminal work *Orientalism* (1978), started to evolve and diversify, depending on the area to which it was applied. The Orientalism by Said theorized the modern process of interaction between colonial and colonized societies. In case of Latin America, the orientalist approach was exported there from the metropolis where it was successful applied during the Reconquest. The peninsular orientalism served the purpose of self-definition of the nation undergoing the process of formation. It began to serve a similar purpose in the colony. / This presentation will analyze the representation of people and lands of nowadays Mexico, portrayed through the orientalist lens. It will focus on the orientalization of their image, habits, customs, and especially food practices, often linked to the religious anthropophagy. The basis of the analysis are the chronicles of the conquest of the early period, like *Las Cartas* by Hernán Cortés, *Historia verdadera de la conquista de la Nueva España* by Bernal Díaz del Castillo, and *Historia general de las Indias* by Francisco López de Gómara. The image resulting from the application of the orientalist practices in the early colonial period led to deep segregation between the colonizer and the colonized, the pictorial representation of which can be found in the so-called castas paintings, originated in Mexico and banned in 1822 for their discriminatory character.

## **Social Sciences Presentations**

*April 1, 2014, 1:30pm – 4:00pm*

### **Block 1 ROOM A**

1:30pm – 1:45pm

Alina Nazareth

Cognitive Factors Affecting Adult Mental Rotation Performance: An Eye-tracking Study

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1:50pm – 2:05pm

Zeila Frade

Through the eyes of Apolo: An exploration of childhood and social tensions in Republican Cuba.

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2:10pm – 2:25pm

Ana Galiano

Trafficking of Women into and within China, Modern-Day Slavery

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2:30pm – 2:45pm

Daniela Ottati

Qualitative Inquiry of the Geography Perceptions of Freshman Students at Florida International University

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*10 min break*

### **Block 2 ROOM A**

3:00pm – 3:15pm

Gabriela Moreno

Hospitality Employee Substance Abuse: Is Anyone Getting the Message?

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3:20pm – 3:35pm

Charles Heck

Precarious Politics: The politics of favela displacement and climate vulnerability in Rio de Janeiro

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3:40pm – 3:55pm

Harry Hipler

Presidential Rankings, Legacy, and Economic Performance 1869-2013

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**Cognitive Factors Affecting Adult Mental Rotation Performance: An Eye-tracking Study**

Alina Nazareth, Shannon M. Pruden

1:30pm – 1:45pm

Mental rotation ability is the ability to mentally rotate 2D or 3D objects in space. The present study, utilizing eye-tracking methodology, examined adults' differential use of cognitive strategies as a potential explanation for differences in mental rotation performance. Spatial literature defines a "holistic" strategy as the process of mentally rotating the whole object. A piecemeal" strategy is the process of reorienting segments of one image to match the corresponding segments of the other image (Khooshabeh, Hegarty & Shipley, 2012). Utilizing a Tobii X60 eye-tracker adult participants completed a brief eye tracking study in which they were presented with two 3D figures (assembled cubes) based on the classic Shepard and Metzler (1971) mental rotation task. Participants were asked to indicate if the two figures were possible rotations of each other, or not, for 40 pairs of images. Preliminary data analysis revealed that mental rotation performance differed significantly by spatial strategy selection (i.e., holistic vs. piecemeal),  $F(1,62) = 7.938$ ,  $p = .006$ . Further analysis will examine the relationship between participant sex and strategy-selection based on participant eye-movement recordings. Our findings suggest that individuals using a "holistic" strategy tend to perform better in mental rotation tasks. This would suggest that spatial training should focus on teaching low performing adults to use the more effective "holistic" strategy to improve performance.

**Through the eyes of Apolo: An exploration of childhood and social tensions in Republican Cuba.**

Zeila Frade

1:50pm – 2:05pm

Published in 1947, "Cuentos de Apolo" stands out in the children's literary production of Cuba, particularly that of the Republican epoch. The eyes of Apolo, a seven year old black boy, are the lens through which social, racial, and geographical differences representative of the period are contrasted. The integrity of the human spirit and the importance of dreams and aspirations also play a significant part in the story's plot and message. The objective of this study is to analyze how the themes explored in this work of Cuban writer Hilda Perera contribute to the creation of a national and cultural identity. For a contemporary critical approximation of this text it is necessary to, using Homi Bhabha's expression, revise the narration of the Cuban nation. While emphasizing the literary value of this collection of vignettes, it will be argued that the text has received insufficient critical attention for belonging to what Rafael Rojas has referred to as the "Middle Age" between the Colonial period and the Revolution of 1959.

