



Graduate Student Appreciation Week

Scholarly Forum

Presentation Abstracts



March 19 – March 20, 2018
Student Academic Success Center 100
9:00 AM – 5:00 PM

Monday, March 19, 2018

9:00 AM - 9:15 AM

SASC 100

Biological Sciences

A Phylogenetic Study of Myrtaceae from the Caribbean Islands Biodiversity Hotspot

Jonathan Flickinger

Neotropical Myrtaceae (tribe Myrteae) are a diverse and prominent group of trees and shrubs including the cultivated guava and allspice. Though easily recognized as a group, Myrteae are taxonomically challenging due to the large number of species and general lack of diagnostic characters for generic delimitation. Approximately 500 species of Myrtaceae are endemic to the Caribbean Islands Biodiversity Hotspot, consisting of the Greater and Lesser Antilles plus the Bahamian Archipelago, but to date, molecular phylogenetic studies of the group have focused on South American species. To address this shortcoming, a phylogenetic study of Caribbean Myrtaceae was conducted to evaluate the monophyly and placement of several Caribbean taxa and to identify novel clades for further study. Samples of Myrtaceae representing all genera native to the Greater Antilles were collected in the field and sequenced for one nuclear (ITS) and two plastid (psbA-trnH and ndhF-rpl32) genetic regions. Aligned sequence data were analyzed using maximum parsimony and Bayesian methods to infer a phylogeny for approximately 110 species of Myrtaceae. Major results include the emergence of the formerly endemic genera *Calyptrogenia* and *Hottea* within *Eugenia* and *Mitranthes* within *Myrcia* s.l., while *Calycorectes ekmanii* is identified as a potential new genus endemic to Cuba. *Pseudanamomis* sensu Bisse is shown to be polyphyletic, while the mostly Antillean genus *Mosiera* forms a monophyletic group sister to *Psidium*. In addition, several well-supported clades of *Eugenia*, the most diverse genus in the region, are resolved, including the novel "lathberry clade." This study makes a significant contribution to the study of Neotropical Myrtaceae by being the first to extensively sample species from the Caribbean region. The results necessitate several taxonomic changes and will inform ongoing floristic studies in Cuba as well as future systematic investigations of Myrtaceae. This study also highlights unique lineages to inform conservation efforts within a global hotspot of biodiversity.

Monday, March 19, 2018

9:15 AM - 9:30 AM

SASC 100

Chemistry

De novo lipid synthesis in *Aedes aegypti*

Anthony Castellanos

In the *Aedes aegypti* mosquito, nutrition plays a vital role in determining reproductive fecundity. When deprived of food sources, resorption of *A. aegypti* follicles has been observed and has been proposed to occur for resource reallocation as a life-history strategy. Lipids, a principal species in ovarian follicles, are thought to play a key role in the insect's physiology. While previous studies have shown how lipid stores fluctuate within the mosquito ovary as a response to various external conditions, little is known about the mobilization of lipids. In the present work, Mass Spectrometry Imaging (MSI) is used to image de novo-synthesized lipid stores in ovarian follicles. *A. aegypti* of the Rockefeller strain were raised at 28°C with 80% humidity, at a 16-hour light and 8-hour dark cycle. Following eclosion, adult mosquitoes were either fed from a cotton pad soaked with either water, heavy water, a 20% sucrose solution, or a 20% sucrose solution prepared in heavy water. On the fourth day, specimens were sacrificed. Female mosquitoes were dissected and their ovaries were harvested. For imaging experiments, samples were further split into individual ovarian follicles. Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS) was used to localize lipid species. Complementary MALDI FT-ICR MS analysis was also performed. Glycerolipids and phospholipids were observed in the ovarian follicles of *A. aegypti*. Pseudomolecular diacylglyceride (DAG) secondary ions of the form $[M-H_2O+H]^+$ were among the most abundant lipid species observed via TOF-SIMS. Diacylglycerides and Triacylglycerides are important metabolic reserves, and are known to be synthesized from sugar meals. Phosphocholine (PC) secondary ions of the form $[M+H]^+$ were also readily observed in positive mode detection. PCs are integral membrane lipids. Analysis of specimen fed heavy-water labeled sucrose revealed a mass shift of such lipid classes, suggesting 2H incorporation into de novo synthesized lipids. The use of complementary MALDI FT-ICR MS experiments aided in the tentative assignment of observed lipid species. Additionally, high mass resolution also allowed the distinction between 2H -containing species from non-labeled C^{13} isotopes. Here, mass spectrometry is used to confirm and localize de novo lipid synthesis in *A. aegypti* for the first time.

Monday, March 19, 2018

9:30 AM - 9:45 AM

SASC 100

English

The Influence of Native English-speaking Environment on Akan-English Bilinguals' Production of English Inter-dental Fricatives.

Felix Kpogo

Learning a second language poses varying degrees of problems for learners. Some problems encountered could be pronunciation related, vocabulary or issues associated with sentence structure. Differences in sound patterns of the second language (L2) learner's first and second languages, and the interaction between the two languages could pose hurdles to L2 learners. In situations where the L2 learner migrates to the native environment of the L2 s/he is learning, s/he is likely to be influenced by the new environment. This study sought to investigate how immersion in a monolingual setting affected the English of Akan-English (AE) speakers from Ghana. I examined the production of the two "th" sounds in English as in teeth /t̪/ and teethe /t̪̃/, with special attention on the rate of replacement of English /t̪/ and /t̪̃/ sounds with their closest sounds in Akan, and the phonological contexts in which these substitutions occurred. Akan-English (sequential) bilinguals who had immigrated to the US were tested on 24 target words containing /t̪/ and /t̪̃/ at the beginning of words, between vowels, and at final word positions. Participants read sentences with a blank and were asked to fill in the blanks with the target words. It was observed that AE bilinguals performed on the /t̪/ and /t̪̃/ sounds, in accordance with the relative exposure that they have had to English. However, substitutions for the targets were still evident in the most fluent speakers, with the rate of substitution for /t̪/ and /t̪̃/ sounds occurring at the end of words highest, followed by those occurring at the beginning of words, and lowest between vowels. The most frequent modification was the use of /t̪/ instead of /t̪̃/ sound at the end of words. These findings are important because they throw light on how different languages of a bilingual interact. It also provides insights to L2 teachers on some of the possible hurdles that second language learners face as they strive to acquire additional languages, so that they could design appropriate methodologies to help learners overcome such hurdles.

Monday, March 19, 2018

9:45 AM - 10:00 AM

SASC 100

Chemistry and Biochemistry

Manumycin-A is a potent inhibitor of mammalian thioredoxin reductase

Anupama Tuladhar

The thioredoxin system is the major cellular reductant system present in the cell, whose role is to maintain cellular redox homeostasis. It does this in part, by regulating the activity of many other enzymes. The system controls many cellular processes such as DNA synthesis and acts as an antioxidant reducing destructive reactive oxygen species. The thioredoxin system is comprised of thioredoxin (Trx) which reduces target protein disulfide bridges by thiol-disulfide exchange and thioredoxin reductase (TrxR) which reduces oxidized Trx returning it to its active form. Because it is a regulator of numerous critical cellular functions, TrxR is also a common target for many cancer drugs including cisplatin and auranofin. Recently we have shown that the Florida red tide toxin, brevetoxin can inhibit mammalian TrxR which explains the oxidative stress observed in marine organisms exposed to brevetoxin during red tide. We have also discovered several compounds which are similar to brevetoxin in size and functionality that have a similar effect on TrxR. These compounds include antitumor and antibiotics such as manumycin A (man-A), geldanamycin and algal toxins such as nodularin, microcystin-LR. Unlike PbTx-2, man-A a known farnesyl transferase inhibitor, inhibits both DTNB and insulin reduction which implies that the potential binding site of man-A is C-terminal selenocysteine. Inhibition of TrxR at the C-terminal tail produces a pro-oxidant known as SecTRAP (Selenium Compromised Thioredoxin Reductase-derived Apoptotic Proteins), which uses NADPH to produce superoxide radical anion. This might explain the observed burst of ROS in cells exposed to man-A. We have also tried to characterize the molecular mechanism of action by using site-specific mutant enzymes which allow us to determine the specific site of interactions between enzyme and man-A. The result with the mutant enzymes have revealed that man-A interacts in very different ways with mitochondrial and cytoplasmic TrxRs. This study will thus identify a novel mechanism of action of man-A and thus will contribute to develop a new drug to treat cancer.

Monday, March 19, 2018

10:00 AM - 10:15 AM

SASC 100

Chemistry and Biochemistry

Introducing Structure-Switching Functionality into Small-Molecule-Binding Aptamers via Nuclease-Directed Truncation

Yingzhu Liu

We report a broadly applicable enzyme digestion strategy for introducing structure-switching functionality into small-molecule-binding aptamers. This procedure is based on our discovery that exonuclease III (Exo III) digestion of aptamers is greatly inhibited by target binding. As a demonstration, we perform Exo III digestion of a pre-folded three-way-junction (TWJ)-structured cocaine-binding aptamer and a stem-loop-structured ATP-binding aptamer. In the absence of target, Exo III catalyzes 3'-to-5' digestion of both aptamers to form short, single-stranded products. Upon addition of target, Exo III digestion is halted four bases prior to the target-binding domain, forming a major target-bound aptamer. We demonstrated that target-binding is crucial for Exo III inhibition. We then determine that the resulting digestion products of both aptamers exhibited a target-induced structure-switching functionality that was absent in the parent aptamer, while still retaining high target-binding affinity. We confirm this functionality of both truncated aptamers by using an exonuclease I-based digestion assay and further evaluate this characteristic in an electrochemical aptamer-based cocaine sensor and a fluorophore-quencher assay ATP assay. We believe our Exo III-digestion method should be applicable for the generation of structure-switching aptamers from other TWJ- or stem-loop-containing small-molecule-binding aptamers, greatly simplifying the generation of functionalized sensor elements for folding-based aptasensors.

Monday, March 19, 2018

10:45 AM - 11:00 AM

SASC 100

Civil and Environmental Engineering

Strut Strength and Failure in Full-Scale Concrete Deep Beams

Nazanin Rezaei

Recently, the strut-and-tie method (STM) is being utilized more in design, due to its versatility and applicability for any type of applied loading or geometry of structures. There has been some recent debate in the actual behavior and performance of some components of STM, specifically struts. This research aims to shed additional light on the behavior and performance of struts in STM. In this study, five full scale concrete deep beams with two different shapes (rectangular and truss-like), were tested under a one-point top loading test set-up. The shear span-to-effective depth ratio (a/d) for the specimens was 1 and 1.6, which led to strut angles of 30 and 45 degrees. All the specimens were simply-supported vertically and reinforced with bonded or unbonded bars horizontally. Observations were made on loading point deflections, crack patterns, failure modes, and strut strength. The results indicate that the truss-like specimens have more capacity compared to the rectangular specimens with similar dimension (between 21 to 33 percent). The unbonded reinforced beam results were similar to bonded results. The ultimate shear strength of deep beams obtained from the experimental tests was compared with STM estimates using ACI 318-14 and AASHTO LRFD Bridge Design Specifications (2016) to evaluate safety and accuracy of the provisions.

Monday, March 19, 2018

11:00 AM - 11:15 AM

SASC 100

Biomedical Engineering

Adaptive control of ventilation through respiratory pacing following spinal cord injury

Ricardo Siu

Cervical spinal cord injury can cause ventilatory impairment because of reduced or lost motor drive to ventilatory muscles. To maintain sufficient ventilation, mechanical ventilators or respiratory pacing devices are often required. In respiratory pacing, electrical stimulation of the phrenic nerve or diaphragm muscle causes contraction of the diaphragm thereby eliciting a functional breath. Commercially available respiratory pacing systems work in an open-loop manner and require tuning of electrical stimulation parameters to maintain appropriate ventilation. These systems are also unable to account for changes in muscle fatigue during pacing and changes in metabolic demand. We have developed a neuromorphic adaptive closed-loop controller for respiratory pacing capable of self-tuning the stimulation parameters to achieve and maintain a desired breath volume via a pattern shaper (PS) and a desired respiratory rate via a pattern generator (PG). The present study implemented this controller with a fixed frequency PG and an adaptive PS in vivo in an incomplete cervical spinal cord injury (iSCI) rodent model to assess controller behavior under iSCI conditions. Anesthetized Sprague-Dawley rats (n=7) received a lateral C2 hemisection to create a high cervical iSCI injury model. Airflow was monitored via a pneumotachometer and integrated to obtain breath volume. The volume profile obtained prior to hemisection served as the desired volume profile. A CO₂ analyzer monitored end-tidal CO₂ (etCO₂). After hemisection, volume decreased and etCO₂ increased. Based on the difference between the measured and desired breath volume profiles, the adaptive PS automatically determined the current needed and drove a stimulator to deliver stimulation pulses to the diaphragm via intramuscular electrodes implanted bilaterally near the phrenic neuromuscular junction. The results show that the PS controller successfully restored breath volume to values observed prior to the injury with an average percent error of 4.6%. EtCO₂ also decreased from an average of 128% to 120% of the pre-injury etCO₂. These results indicate that the PG/PS controller could be used to restore ventilatory function after spinal cord injury. Future work will involve implementing an adaptive PG to adjust both respiratory rate and breathing volume in the iSCI animal model.

Monday, March 19, 2018

11:15 AM - 11:30 AM

SASC 100

Chemistry

Conformer-specific Structural Analysis of Peptides With Mobility-Selected TIMS-FTICR MS/MS and Action IRMPD

Jacob Porter

Proteins, such as growth-regulating hormones and histones which aid DNA storage, play many crucial roles in the human body. Their function is often closely-related to structure, which is often difficult to ascertain with traditional solution-phase techniques. The objective of the current research is to isolate small structural motifs from crucial biological proteins, and analyze their shape in the gas phase, to see how intramolecular interactions stabilize their structure and influence their function. Trapped ion mobility spectrometry coupled to tandem mass spectrometry (TIMS-MS/MS) allows for the separation of ions by size and mass, elucidating the conformational subpopulations of a molecule. These conformers can then be individually fragmented, giving information on the structural differences between them. Methylated, trimethylated, acetylated and phosphorylated post-translational modifications of histone tails and AT-hook 1, 2 and 3 peptides were prepared at a final concentration of 1 μM and 8 μM in water, respectively. Ion mobility experiments were performed on a custom built nESI-TIMS coupled to a Solarix 7T FT-ICR mass spectrometer. ECD fragmentation was carried out in-cell, and IRMPD fragmentation data were obtained using a Bruker IRMPD CO₂ laser console collinear to the ICR cell. IRMPD action spectroscopy experiments were performed on an Apex Q 7T FT-ICR mass spectrometer, equipped with an ESI source, coupled to an optical parametric oscillator (OPO) laser. Analysis of post-translationally modified histone tails in the mobility domain enabled separation with high resolving power ($R > 120$). Multiple charge states were observed simultaneously, with several closely-eluting conformers, which previous IMS instrumentation has struggled to separate. Fragmentation of post-translationally modified histone tails gave up to 98% sequence information. In several samples with very closely-eluting mobility bands, the PTM location could be elucidated by electron capture dissociation (ECD) fragmentation. In the case of AT-Hook peptides, conformer-specific fragmentation was able to identify differences in protonation between conformers, and IRMPD action spectra identified conjugated NH₂ stretches corresponding to highly-folded conformations. This research represents the first use of mobility spectrometry and ultrahigh-resolution tandem mass spectrometry in a single experiment to characterize and fragment peptides, untangling the complex gas-phase conformational space of crucial biological peptides.

Monday, March 19, 2018

11:30 AM - 11:45 AM

SASC 100

Leadership and Professional Studies

Like a Tapestry: Navigation of Feminist and Submissive Identities

Carolyn Meeker

As women navigate the intersecting meanings of feminism and submission, they might struggle to reconcile their (often feminist) politics and D/s practice (i.e., belief in equality with desire to yield authority, desire to be beat with understanding of abuse). If someone perceives her intersecting identities as conflicting, she might struggle to choose which identity to prioritize. The purpose of this study was to understand the experiences of women in the BDSM community who identify as feminist and submissive, regarding their experiences navigating these identities. The study was guided by the question: How do women in the BDSM community who identify as feminist and submissive perceive and navigate these identities? This study utilized a phenomenological approach (van Manen, 1997) to explore how 23 women make meaning of their identities and experiences as feminist and submissive. Data was collected during summer 2017, when the women completed an 11-question demographic survey, a 27-question semi-structured interview, and 17 follow up questions to clarify or deepen the understanding of a concept. Inductive analysis was used to find meaning in the data by noting the patterns, categories, and themes that emerged, as suggested by Creswell's (2013) simplified version of Moustakas' (1994) modification of the Stevick-Colaizzi-Keen method. Through the process of horizontalization (Creswell, 2013; Moustakas, 1994) significant statements from the interview transcripts were clustered into themes. Common themes across the transcripts were used to create composite textural, structural, and textural/structural descriptions of the participants' experiences. Four broad themes emerged: (1) the distinction between feminist identity and feminist values - five did not claim a distinct feminist identity; (2) the complexity of submissive identity - submission was employed in different ways and to different degrees; (3) core values as consistent across all identities; and (4) learning to accept and reconcile feminist and submissive identities, particularly related to accepting submissive desires in light of consent. The findings of this study can be applied to the fields of counseling, feminism, kink/BDSM research, sex and sexuality education, higher education, adult education, and human resource development through incorporation into coursework, training, and policy.

Monday, March 19, 2018

11:45 AM - 12:00 PM

SASC 100

Biological Sciences

***Aedes aegypti* Ir8a can detect humans**

Joshua Raji

Mosquitoes use olfaction as a primary means of detecting their human hosts, but our molecular understanding of this sensory modality is far from complete. We have previously identified a family of olfactory receptors, the odorant receptors (ORs), which are necessary for mosquitoes to detect human odor by eliminating the function of their obligate co-receptor ORCO. However in the presence of carbon dioxide (CO₂), host-seeking behavior was strongly retained in female orco mutants. This suggests the olfactory receptors that remain intact in orco mutants, the ionotropic receptors (IRs), are playing a significant role in detecting humans. A functional IR odor-gated ion channel consists of an odor-selective IR and two or more IR co-receptors. To determine the relative contribution of IRs in human host detection, we used a genome editing tool, CRISPR/Cas9, to disrupt Ir8a co-receptor. We independently mutated exon 2 and exon 3 of the gene to generate two nulls alleles of *Aedes* Ir8a. Our studies show that olfactory receptor neurons of Ir8a mutant lack odor-evoked responses to acidic volatiles present in human odor. Behaviorally, Ir8a mutants have significant reduction in host seeking when tested in a uniport olfactometer assays. Our results further show that CO₂ gates the interaction between IR pathway and OR pathway. The loss of Ir8a in the Gr3 mutant background does not enhance the phenotype when compared to Gr3 mutants. We reveal a role for the IRs in mosquito detection of their human hosts and conclude that Ir8a co-receptor is crucial for an anthropophilic vector mosquito to effectively host seek. This study identifies novel targets to control chemosensory-driven behavior in anthropophilic mosquitoes.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group A - # 1

Teaching and Learning

Culturally Relevant Pedagogy in the Mathematics Classroom and their relationship on Latino Children's Development of Understanding Mathematical Concepts