**Trafficking of Women into and within China, Modern-Day Slavery**

Ana Galiano

2:10pm – 2:25pm

The purpose of this research is to explore one of the most dire human rights concerns of today, namely that of human trafficking and modern-day slavery. This study focuses specifically on trafficking in women into China's borders, as well as within those borders, and the demand created by the country's population planning policies, combined with the culture's patriarchal values and its desire for only male children. This in turn has resulted in a significant disproportion between the number of men and women, contributing to the demand for women and child brides from within China, Russia, Mongolia, Burma, North Korea, Vietnam, and Laos among others. The victims are forced into marriage and involuntary domestic servitude and even coerced into sexual exploitation by their husbands. Since China releases very limited information on the extent of trafficking and exploitation, this area study will use case studies obtained by U.S. Department of State, diplomatic posts, and agencies which research their occurrences as well as the governmental action being taken to combat it. To further this research, the use of qualitative and limited quantitative data obtained by such research will be used to expose China's significantly increasing incidents and failure to make necessary efforts to address it. The goal is to formulate clear expectations for China in the areas of investigations and prosecution of such crimes and provide assistance and protection to the victims.

**Qualitative Inquiry of the Geography Perceptions of Freshman Students at Florida International University**

Daniela F Ottati

2:30pm – 2:45pm

As a result of the study, the researcher seeks to understand how FIU freshman students perceive geography, based on the following areas: how students understand the field of geography, what experiences the students had with geography, and how relevant students find geography to their past, present, and future. [\*Note\* Since there were no intentions to publish the work after the completion of this class project, the researcher did not go through the IRB process].

**Hospitality Employee Substance Abuse: Is Anyone Getting the Message?**

Gabriela Moreno, BS; Lisa Moll, MS, CHE; Miranda Kitterlin, PhD

3:00pm – 3:15pm

Frequent substance abuse behavior is a phenomenon exhibited more by foodservice industry employees than employees in other industries and is widely documented in government and academic research. Over the past twenty years a number of related studies have called for future research to fully examine the reasons for this strong substance abuse norm among foodservice workers. This study sought to identify what experiences foodservice employees are having with regards to workplace prevention policies, efforts, and messages. Participants reported that, in their perceptions, substance abuse prevention measures were virtually non-existent at their places of employment. Practical implications for industry are provided.

**Precarious Politics: The politics of favela displacement and climate vulnerability in Rio de Janeiro**

Charles Heck

3:20pm – 3:35pm

Based on more than 15 months of fieldwork in Rio de Janeiro, this research project uses the analytic of ‘area of risk’ to explore how favelas have been controlled and disciplined by Rio’s urbanists, international advisers, and the Brazilian Institute of Geography and Economics (IBGE). To explore this topic, I examined historical documentation from the archives of Rio’s newspapers, government documentation, and ethnography in Santa Marta. Santa Marta was founded more than 70 years ago, and since then has been the object of several attempts at removal and urbanization. It has played a pivotal role in the launching of new institutions and policies for favelas, the most notable of which was the Pacification Police program that began in 2008. My research found that prior to 2008, Rio’s favelas were framed as ‘areas of risk’ due to their association with drug trafficking and violence, but since then they have been reconfigured as places at risk for catastrophic climate events, using the same term ‘area of risk’. This has been accomplished by the dual categorical status of area of risk within the IBGE and municipal institutions charged with urbanizing favelas. Santa Marta’s residents have recognized the effects of this reframing and counterposed a discourse of social justice and urban citizenship to demand infrastructure improvements rather than resettlement. They have formed a coalition with outside technical experts to reevaluate experts contracted by the city of Rio.