Indira Gil

Latino children comprise a quarter of the elementary aged students in the United States, yet their needs remain unmet. Using an extensive literature review on culturally relevant pedagogy and secondary data, this study quantitatively explores how Latinos have been historically educated in the area of mathematics in the United States, the reforms enforced in the mathematics classrooms and their aims, and how Latino children have developed understanding of mathematical concepts. Furthermore, the author investigates the necessary steps that need to be taken to ensure Latino children effectively development understanding of mathematical concepts.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group A - # 2

Landscape Architecture

"Moveable Feast" Bahamas Style

Tricia Keffer

The relationship between cultural dietary habits and the role of community gardens and farming on New Providence Island in the Bahamas has significantly altered over time. One of the most pressing issues is the 100% dependency on foreign imports for all fresh as well as packaged foods. The problems this dependency creates run much deeper than the simple economics of imports and exports. The cultural shift in economics, status, food availability and tastes has contributed to a complex of circumstances that have negatively impacted the health of the local population. The project's research progressed from simply what people ate to their historical contexts, and changes in farming methods, to the geological condition of the island and its soil. All of this led to the design strategy of the project. The Ministry of Housing would like to find creative solutions that promote self-sufficiency and produce for less expensive and healthier food options. The methodology included a site visit, observations, and meetings with stakeholders of the Bahamas government ministry officials and a collaboration meeting with students at the University of the Bahamas. Three important questions need to be answered: How the people can re-learn cooking skills to enjoy and appreciate tasty healthy food? How to appreciate a new cultural understanding of the role of community gardens? How to engage the youth in healthy diet habits? An analysis of the history, economics, agriculture, festivals, diet, imports and exports yielded that community gardens and tasty foods would be key components to healthier living an improved dependency on foreign imports. In order to encourage healthy eating, I propose to employing Tactical Urbanism techniques and exploring opportunities for low cost temporary installations along streets, on school grounds, and near churches. Such temporary installations are thought to be catalyzers of change in eating habits and a means to inspire locals to consider similar strategies in their backyards. In addition to these temporary initiatives, my proposal also suggests permanent kitchen gardens at the local university, where the students can learn how to grow food while enjoying the recreational spaces developed around the gardens. The most important benefit of such tactical urbanism in the New Providence is the low initial start up cost. Engaging locals in a traditional street festival atmosphere, a cultural activity with which they are very accustomed to, can increase the success of the idea of community gardens. It makes learning new foods fun in a social environment and it can yield measurable results, which can lead to permanent installations. The locals would enjoy better health, more food independence, and less health care costs.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group A - # 3

Biomedical Engineering

Visible Light OCT-based Quantitative imaging of Lipofuscin in the Retinal Pigment Epithelium with Standard Reference Targets

Zahra Nafar

We developed a technology for quantitative retinal Auto-Fluorescence (AF) imaging for quantifying lipofuscin in the retinal pigment epithelium (RPE). The technology is based on simultaneous visible light Optical Coherence Tomography (VIS-OCT) and AF imaging of the retina and a pair of reference standard targets at the intermediate retinal imaging plane with known reflectivity for the OCT and fluorescence efficiency for the AF. The technology is able to eliminate the pre-RPE attenuation in AF imaging by using the simultaneously acquired VIS-OCT image. With the OCT and AF images of the reference target, the effects of illumination power and detector sensitivity can be eliminated.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group A - # 4

Civil and Environmental Engineering

Estimation of Freeway Platooning Measures Using Surrogate Measures Based on Connected Vehicle Data

Leila Azizi

The increase in the market penetration of connected vehicles (CV) in the next few years will allow for a better estimation of system performance to support planning, planning for operations, and operations and management of transportation systems. The assessment of platooning measures on freeway facilities using CV data will help determine the stability and congestion level of the traffic stream. However, the parameters required to identify the platoons, such as time headway, will not be available based on data from low market penetrations of CV. Thus, other measures are needed for the estimation of platooning measures at lower CV market penetrations. This study utilizes two surrogate measures to estimate the percentage of vehicles in the platoon and the platoon size distribution: the standard deviation of speed between vehicles, and the average of the standard deviations of the speeds of individual vehicles. Relationships between the surrogate measures and platooning measures are then identified and utilized based on the available trajectories data. The results show that the platooning measures can be accurately and reliably estimated at relatively low CV market penetrations based on surrogate measures.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group A - # 5

Electrical and Computer Engineering

The effect of microchannel width on mixing efficiency of microfluidic electroosmotic Mixer

Shahrzad Forouzanfar

This study is focused on electroosmotic micromixer and the effects of driving force are investigated in the sense of different mixing channel width schemes. Two pairs of electrodes are mounted on the sidewalls of mixing channel to provide the required electric field. Various Numerical simulations are performed to assess the fluid flow in the presence of the electrokinetic driving force. Throughout the simulation, the amplitude of the applied field and the flow rate in the mixing channel are kept constant while the width of channel and distance between facing electrodes mounted on the sidewalls of the channel are swept within 100 μm to 300 μm with 50 μm increment steps. Results are extracted in terms of mixing efficiency for the steady and transient state. It is proved that the width of mixing channel has a significant impact on the performance of micromixer due to the corresponding change in effective electric field distribution and driving force along the mixing chamber. Maximum mixing efficiency of 74.8% is achieved at 100 μm channel width and normalized electric field of 3.2×10^4 V/m peak along the horizontal center line. Finally, a fabrication method with three-dimensional electrodes on the sidewalls of mixing channel is demonstrated. This achievement shows that electroosmotic micromixers would have numerous applications following current trends toward nanofluidics and nanotechnology.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group A - # 6

Mechanical Engineering

Seeing through a robot's eyes - Visualization in Robotics

Janhavi Chitale

Starting from 1960's, use of the industrial robot that became identifiable as a unique device along with computer aided design (CAD) and computer aided manufacturing (CAM) systems, characterizes the latest trends in today's automation process. Robotics has become an integral part of life with its applications ranging from manufacturing to healthcare to environmental monitoring. Use of robots in hazardous environments and dangerous situations highlights the utility of modern robots. Algorithms used for programming the robots can be seen as brain power of the robot which controls its sensors which act just like senses in living organisms. Especially for the robots employed for monitoring and sensing activities, visualization capacity of the robot is extremely crucial. This research presents an overview of the various types of visualization algorithms applied in robotics. Basic concept, pros and cons as well as applicability in different situations is discussed.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 1

Health Promotion and Disease Prevention

Racial and Gender differences in HIV Testing among High School Adolescents in the United States: 2015 Youth Risk Behavior Surveillance System

Derrick J. Forney

BACKGROUND: In 2015, youth under the ages of 25 accounted for 22% of all new HIV diagnoses in the United States. We assess the gender and racial differences in HIV testing among youth in the Youth Risk Behavior Surveillance System for 9th -12th grade students. **METHODS:** In high school students who completed the 2015 Youth Risk Behavior Survey. Chi-squared tests were used to analyze gender and racial differences. The study involved (n=14,531) teenagers, including 7,318 females and 7,213 males. **RESULTS:** When examined by sex, 10.8% females had been tested for HIV, 78.2% reported never being tested before and 11.0% reported not being sure. When the data was assessed by gender, 4.7% of all males reported being tested for HIV, 39.8% of all males had never been tested and 5.1% were not sure. There was no significant difference of the likelihood of being tested for HIV between men and women. When examining differences by race, we found that African Americans are significantly more likely to be tested for HIV than any other racial group (p= 0.001). When stratified by race, African American females (16.7%) were more likely than White females (9.4%), Hispanic/Latino females (10.4%), and other races (11.9%) to have been tested at least once (p=0.001). Similarly, African American males (15.8%) were more likely to have been tested at least once compared to White males (8.0%), Hispanic/Latino male (9.9%), and other races (8.8%) (p=0.001). **CONCLUSIONS:** HIV testing is more prevalent among African Americans than any other racial group in high school grades 9-12. The lower rates of HIV testing among Whites maybe due to lower rates of HIV infections and health care providers utilizing findings to discuss HIV testing to different populations.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 2

Chemistry

Analysis of Dissolved Organic Matter from Subtropical Wetlands using tandem Trapped Ion Mobility Spectrometry (TIMS) and FT-ICR MS

Lilian V. Tose

Dissolved organic matter (DOM) is a complex mixture of aromatic and aliphatic hydrocarbons of organic matter present in natural aquatic systems that have many functional groups. However, the enormous complexity of DOM has been shown that high resolution mass spectrometry is a powerful technique for the identification in a molecular level using exact mass measurements. In the present work, the advantages of coupling Trapped Ion Mobility Spectrometer (TIMS) with high resolution mass spectrometry was demonstrated for analysis of DOM. Multiple molecular signatures were observed in the 2D-TIMS plot per mass signal by FT-ICR MS. In both cases, the 2D-TIMS plot showed a single trend line of singly charged species. The number of molecular features identified in the MS and IMS-MS domain are directly related to the resolving power of the TIMS and MS analyzers. Inspection of the MS domain leads to the observation of a single, broad gaussian distribution centered around m/z 400, regardless of the MS analyzer. Closer inspection of the MS spectra allowed the identification of 4,950 and 7,760 m/z signals using TOF and FT-ICR MS, respectively. Assuming a total general formula of $C_xH_yN_0-3O_0-19S_0-1$, 3,050 and 1,430 chemical formulas were assigned in the TOF and FT-ICR MS, respectively. The 80% of the identified chemical compounds corresponded to highly conjugated oxygen compounds (O1-O18). In general, DOM samples (long and short hydroperiod) for each wetland was observed a relative difference of a number of mass peaks and of assigned molecular formulas by FT-ICR MS. The high resolving power of the TIMS analyzer was capable to distinguish structural/conformational isomers according to $1/k$ ($cm^{-2} V.s$) and CCS, which were compared with five isomeric standards. While at low m/z the TOF MS performance is good enough to almost reproduce the FT-ICR MS results, this situation changes as the m/z increases. For example, at m/z 465; while the TOF MS is able to identify the most abundant 8 compounds, it fails to detect a lower intensity distribution containing 4 compounds.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 3

Nursing-Nurse Practitioner

Analysis of Lung Function Measures in Those with Overlap Syndrome (OS)-, Chronic Obstructive Pulmonary Disease (COPD) and Obstructive Sleep Apnea (OSA)

Ingrid Leon

Overlap syndrome (OS) occurs when an individual has both obstructive sleep apnea (OSA) and chronic obstructive pulmonary disease (COPD). The effects of having both COPD and OSA is not entirely clear, and it is possible that the two conditions are not simply additive but synergistic. This systematic review sought to find how OS affects lung function measures, specifically: T90, oxygen saturation, and FEV1. Searches using PubMed and CINAHL yielded a combined total of 216 journal articles, which was reduced to a final eight after setting restrictions and screening the articles for relevance. The articles were then searched for subject data of the aforementioned measures, which were then compiled and analyzed. It was found that T90 was higher in OS patients than in COPD or OSA patients alone, and that oxygen saturation was lower in OS subjects than in those with COPD. However, the effects of OS on FEV1 remain unclear. Incidentally, this review also found that CPAP treatment benefits the nocturnal oxygen saturation of OS patients. Additional research is required to further examine the effects of OS.

Keywords: Overlap Syndrome (OS), Obstructive Sleep Apnea (OSA), Chronic Obstructive Pulmonary Disease (COPD), Spirometry, Polysomnography, Systematic Review

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 4

Biomedical Engineering

Comparison of collagen orientation and distribution in-vivo between non-pregnant and pregnant human cervix using Mueller Matrix polarimetry

Joseph Chue-Sang

Preterm birth (PTB) presents a serious medical health concern throughout the world and maintains a high incidence rate in both developed and developing countries ranging between 11-15%, respectively. PTB can be caused by many different morbidities and ultimately results in the disorganization of cervical collagen and the premature alteration of the cervix mechanical properties. Changes in cervical collagen orientation and distribution may prove to be a predictor of PTB. Polarization imaging is an effective means to measure optical anisotropy in birefringent materials such as those rich in collagen. Non-invasive, in-vivo full-field Mueller Matrix polarimetry (MMP) imaging was conducting using a modified colposcope in a clinical study comparing collagen orientation and distribution between non-pregnant and pregnant patients. Six patients threatening PTB were imaged at the Jackson Memorial Hospital Triage Unit and six non-pregnant patients were image at Florida International University STAR center. In pregnant women collagen distributions changed depending on patient age and number of pregnancies in the non-pregnant population age played an important role in collagen organization.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 5

Civil and Environmental Engineering

Development of Ultra-High Performance Joint Detail for Florida Slab Beam Bridge

Francisco Chitty

The Florida Slab Beam (FSB) is a precast, prestressed, flat-slab beam currently used for short-span bridges (less than about 65 feet) by the Florida Department of Transportation (FDOT). Current the FSB design standard includes a cast-in-place (CIP) concrete deck and joint between adjacent beams. A modified section and longitudinal joint details were desired by FDOT to decrease construction time and enhance durability. The new section and connection geometries will not require a CIP deck and will utilize ultra-high performance concrete (UHPC) in female-to-female joints, which will create an ideal section for accelerated bridge construction applications. An analytical analysis was conducted to determine the transverse moment capacity of eight different models: three 18-inch depth joint models and five 12-inch depth joint models using both regular concrete and UHPC at the connection. A number of different joint details utilizing UHPC were found to have similar performance to the current FSB joint detail with CIP deck and joint region. An experimental investigation is scheduled in the fall for small-scale specimen recreating the same geometry configuration and loading scheme. The specimens that show enhanced strength capacity at the joint connection will be further analyzed by evaluating the complete longitudinal behavior using large scale specimens.

Monday, March 19, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 6

Computing and Information Sciences

Real-time Identification of Movement Similarity

Samia Tasnim

Due to the growth in numbers of various mobile devices, there is also growth in the mobile trajectories. As a result, there exists the research opportunity to find the movement relationship between these mobile nodes. Moreover, the identification of trajectory outliers can lead to the discovery of useful and meaningful knowledge and has a number of practical applications (e.g., transportation, location-based services, public safety etc.). We want to identify the movement similarity and detect trajectory outlier in real-time. We propose a window-based mechanism to identify the group of trajectories that have similar behavior. Our online method operates on the input streams in real-time, rather than traditional offline trajectory clustering and analysis methods. We incorporate semantics annotation in the raw trajectory data in order to discover various movement relationships between sub-trajectories of mobile nodes. Semantics is the piece of information that allows us to give a meaningful value to the data. Adding semantic annotation facilitates various movement pattern identification in mobile trajectory data. Experimental results using a real-world dataset indicate promising outcomes to our proposed trajectory data mining method.

Monday, March 19, 2018

2:00 PM - 2:15 PM

SASC 100

Civil and Environmental Engineering

Holistic Testing to Determine the Efficacy of a Retrofit Technique for Residential Buildings

Ziad Azzi

Roof-to-wall connectors in residential buildings, in the form of metal hurricane clips, are often damaged during hurricane events. Non-intrusive Fiber Reinforced Polymer (FRP) connections are considered useful replacements or retrofitting alternatives for intrusive metal connectors for roof-to-wall connections in residential buildings. FRP connections are advantageous as they are nonintrusive and corrosion resistant as opposed to metal connectors. FRP connections were prepared and tested at the Wall of Wind (WOW), which is a large open jet wind testing facility capable of simulating hurricane winds at different speeds and up to 157 mph, which represents a Category 5 Hurricane. Prior to WOW testing, the FRP sheets with different length scales were individually tested in the structures lab to determine their pull out strengths. Based on the results, a 1:2 scale FRP sheet was used to develop the roof to wall connection in a 1:4 scale model of a typical wooden residential house with a gable roof. The model was exposed to wind speeds ranging between 60 mph and 120 mph at the mean roof height. Initial results showed that the uplift load capacity of the FRP connection is adequate for resisting wind induced loads at high wind speeds (up to 115 mph, Category 3 Hurricane). In addition, the WOW tests were also used to experimentally validate the theoretically calculated failure wind speed for the connection. A close agreement was obtained between the theoretical and experimental failure wind speeds. It was concluded that theoretical failure wind speeds for a given roof configuration can be accurately estimated from component level testing for the uplift capacity of the connection and aerodynamic loads calculated based on current building standards (such as ASCE 7). The effective design and development of non-intrusive roof to wall connections can significantly reduce property losses in tropical storms and hurricanes, thus positively impacting the economy of the U.S and the safety of its citizens.

Monday, March 19, 2018

2:15 PM - 2:30 PM

SASC 100

Health Promotion and Disease Prevention

E-TIME Enhanced Text-messages to Increase Motivation to Exercise

Ari Hozman

Background: Approximately 21% of U.S. college students are obese and 15% are overweight. Insufficient levels of physical activity is a primary cause of obesity. Less than half of all college students meet minimum physical activity recommendations. Text-messaging based interventions have been shown to be effective in increasing exercise among sedentary populations. Our aim was to assess the effectiveness of a text-messaging intervention on increasing frequency of physical activity and knowledge of on-campus locations to exercise among college students. Methods: A 4-week 2-arm randomized controlled trial was conducted. Two classes of undergraduate students were randomized into either experimental arm (n=14) or control arm with no intervention (n=16). Participants in the experimental arm received 18 text-messages, decreasing in frequency over the time-period. Text-messages were developed using the theory of planned behavior as a framework. Frequency of weekly physical activity and knowledge of on-campus locations to exercise were measured at baseline and follow-up. Cross-tabulations and repeated measures ANOVA were conducted. Results: The intervention arm showed a significant increase in weekly physical activity from 3,487 METS-minutes per week at baseline to 4,839 METS-minutes per week at follow-up ($p < 0.05$), compared to no significant increase in weekly physical activity in the control arm. The intervention arm showed a significant increase in knowledge of on-campus locations to exercise from baseline to follow-up ($p < 0.05$), compared to no increase in the control arm. Conclusion: A text-message based physical activity intervention is a feasible and effective method for increasing physical activity and knowledge of locations to exercise in college students.

Monday, March 19, 2018

2:30 PM - 2:45 PM

SASC 100

Civil Engineering

Morphology-Oriented Multiscale Mechanics of Geologic Materials using Hybrid Numerical-Experimental Framework

Sumana Bhattacharya

Geologic materials such as soil and rock are particulate in nature, which inherently enables them to exhibit multiscale behavior. It is widely known that particle size and morphology play very important roles in macroscale behavior of geologic materials. Particle morphology has widely been characterized at three different morphologic scales: global form, local angularity and surface texture. Previous researches focus on investigation of aggregate morphology with aggregates collected from different locations, e.g. river banks, quarries etc. Although efficient, the main drawback of these researches are the integrated effect of particle morphology and material constituents. The acquisition of a specific morphology aggregate is often an expensive affair since a particular morphology is available only from some particular locations, thus hindering efficient and systematic investigation. Numerical simulation is often computationally expensive. A hybrid framework using experiments with 3D-printed particles give us better control over morphology. The understanding of the relative influence of individual morphology components is not well-known since natural aggregates are a conjunction of different morphology components and constituent materials. The hybrid framework gives us the flexibility to independently analyze the effect of different morphology components and enables us to address the gap of better understanding the effect of particle morphology. In this study, a 2D morphology space with X-axis as global form and Y-axis as local angularity is used to systematically characterize particle morphology. Wadell sphericity and roundness are used as descriptors for form and angularity respectively. 9 particles with specific sphericity and roundness are generated and 3D-printed. Laboratory direct shear tests have been conducted on each particle in both loose and dense states at 4 different normal stresses. Out of these 9 particles, 4 particles have extreme values of sphericity and roundness enabling us to examine the behavior of particles having extreme morphologic features. All the particles have the same volume so that the number of contact points between them are approximately the same. The shear stress and volume change behavior for individual particles for each test conditions will be discussed to show the effect of each morphology component.