**Presidential Rankings, Legacy, and Economic Performance 1869-2013**Harry M Hipler

3:40pm – 3:55pm

The economy influences presidents' rankings by scholars. Based on initial observations of presidents from 1869 to 2013 and a quantitative correlation coefficient analysis of these presidents by examining unemployment and GDP, there is a moderate positive correlation between economic performance and presidential greatness for US presidents from 1869 to 2013. For a president to have an opportunity to achieve greatness status, he must have a positive economic performance record during his administration without which he will not obtain presidential greatness. Contrasting with previous research, my result supports the constructive importance of economic performance during a presidential administration to obtain greatness status. Any hypothesis that suggests that economic performance is the sole reason for determining presidential greatness should be qualified and moderated to suggest that while economic performance is important, there are other factors that will mitigate against presidential greatness. These factors include scandal and dishonor, failure to be re-elected, failure to enact signature legislation, maintaining the status quo without accomplishments, and decision-making without crisis testing in domestic and international affairs. As important as positive economic performance is in determining presidential greatness, economic performance will not guarantee presidential greatness if other mitigating factors exist.

## **Humanities Posters**

*April 1, 2014, 12:30pm – 1:30pm*

### *ROOM C*

- Raed Bahelah Accessibility to cigarettes and exposure to tobacco promotional advertisements among youth: results from the Global Youth Tobacco Survey in Yemen, 2008.  
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**Accessibility to cigarettes and exposure to tobacco promotional advertisements among youth: results from the Global Youth Tobacco Survey in Yemen, 2008.**

Raed Bahelah

**BACKGROUND** Tobacco smoking is the main risk factor for the leading causes of death worldwide. In the Middle East, Yemen has the third highest rate of adult tobacco smoking (45%) after Tunisia (60%) and Lebanon (58%). The aim of the current study is to investigate the exposure of youth to tobacco promotional advertisements and accessibility to tobacco products in Yemen. **METHODS** The current analysis is based on data from the latest global youth tobacco survey conducted in Yemen in 2008. Complex samples tool in SPSS 21.0 was used to perform all the analyses. Prevalence ratios with 95% confidence intervals (CIs) were calculated. **RESULTS** A total of 1,219 students aged 13-15 years enrolled in 7-9 school grades were surveyed. Approximately 18% (14.9-21.8%) of boys and 10% (7.5-13.2%) of girls were ever cigarette smokers, while 4.3% (2.9-6.4%) of boys and 1.2% (0.5-2.9%) of girls were current cigarette smokers. More boys than girls were exposed to ads on billboards [70.8% (66.8-74.5%) and 57.9% (53.3-62.3%) respectively], and offered free cigarettes by a tobacco representative [21.3% (18-25.1%) and 13.4% (10.5-16.9%) respectively]. Approximately 2 in 3 students exposed to ads on newspapers/magazines [66.4% (62.2-70.3%) and 60.9% (56.4-65.3%) respectively], and 1 in 4 students had an object with cigarette/tobacco logo [28.5% (24.8-32.6%) boys and 21.5% (18-25.5%) girls]. Among smokers, 7.7% (3.7-15.1%) boys and 12.9% (5.8-26.2%) girls bought cigarettes from a store and 12.3% (7.1-20.4%) boys and 14.9% (6.8-29.6%) girls were not denied purchase of cigarettes because of their age. Smoking at home was reported by 13.5% (7.4-23.5%) boys and 14.5% (6.6-28.9%) girls. **CONCLUSION** Exposure and accessibility to tobacco products among Yemeni youth is high. Effective control policies to limit access and prohibit tobacco ads are urgently required.

**Breaking Bitcoin: Do exchange volume innovations lead to increased real cryptocurrency activity?**

David Vitt

Bitcoin is a 4 year old digital medium of exchange aspiring to be a self-sufficient currency. Proponents of the system tout it's "advantages" such as its lack of central authority for debasement, high granularity for division, and transaction anonymity. In the long run, the algorithm backing Bitcoin guarantees a fixed supply of money. Theory behind Bitcoin provides no prescription for the transitional period, which has been plagued with high volatility. I present a Money In Utility model to motivate why a consumer might participate in Bitcoin activity from a consumption and portfolio perspective, with a further contribution of endogenized portfolio preferences. To connect this to empirical observations, I employ vector autoregression to identify whether exchange volume innovations increase subsequent real Bitcoin activity. I find that increased exchange activity has asymmetric effects across wallet types, with exchange volume innovations tending to favor the top 100 wallets more than the remaining \$approx 2.9\$ million wallets, many of which are associated with gambling. A news effect shock, via search frequency at Google, is also shown to increase transactions to both wallet types, increase exchange volume, and yield lasting price increases. Market manipulation concerns are addressed.