Monday, March 19, 2018

2:45 PM - 3:00 PM

SASC 100

Physics

Tagging Algorithm for Resolved Top Quark Decays

Yagya Joshi

Many of the Super Symmetric particles searches model in Compact Muon Solenoid (CMS) experiment at Large Hadron Collider (LHC) have two or more top quarks produced in p-p collision. As lifetime of top quark is very short ($5\text{--}10 \times 10^{-25}$ s), it decays into W boson and bottom quark, W eventually decaying into leptons or hadrons. Final state of the process will have many hadrons reconstructed as collimated stream of particles called “jets”. So reconstructing top quark from decay product is very important in those searches. Here we present the Multivariate Analysis algorithm to reconstruct the top quark with great efficiency and much lower fake rate. Results are compared against traditional cut and count method.

Monday, March 19, 2018

3:00 PM - 3:15 PM

SASC 100

Social Work

Risk and Preventive Factors in Refugees' Substance Use: Case of Afghans in Iran

Mitra Ahmadinejad

Problem Statement: There are reasons to believe that Afghan refugees are at high risk of illicit drug use. However, prevalence of use and risk and protective factors among this population are understudied. Research Objectives: Against this background, this study aims to estimate prevalence of substance use and potential risk and protective factors in this area among Afghan refugees in Iran. Research Methodology: In this study, prevalence of use was estimated using a cross sectional dataset on 2,034 Afghan households. Risk and protective factors for substance use were identified through semi-structured interviews with eight key informants. Chi square test was used for bivariate analysis and penalized likelihood logistic regression model was used for multivariable analysis between identified risk and protective factors and incidence of substance use at household level. Results/Conclusions: Findings indicate that on one in every 24 refugee households had at least one member using substances at the time of the survey. Results also suggest higher rates of substance use among refugees in settlements, illiterate households, and households with lack of job security. Contribution/Significance: This research is one of the first to study substance use among Afghan refugees in Iran. There is a need for further studies in this field, but findings call for more attention to drug prevention and treatment among Afghan refugees in Iran.

Monday, March 19, 2018

1:00 PM - 1:15 PM

SASC 202

Physics

Detection and manipulation of single nanoparticle (NP) dynamic assembly process by the integration of nanopore and nanoelectrode

Popular Pandey

Nanopore and ultras-small electrode are two promising electrochemical methods for single entity studies. However, sensitivity and the selectivity of these methods are still limited. In recent years, simultaneous multiparameter detection methods have received wide attention for improving the sensitivity and selectivity of individual methods. In this talk, I will show that the two methods (nanopore sensing and nanoelectrode sensing) can be incorporated together to study single nanoparticle (NP) in solution by using a multifunctional nanopipette that contains both nanopore and nanoelectrode at the nanopipette apex. Based on the complementary and correlated ionic current from the nanopore and potential signals from the nanoelectrode, we can unambiguously differentiate various single NP events. In addition to single NP events, the dynamic assembly of NPs can be manipulated and investigated in detail by both nanopore and nanoelectrode.

Monday, March 19, 2018

1:15 PM - 1:30 PM

SASC 202

Civil and Environmental Engineering

Local and Global Strain-Based Corrosion Detection Technique for Highway Bridges

Dewan Hossain

Corrosion monitoring of steel-reinforced concrete structures with embedded sensors can be used to complement the common inspection techniques. Restricted access locations such as in bridge internal post-tensioned ducts and in tunnel applications, the chances to fix the embedded sensors are subjected to get damaged by weather or vandalism are very limited. In this research, the performance of concrete structures is to be evaluated based on the local and global corrosion sensing techniques. Global behavior monitoring of the structure involves monitoring of the dynamic properties of the structure. However, as the structure undergoes changes, average strain along the length of the member can deviate from the expected value (e.g., undamaged average strain). In the preliminary study, finite element simulation has been conducted on a 75-ft Florida I-beam (FIB-36) where incremental mass losses such as 5%, 10%, 15%, 20%, 40% , 60% and 75% have been applied in post-tensioned strands. The changes in top and bottom fiber strain due to this changes along with cracking and ultimate load capacity profile of FIB-36 has been compared to identify micro-level changes in strain-based behavior due to corrosion damage. This approach is useful quantify prestress losses due to corrosion and would allow practicing engineers to give guidance on where sensors can be used most efficiently using this local and global sensing technique.

Monday, March 19, 2018

1:30 PM - 1:45 PM

SASC 202

Music

**Case Study of the Eastern Band of Cherokee Indian's Language Immersion School
Music Program**

Raven Reynolds

Beginning in the middle of the 20th century, with a resurgence of tribal agency and a determined push for legislation that protected indigenous culture and treaty rights, Native American tribes are experiencing cultural revitalization of their languages, arts, and religion. An exercise in their agency has been to create language immersion schools on tribal land that integrate state-mandated curricula but are taught in the tribal language and incorporate traditional arts and culture into the curriculum. This case study looked at the ways in which indigenous identity is developed and affirmed when represented in the music education program of the New Kituwah Academy language immersion school of the Eastern Band of Cherokee Indians. The purpose of this study was to examine ways in which teaching in this specialized environment has helped to shape the identity of the music educator as he navigated barriers that presented themselves when trying to straddle the line between state-mandated curricula, total language immersion methodology, and the cultural heritage of his students. The literature review supports the importance of this case study by highlighting the lack of research on Native American music education pedagogy and the educators who teach in these indigenous communities. This lack of multiplicity in educator perspectives has resulted in the research on identity development to largely focus on teacher efficacy and musicianship within the traditional K-12 setting. Additionally, the trend of cultural inaccuracy present in the curricular resources available to music educators is analyzed using a model for indigenous education that is culturally responsive, authentic, and self-affirming. Data for this single case study was generated through classroom observations, field notes, audiovisual recordings, and semi-structured interviews with the educator. The data analysis was qualitative in nature to allow the researcher to provide a detailed case study within the context of Kituwah, Cherokee's language immersion school's music program. It provided the music education community a specific context for the successful and respectful integration of indigenous culture within the music classroom. In addition, it may contribute a unique teacher perspective that could help refashion the philosophical and pedagogical framework of pre-service and in-service educators.

Monday, March 19, 2018

1:45 PM - 2:00 PM

SASC 202

Business Administration

#FOMO: How the Fear of Missing Out Drives Consumer Purchase Decisions

Michelle van Solt

The fear of missing out (FOMO), defined as “pervasive apprehension that others may be having rewarding experiences from which one is absent” (Przybylski et al., 2013), has been seen as a motivator for individuals to take action. This paper focuses on consumers’ experiential purchase decisions motivated by FOMO. More specifically, we explore the situational factors that result in higher levels of FOMO for consumers, thereby addressing issues such as: (1) which social groups (i.e., close vs. distant) are capable of instilling more FOMO in individuals and (2) which type of experiences (i.e., ordinary vs. extraordinary) results in higher levels of FOMO. We also distinguish FOMO from anticipated regret. Given that there is little empirical consumer research on FOMO, it is important to clearly identify FOMO’s antecedents in order to further understand this phenomenon. The results of two empirical studies showed that purchase intent is higher when participants imagined that their close, rather than their distant, social groups will attend, an effect mediated by FOMO. In the first study, participants anticipated feeling higher levels of FOMO when a close social group, as opposed to a distant social group, was attending a local music festival, also leading to higher purchase intent. A mediation analysis demonstrated the mediating role of FOMO on the effect of social group to purchase intention. In the second study, we test how the type of experience (ordinary, extraordinary) moderates the relationship of social groups (close, distant) on FOMO. By manipulating the music festival scenario one with extraordinary conditions (i.e., favorite band, VIP passes with backstage access, etc.) and ordinary conditions (i.e., unknown local bands only, general admission, etc.), participants reported experiencing more FOMO with their close friends for an ordinary event than an extraordinary one as demonstrated by a moderated mediation that is statistically different from zero. The social element which is a key component in FOMO is not important when it comes to anticipated regret serves as a main distinction between the FOMO and anticipated regret. These findings provide evidence of the circumstances that can result in greater feelings of FOMO and consequently in purchase intent.

Monday, March 19, 2018

2:00 PM - 2:15 PM

SASC 202

Psychology

**Restricted Diffusion Imaging (RDI) of the human corpus callosum in children and adults:
Evidence of the use of RDI as a metric of axonal packing density**

Dea Garic

Restricted diffusion imaging (RDI) is a novel diffusion-weighted neuroimaging metric that is proposed to measure cellular and axonal density (Yeh et al, 2016). This metric has been shown to be sensitive to tumors and inflammation within the rat brain, but it has never been tested to measure axonal density within the developing human brain. Our study aimed to use this in vivo imaging method to replicate anterior-to-posterior distribution of axonal density in the corpus callosum that are well-established in post-mortem tissue (Aboitiz et al, 1992). We hypothesized that, because it was designed to be sensitive to cellular density, the novel RDI metric would be the only diffusion metric currently capable of replicating the classic corpus callosum density pattern in both adult and developing samples. Our participants were 840 adults from the human connectome project (HCP) database (undisclosed exact ages, age range= 20-40 years) and 129 infants, children, and adolescents ($M= 8.67$ years) from the C-Mind database. In both samples, we were able to match the histological density patterns seen in post-mortem tissue. Specifically, contrast analyses showed a high degree of fit between the density patterns from the Aboitiz model and our adult sample, $t(839) = 167.99$ $p < .001$, and developing sample, $t(126) = 227.4$, $p < .001$. We also showed that the pattern was only apparent for RDI. The anterior-posterior distribution of other metrics, which included generalized fractional anisotropy (GFA), quantitative anisotropy (QA), fractional anisotropy (FA), radial diffusivity (RD), axial diffusivity (AD), and mean diffusivity (MD), did not match the pattern revealed in post-mortem tissue. These findings provide preliminary evidence in support of the RDI metric's sensitivity to cellular density and could potentially have large implications for clinical neuro-assessments in the future.

Monday, March 19, 2018

2:15 PM - 2:30 PM

SASC 202

Chemistry and Biochemistry

Insight on the surface chemistry of bimetallic nanostars: capping agents and Stability

Chiara Deriu

Anisotropic nanoparticles represent the state-of-the-art substrates for surface-enhanced Raman spectroscopy (SERS), and there is great interest in the development of facile synthetic strategies that achieve these morphologies in a seedless, one-pot, and surfactant-free manner. However, the absence of surfactants as shape directors poses challenges in maintaining the stability of the colloid, and detergents such as CTAB are generally added post-synthesis as stabilizers. This hinders the SERS signal via the formation of a bilayer that prevents a close contact between analyte and metal surface. Ideal capping agents for SERS substrates, on the other hand, should ensure a shelf-life to the colloid without interfering with the SERS measurement. A published protocol for the surfactant-free synthesis of unstabilized bimetallic Au/Ag nanostars was selected as a basis to study alternatives to CTAB as stabilizing agent to be added post-synthesis. DLVO theory of colloid stability was used as a criterion for the selection of candidate stabilizing agents, and UV/Vis spectroscopy was used to evaluate the stability of the colloidal preparations over time. XPS, Zeta potential measurements, and infrared spectroscopy were used to investigate the surface chemistry of the nanostars, and the interaction modes of the candidate stabilizers. Preliminary results obtained from decay studies indicate a pattern of increased capping efficacy for candidate agents bearing carboxylate functions, suggesting that the driving force in the capping process is not purely electrostatic in nature.

Monday, March 19, 2018

2:30 PM - 2:45 PM

SASC 202

Philosophy

The Myth of Personal Identity: The Self as Embodied and Incomplete

Antonina Shachar

The problem of personal identity - what makes someone the same person across their lifespan - arose in antiquity and continues to be debated in modern philosophical, psychological, and theological disciplines. Although numerous theories have attempted to settle the debate, none have led to a consensus. I suggest this is due to an underlying fallacy common to most theories of personal identity: mind-body dualism. My proposed solution arises from research in developmental psychology, cognitive neuroscience, and phenomenology: the self is embodied. In much the same way a song emerges from the orchestration of melody, harmony, key, metre, and rhythm, the self emerges from the dynamic interplay of biological development, conscious choices, and the environmental constraints posed upon them. And, like a song, the self is a process whose full meaning can only be gleaned upon its completion (i.e. death). Supporting evidence for the embodied self is reviewed and a cohesive theory of personal identity established. Pivotal problems in personal identity, such as cases of fission and fusion, are investigated and answered in light of this theory. Situated at the intersection of philosophy and cognitive neuroscience, this research project addresses the necessary and sufficient conditions for the persistence of the self through time. The proposed theory is intuitive, fits with our current scientific worldview, retains the “importance” of personal identity, and has action-guiding potential in ethics. Ethical implications fall into the following domains: personal (the status of embryos and humans in vegetative states), legal (the validity of contracts and statutes of limitations), and technological (the consequences of mind-uploading and brain-body interfaces).

Monday, March 19, 2018

3:15 PM - 4:30 PM

SASC 100

Group A - # 1

Electrical and Computer Engineering

A System for Non-Intrusive Affective Assessment in the Circumplex Model from Pupil Diameter and Facial Expression Monitoring

Sudarat Tangnimitchok

Background- This paper outlines a system for non-intrusive estimation of a computer user's affective state in the Circumplex Model from monitoring the user's pupil diameter and facial expression. The pupil diameter parameter will be collected from an EyeTech TM3 eyegaze tracker (EGT) while the parameters from facial expression will be obtained by a RGB-D camera (KINECT). Problem- Normally, the computer response is typically mechanistic and disregarding the affective status of the user. Affective Computing seeks to enable the computer to sense the user's affective state, implement a machine's affective model, and express an appropriate affective state of its own. In this work we outline the system we propose to estimate the user's affective state in the Circumplex Model of Affect by non-intrusive methods, using pupil diameter and facial expression monitoring. Methodology- In the Circumplex Model of Affect, affective states are defined by two independent neurophysiological systems which are referred to as "arousal" and "valence". By estimating the user's level of arousal, from changes in pupil diameter and the valence, obtained through facial expression detection, we intend to place the affective state of the user in the circumplex model. Recent studies suggest that pupil diameter increases when the test subjects experience sympathetic activation from exposure to stressor stimuli while the size decreases when they are exposed to a calm and relaxed condition. As humans we use our eyes to observe the changes in facial muscles that define facial expressions and then we interpret those expressions. The valence estimation method proposed utilizes an RGB-D camera (KINECT) as the computer's eyes. Kinect provide a wide variety of functionalities including the delivery of 94 unique "shape units" to create meshes that fit and track our face in real-time. It also provides facial points marking important locations. This allows the tracking of the movement of facial muscles in a way similar to the placement of physical markers on the user face, but in a less intrusive way. By integrating the principles of the Facial Action Coding System (FACS), it is possible to code the facial expressions of known affective significance.

Monday, March 19, 2018

3:15 PM - 4:30 PM

SASC 100

Group A - # 2

Biomedical Engineering

Low Cost, Portable Mueller Matrix Polarimeter for Cervical Health Determination

Mariacarla Gonzalez

Preterm birth (PTB) presents a serious medical health concern throughout the world and maintains a high incidence rate in both developed and developing countries ranging between 11-15%, respectively. PTB can be caused by many different morbidities and ultimately results in the disorganization of cervical collagen and the premature alteration of the cervix mechanical properties. Changes in cervical collagen orientation and distribution may prove to be a predictor of PTB. Polarization imaging is an effective means to measure optical anisotropy in birefringent materials such as those rich in collagen. Non-invasive, in-vivo full-field Mueller Matrix polarimetry (MMP) imaging was conducted using a modified colposcope in a clinical study comparing collagen orientation and distribution between non-pregnant and pregnant patients. Six patients threatening PTB were imaged at the Jackson Memorial Hospital Triage Unit and six non-pregnant patients were imaged at Florida International University STAR center. In pregnant women collagen distributions changed depending on patient age and number of pregnancies in the non-pregnant population age played an important role in collagen organization.

Monday, March 19, 2018

3:15 PM - 4:30 PM

SASC 100

Group A - # 3

Biological Sciences

Applications of Molecular Methods to Improve Diet Resolution of Gulf of Mexico Red Snapper

Alexander Shenton

The desire for a more holistic approach to fisheries management, beyond single species, is clear at both a global level from UN resolutions, and mandated in our current federal fisheries management policy. Including even the simplest of interspecific interactions, predator-prey interactions, could greatly improve management. Red snapper (*Lutjanus campechanus*), and with one of the largest body of diet research is an excellent candidate for multispecies management. However, understanding direct interactions is not only a matter of the quantity of diet data you have, but also the quality. Unless prey are identified to the species level, it is difficult to implement predator-prey relationships into a stock assessment. The large majority of red snapper diet information is derived from visual identification of gut contents, Gut contents analysis (GCA). Much of the material recovered from these stomachs is unidentifiable chime, and of the remaining material little of it can be visually identified to a high level of taxonomic resolution. Molecular techniques such as stable isotope analysis, genetic barcoding, and next generation sequencing have the potential to overcome the shortcomings of visual GCA. Few studies have applied these techniques to red snapper, or have done so at a small scale. In this project, we will review various molecular methods that could improve GCA, the advantages and disadvantages of each method, the ways they have been used to inform diet studies of red snapper and other species, as well as their future applications.

Monday, March 19, 2018

3:15 PM - 4:30 PM

SASC 100

Group A - # 4

Dietetics and Nutrition

Has The Duration and temperature of Lysis Buffer Been Minimized for The Comet Assay?

Alhanoof Alohalay

The single cell-gel electrophoresis also known as the comet assay, is a method of choice for measuring different types of DNA damage in individual eukaryotic cells. Performing the comet assay occupies three days, excluding the final image analysis. The comet assay includes: lysis overnight (day 1), electrophoresis and neutralization (day 2), staining (day 3) and then scoring using the fluorescent microscopy. Although the comet assay is a sensitive, specific and reliable methodology, yet, it is very time-consuming. Therefore, the aim of this study was to minimize the duration of the comet assay by examining the effect of the lysis buffer temperature and the duration of the lysis step on the efficiency of this assay. Experiments were conducted using human dermal keratinocytes (HaCaT cells) as a model system, (untreated or treated with 50 μ M H₂O₂) to compare the lysis buffer temperature at 4°C and room temperature for multiple time courses: 0.5 - 4 h and overnight. Treatments were performed in duplicates for each case. After the electrophoresis and neutralization steps were conducted, the percentage tail DNA on comets were scored using Comet IV software. A key finding was that there were no significant differences in the level of DNA damage between cell lysis at 4 °C for an overnight or for 30 min at room temperature. This finding suggests that it is possible to minimize the length of the comet assay by reducing the duration of lysis step to 30 min at room temperature.