**Reasons why university students fail to respond to online health and wellness surveys: Looking at qualitative data**

Elena Sebekos, MPH and William W. Darrow, PhD

Background: A large public university located in the southern United States relies on data collected annually from students to assess needs for health and wellness services. The American College Health Association-National College Health Assessment II has been conducted using online methods since 2008, but with unacceptably low response rates: 5.7% in 2010, 7.0% in 2011, and 5.0% in 2012. We sought to identify factors that motivate and hinder students to complete such needs assessment surveys. Methods: An anonymous health-related survey was developed and emailed to 8000 randomly selected students in spring 2013 to determine the reasons for poor participation and to improve response rates. Students were invited to complete a brief questionnaire and to type in their comments. ATLAS.ti was used to analyze written responses. Results: Of the 632 respondents, 92 (14.6%) offered one or more comments and another 23 contacted the Principal Investigator directly to complain. Analysis of the comments revealed six major themes: (1) incentives, (2) opinion not mattering, (3) length, (4) content and dissemination of survey messages, (5) feedback, and (6) spamming. Sixteen of the 23 complaints received by the PI focused on a single issue: excessive spam. Conclusion: Survey administrators can increase response rates to health and wellness surveys by addressing the concerns expressed by students. Providing appropriate incentives, minimizing length, disseminating survey results, and reducing the number of requests for survey participation should improve response rates. Reliable information should help wellness center staff allocate funds appropriately and implement more targeted and effective health promotion programs.

**A Case Study: Overnight Summer Music Camp and the Impact on its Youth**

Ari Nemser

This study explored niche specialty camp environment of an overnight music camp, Camp Encore Coda, located in the woods of Maine. The purpose of this study was to gain an understanding of the music camp environment, uncovering the unique ways it impacts the social and musical developments of its participating youth as well as contrasting its learning environment to that of the traditional classroom. This qualitative case study was framed by the key concept of multidimensional growth, emerging from a uniquely structured holistic learning environment. The research questions investigated focused on the ways overnight music camp impacts attending youth, how it facilitates growth that may differ from or be non-existent in the traditional classroom, and how youth perceive these differences. Data collection was administered throughout 6 days on site by the researcher using surveys, interviews, focus groups, and observations. This study uncovered exorbitant levels of social and musical growth among the youth; all directly linked to isolation from technology, communal living, and a community of practice fully immersed in music. Learning models and engagement patterns that are not prevalent in many traditional school settings with the same completeness exhibited at overnight camp were also uncovered. There lacks a significant amount of music education research that attempts to explore and provide an initial evaluation of the learning opportunities unique to overnight music camps. This is particularly significant for music educators who strive to continue the advancement of the field through positive impact on students inside and outside of the school classroom.

**Universal Narrative Model**

Jose Pombo

The chief reason behind the undertaking of this text is to delineate the methodological and pedagogical information that surrounds narratives vis a vis critical and literary theory analysis and its possible implementation in a classroom setting. The main target audiences are social studies or social science students, educators, or curriculum specialists. Regardless where the narrative originates from or is categorized by; it is my understanding that there are three fundamental basic theoretical components (and or perspectives) that all narratives should possess, which are more precisely a: historical; philosophical, and social dimension. Given the above mentioned thematic scheme, my intention is to develop an education methodology (applicable mainly in a history or social studies classroom), but with interdisciplinary ramifications. This specialized usage of narratives that will offer students: a) an increase in overall content knowledge; and b) a propagation of critical analysis based on the specified content knowledge that culminates ultimately with overall comprehensive understanding. The following are the steps involved with the application: Choose Narrative and read carefully. Identify the type or genre of the narrative: what cannon does the narrative belong to. Determine historical basis of narrative: historiography (who, what, where and the time frame involved). Pinpoint political /ideology nuances. How would use of this model effect student learning?

**Willingness to Pay for Coral Reef Conservation in Southeastern Florida**

Jim Harper

How willing are people to act to protect coral reefs? This question gains urgency daily, as coral reefs worldwide face extinction in less than a century. The reefs of the Caribbean region, including Florida, rank among the most threatened, yet it remains unclear how much reef users are willing to pay to sustain them. Based on a survey of stakeholders in southeastern Florida, particularly anglers, this study finds high levels of concern and willingness to pay. The survey features an unprecedented online choice experiment, a methodology designed to mimic complex consumer decision-making. Moderate concern for climate change indicates a gap between stakeholder awareness and scientific consensus. Stakeholders appear more motivated by local than global concerns.