Monday, March 19, 2018

3:15 PM - 4:30 PM

SASC 100

Group A - # 5

Biomedical Engineering

Developing a mathematical model for functional uncoupling in the stomach

Ashfaq Ahmed

The stomach exhibits a characteristic slow wave of contraction. Slow waves originate from dominant pacemaker cells within the stomach wall along the greater curvature in the mid-corpus and spread aborally through the antrum to the pyloric sphincter. These slow waves exhibit three primary patterns of propagation. Under normal slow wave activity, the antrum slow wave, whose intrinsic frequency is less than that originating from the corpus, is entrained by the slow wave originating in the corpus. Under some pathological states, Interstitial Cells of Cajal (ICC) in the myenteric plexus within the antral region become local pacemakers. The slow waves generated there propagate backwards and collides with the waves coming from the corpus resulting in disruption of gastric peristalsis and delayed gastric emptying (gastroparesis). This scenario is called functional uncoupling of the contractions of the stomach. To better understand the mechanisms underlying the functional uncoupling, we are computationally modeling the slow waves as being generated either by a chain of coupled oscillators or as a chain of interconnected biophysical circuits of networks of cells. The oscillator model is based on Aliev's work² which models the intestine as a syncytium of ICC and longitudinal muscle cells. The biophysical circuit model is based on the work by Corrias and Buist³ to mimic the propagation of the slow wave. The cells will be modeled with a frequency gradient with the rostral most cell having the highest frequency and caudal most cell having the lowest frequency. The cells will then be coupled so that all of them are entrained at the same frequency. After establishing the chain model, uncoupling will be introduced by changing the concentration of inositol trisphosphate (IP₃) at different locations in the biophysical model which is supposed to change the intrinsic frequencies accordingly and changing the excitability of different cells in oscillator model. By modeling functional uncoupling in stomach, we can use this model to study different gastrointestinal disease, especially motility related diseases.

Monday, March 19, 2018

3:15 PM - 4:30 PM

SASC 100

Group B - # 1

Mechanical and Materials Engineering

Electrostatic Spray Deposited Sn-SnO₂-CNF Composite Anodes for Lithium Ion Storage

Amin Rabiei Baboukani

Metals and metal oxides as anode materials for Li-ion batteries and supercapacitors are of significant interest to many potential technologies because of their high theoretical capacity value, low price, and environmentally friendly features. In spite of these considerable benefits and ongoing progress in the field, momentous challenges exist, especially structural disintegration due to volume expansion of electrode materials. In this study, the direct synthesis of electrospun tin based composite with CNF prepared directly on a nickel foam current collector using the electrostatic spray deposition (ESD). This binder free approach provides some advantages such as the controllability of the nanostructure morphology and scalable manufacturing capabilities. The electrochemical performance of the Sn-SnO₂-CNF composite synthesized by electrostatic spray deposition as an anode material for Li-ion batteries were evaluated by cyclic voltammetry and charge-discharge experiments. The composite material showed large discharge capacity of 1117.5 mAhg⁻¹ after 30 cycles and also a high rate capability. In this presentation, the cycling stability and rate capability of samples will be presented in a half-cell assembly against Li/Li⁺. Moreover, the feasibility of creating anodes and the results of characterization of the active materials will be discussed.

Monday, March 19, 2018

3:15 PM - 4:30 PM

SASC 100

Group B - # 2

Environmental Health Science

: ID3 mediated vascular reprogramming of PCB exposed endothelial cells and its potential contribution to lung tumorigenicity

Mayur Doke

ID3, a transcription regulator, has been shown to contribute to the aggressive spread of certain cancers by facilitating the generation of tumor blood vessels. Tumor vascular cells characterized as CD133+ endothelial stem/progenitor cells are associated with poor prognosis in lung cancer. Previously, we have shown that ID3 overexpression reprograms adult endothelial cells to acquire vascular stem markers including CD133. However, little is known regarding the molecular contribution of ID3 to tumor vascular reprogramming and how this may impact the aggressive growth of lung cancer. In the current project, we evaluated ID3 mediated vascular reprogramming upon polychlorinated biphenyl (PCB) exposure. This idea is consistent with the literature, which shows that PCBs accumulate in the human lung; PCBs produce pathological vascular remodeling; high levels of PCBs are found in human lung tissue; and epidemiological studies associating lung toxicity with PCBs. Recent studies identify PCB153 as one of the largest contributors for total PCB body burden in humans. Using human lung endothelial and smooth muscle cells, we exposed ID3 overexpressing and vector control cells to PCB153. We observed a significant increase in cell proliferation as determined by the BrdU incorporation assay and FACS analysis. Similarly, a 3D HuBiogel model, which mimics in vivo conditions, showed a significant increase in size and number of vascular spheres upon PCB153 treatment. Pluripotent vascular stem cells showed the loss of VE-cadherin and gain of MMP9, N-cadherin, and vimentin, which are markers of endothelial-mesenchymal transition. RNA-seq analysis showed that PCB153 exposed vascular stem cells had a significant increase in lncRNAs MALAT1 (Metastasis Associated Lung Adenocarcinoma Transcript 1) and HIF1A-AS2. A combination of ChIP-seq and transcriptome analysis identified significantly up-regulated genes (HES1, WEE1, E2F2) and down-regulated genes (SMURF2, CDKN2C, SH2B3). Our findings suggest that ID3 mediates vascular reprogramming through transcriptional regulation of pluripotency factors and epigenetic regulating lncRNAs. ID3 may also serve as a novel diagnostic/prognostic indicator for evaluating chemical-induced vascular reprogramming. Its potential application may be useful in identifying individuals who are susceptible to aggressive lung cancer from exposure to vascular toxicants.

Monday, March 19, 2018

3:15 PM - 4:30 PM

SASC 100

Group B - # 3

Civil and Environmental Engineering

New Connection Detail to Connect Precast Column to Cap Beam Using UHPC in ABC Applications

Mohamadreza Shfieifar

Accelerated Bridge Construction (ABC) is a paradigm change in delivery of bridges. ABC minimizes the traffic interruption, enhances safety to public and workers by significantly reducing onsite construction activities and results in longer lasting bridges. The use of precast elements is gaining attention owing to inherent benefits of accelerated construction. Designing an economical connection is the main concern for these structures. New improved materials such as Ultra High Performance Concrete (UHPC) with superior characteristics can provide solutions for joining precast concrete elements. UHPC is a cementitious material with a compressive and tensile strength much more than regular concrete, durability, improved toughness and increased damage tolerance making it well-suited for use in heavily loaded structural components. In this research two types of column to cap beam connection using UHPC are proposed for seismic and non-seismic regions. Among the merits of the proposed detail are large tolerances in construction and simplicity of connection, which facilitates and accelerates the on-site construction time. The experimental program was carried out to evaluate the performance and structural behavior of the proposed connection. Four specimens were subjected to constant axial compressive loads and cyclic lateral loading to study the effect of the axial load and stirrup spacing in the plastic hinge and splice region. Experimental results show an acceptable behavior of the proposed detail. The displacement ductility of the specimens incorporating suggested seismic details demonstrated adequate levels of displacement ductility.

Monday, March 19, 2018

3:15 PM - 4:30 PM

SASC 100

Group B - # 4

Chemistry and Biochemistry

Utilizing Inhibition of Exonuclease Digestion on Target-Bound Aptamers to Sensitive Detect Small-Molecule Targets

Juan Canoura

Here, we demonstrate for the first time that the digestion of aptamers by exonuclease III can be inhibited upon binding of a small-molecule target, and utilized this finding to achieve sensitive small-molecule detection with unmodified, pre-folded aptamers. We show that the target binding of an aptamer halts exonuclease III digestion four bases prior to the binding site. The double-stranded inhibition product retains strong target affinity, whereas digestion of unbound aptamer produces a single-stranded product incapable of target binding. Exonuclease I efficiently digests these single-stranded products, but is incapable of digesting the target-bound double-stranded product. The remaining products can subsequently be detected fluorescently using SYBR Gold. We demonstrate that this dual-exonuclease approach can be broadly applied to aptamers with various secondary structures to achieve sensitive detection of small-molecule targets with sub-micromolar limits of detection. Critically, this approach does not depend on any meaningful binding-induced conformational change, and can be employed with unmodified folded aptamers for a variety of small-molecule targets.

Monday, March 19, 2018

3:00 PM - 3:15 PM

SASC 251

Biological Sciences

Eye in the sky: Using Unmanned Aerial Vehicles (UAVs) to quantify both coral structure and invertebrate density in shallow water marine environments

James Kilfoil

Coral reef ecosystems are experiencing degradation at a global-scale due to the effects of climate change, overfishing, and other anthropogenic stressors. It is imperative that resource managers be able to track changes in the structure and dynamics of these ecosystems if future recovery efforts are to be successful. Visual counts from SCUBA divers are the dominant method by which this type of information is currently gathered. However, this approach has a number of limitations including its high cost, observer errors, and assumptions regarding species distributions. The rapid development of Unmanned Aerial Vehicles (UAVs) may offer an emerging solution to these issues. In August 2014, we conducted the first study using UAVs to quantify the density of coral structure and invertebrates present within a shallow-water nursery in Tetiaroa, French Polynesia. During a one-week period, we flew a total of 56 transects (8 per day) over an area of 1200 m². Although UAVs were successful in enumerating both coral structure and marine invertebrate density, the processing time required to manually review video footage limited the feasibility of this technique. Accordingly, we used image processing procedures (i.e., background subtraction, morphological erosion) to automate the review process, generating precise density estimates of invertebrates (i.e., sea cucumbers) and coral structure over a relatively large area, in near real-time. Furthermore, by subsampling our UAV data into finer scale sampling units (i.e., $\approx 10\text{ m}^2$), we were able to evaluate the uncertainty of density estimates obtained from traditional area-limited sampling techniques such as diver and snorkeler transect counts.

Monday, March 19, 2018

3:15 PM - 3:30 PM

SASC 251

Electrical and Computer Engineering

A Moving Target Defense and Network Forensics Framework for ISP Networks using SDN and NFV

Abdullah Aydeger

With the increasing diversity of attacks, there is a trend towards building more agile networks that can defend themselves or prevent attackers to easily launch attacks. To this end, moving target defense (MTD) mechanisms have started to be pursued to dynamically change the structure and configuration of the networks not only during an attack but also before an attack to make the network reconnaissance harder. Furthermore, network forensics mechanisms are introduced to help locate the source and types of attacks. Emerging SDN and NFV provide excellent opportunities to implement these mechanisms efficiently. This paper studies MTD and forensics mechanisms in the context of an ISP and proposes an architectural framework that will facilitate their implementation. We propose various shadow networks and hosts through NFV to be used when implementing MTD mechanism via route mutation. The idea is to relay any network reconnaissance packet to such shadow networks so that attackers will not be able to identify the actual network topologies. We implemented this framework in Mininet and tested the efficiency of different architectural options. The results indicate that network reconnaissance can be prevented and the overhead at controller can be reduced at the expense of slight delays in the network.

Monday, March 19, 2018

3:30 PM - 3:45 PM

SASC 251

Psychology

Is low social class a stigmatized identity at work?

Anna M. Kallschmidt

Despite recognizing that socioeconomic standing can influence workplace behavior, research in industrial-organizational psychology has yet to explore social class as an identity at work, including the potential for low social class to function as a stigmatized identity. Due to the dearth of research on class in the workplace, we used qualitative methods to establish whether having a lower social class background might be experienced as a stigmatized identity for employees. In a sample of 20 White men who self-identified as having come from a lower social class, we used interview methods to probe the nature of social class concealment and disclosure at work, including reasons related to the situation, motives, and person(s) involved. Thematic analysis revealed five reasons why these White men concealed their former, lower class status at work: Judgment, Nobody understands, It's personal, Pity, and Don't want to feel embarrassed or vulnerable. The analysis also revealed five reasons why participants disclosed their previous identity at work: being Forced to, To relate, To motivate/help somebody, Noticing class cues, and Becoming close. Results indicate that the disclosure of a low social class background is more common than concealment in this group, though the disclosure may be forced. Our results also indicate that disclosure of lower social class is an ongoing process and happens unevenly across time and across people. Future research should examine the experiences of those from other identity intersections, since being a woman and/or person of color, for example, is likely to alter the experience of class stigma and disclosure at work.

Monday, March 19, 2018

3:45 PM - 4:00 PM

SASC 251

Teaching and Learning

An Insight into Motivations and Effects for Code-Switching in Conversations among Vietnamese EFL Learners

Dung Nguyen

Yes, code-switching is a skill and a strategy and it is something to be proud of! (Nortier, 2011)
Code-switching is a widespread linguistic phenomenon among bilinguals. A person who is proficient in two languages tends to use both interchangeably. The phenomenon is commonly witnessed among English as a Foreign Language (EFL) learners of high English proficiency. However, thus far, there has been a very limited amount of research on code-switching of EFL learners. Current research seeks to gain an insight into motivations and effects of code-switching phenomenon among Vietnamese EFL learners. Specifically, the research addresses four main questions related to why, how, and when code-switching takes place, and to what extent code-switching has effects on advanced EFL learners as language agents and their interlocutors. In order to tap into in-depth code-switching beliefs and attitudes of the research participants, semi-structured interviews were used as the data collection instrument. A purposive sample of seven advanced EFL learners, who identify themselves as Vietnamese-English bilinguals currently living in Vietnam, were invited to participate in the interviews. The research findings show that code-switching occurs for the intra- and inter-personal communication modification purposes. Thus, code-switching should be viewed as a natural linguistic act and communicative strategy among advanced EFL learners, instead of a language deficiency. Their ability to alternate between two different systems of languages reflects a high level of the linguistically cognitive process. Code-switching should be accepted and encouraged as long as it fits the communication contexts, and places both bilinguals and their speech partners at ease.

Monday, March 19, 2018

4:00 PM - 4:15 PM

SASC 251

Civil and Environmental Engineering

Experimental Assessment of Wind Loads on Vinyl Wall Siding

Mohammadtaghi Moravej

Wind-induced damage to multi-layer building wall systems, such as systems with vinyl siding, is common, especially in hurricane-prone areas. Wind load distribution through these multi layered walls and the amount of load reduction due to pressure equalization is expressed through pressure equalization factors (PEFs). The ASTM D3679 standard suggests a PEF of 0.36, which means a 64% reduction in the net pressure on the siding. This paper presents results from an experimental study conducted on a low-rise building subjected to realistic wind loading conditions at the wall of wind (WOW) experimental facility at Florida International University. Results of this full scale testing indicates that PEFs can be much higher than what was obtained from pressure chamber tests which has been the basis for the value suggested by the ASTM standard. For instance, PEFs ranged from 71 to 106% for the case of pressure coefficients with negative sign (suction) and from 39 to 110% for the case of pressure coefficients with positive sign (pressure). When a combined set of taps was considered, PEFs ranged approximately from 50 to 80% for the case of “suction” and from 15 to 75% for “pressure”. Based on the 1 m² of tributary area used in ASCE 7-10 Standard, results show that the net load on vinyl wall siding can be obtained by reducing the net design load for the entire wall assembly by 25 and 60% for suction and pressures, respectively. However, a smaller tributary area (<1 m²) can experience a local peak load that can induce damage to connections, especially in the case of relatively flexible wall coverings, with no or very little load sharing between connection points. Results indicate that for smaller areas (~0.2 m²) the allowable percentage reductions should not be more than 15 and 25% for suction and pressures, respectively. This study shows that the suggested ASTM PEF of 0.36 may lead to the underestimation of loads for the design of details affected by local loads.

Monday, March 19, 2018

4:15 PM - 4:30 PM

SASC 251

Electrical and Computer Engineering

A Scalable Protocol Stack for IEEE 802.11s-based Advanced Metering Infrastructure Networks

Samet Tonyali

The utility companies and the researchers have been developing new applications and communication protocols for the Smart Grid Advanced Metering Infrastructure (AMI) network. Since the AMI network consists of thousands of smart meters, it is built as a wireless mesh network (WMN) because it requires far less cabling work, thereby lowering the infrastructure, deployment and maintenance costs. However, WMNs suffer from scalability issues as the network grows. Therefore, in this paper, we present a scalable protocol stack for the IEEE 802.11s-based AMI applications. We propose several modifications and parameter adjustments at different layers of the protocol stack. Specifically, several parameters at the MAC layer are adjusted. Furthermore, we integrate a modified Address Resolution Protocol to take advantage of Hybrid Wireless Mesh Protocol's proactive route requests/replies, which is IEEE 802.11s standards default routing protocol. Moreover, we propose five novel retransmission timeout calculation functions for the application layer protocol, CoAP, in order to increase the reliability. We assessed the performance of the proposed protocol stack under the widely used ns-3 simulator. The simulation results have shown that the proposed stack can reliably scale to thousands of nodes.

Monday, March 19, 2018

4:30 PM - 4:45 PM

SASC 251

Mechanical and Materials Engineering

Tribological, Nanomechanical and Oxidation Properties of the Cold-sprayed MAX phase Ti₂AlC Coating

Archana Loganathan

Ultra High Molecular Weight Polyethylene (UHMWPE) is a biocompatible polymer, commonly used for bone implants. Generally, to improve the strength and tribological properties of UHMWPE, two-dimensional (2D) materials can be used as a reinforcement. Boron nitride nanoplatelets (2D-BNNP) was dispersed in UHMWPE using centrifugal mixer and deposited onto Ti-6Al-4V substrate via electrostatic spray deposition. The addition of BNNP in the UHMWPE resulted in a dense coating with a thickness of $\sim 100 \text{ \AA}$. Fracture surface showed a uniform dispersion of BNNP in the UHMWPE coating. XRD and DSC studies on the UHMWPE-BNNP coating revealed a significant drop in crystallinity compared to the pure UHMWPE coating. Nanoindentation studies showed that the hardness improved by 17% by the addition of BNNP to the UHMWPE coating. Plasticity index for UHMWPE + 1 wt.% BNNP coating was about 4.2% lower than the pure UHMWPE coating. Further, nanoscratch test was performed on the coatings and BNNP reinforced coating showed an 18% decrease in coefficient of friction compared to the pure UHMWPE coating indicating the superior frictional properties of BNNP due to interlayer sliding. Thus, 2D BNNP reinforced UHMWPE coating will be a potential self-lubricating coating material for biomedical applications.

Monday, March 19, 2018

3:00 PM - 3:15 PM

SASC 352

Religious Studies

Karma and the Threefold Law: An Investigation of Indian Religious Influence on Wiccan Ethics

Humberto Perez

Buddhism and Wicca are two religions separated by thousands of years and thousands of miles in origin yet on the surface they appear to share a similar ethical system. Karma and the Three Fold Law are both mechanisms by which individual actions are judged. However, the reasons for judging the actions of individuals is different for both religions. Karma can be viewed almost as a universal balance sheet. An individual's actions are scored as good or bad and the end goal of the individual is to eliminate all Karma in order to attain Nirvana and an escape from the eternal cycle of rebirth. The Three Fold Law can also be considered the law of returns. It states that what ever an individual puts out will be returned to them three fold. Unlike in Buddhism, Wiccans see no need to escape from the rebirth cycle and their system of ethics reflects that. Despite the difference in end goals of both ethical systems, there are some within the Wiccan community who continue to refer to the Three Fold Law as a form of Karma. Although Gerald Gardner, the founder of the Wiccan religion, drew inspiration from various other religions to help craft many of his religious beliefs, an analysis of both ethical systems shows that the link between the two is superficial at best.

Monday, March 19, 2018

3:15 PM - 3:30 PM

SASC 352

Dietetics and Nutrition

Feasibility Pilot Study of a Nutrition Intervention for People Living with HIV (PLWH) in the Miami Adult Studies on HIV (MASH) Cohort

Alicia Sneij

Originally HIV was considered a disease of rapid wasting and malnutrition, but antiretroviral therapy has changed the nutritional needs of these patients. To develop a protocol to change the preconceptions on nutrition interventions in people living with HIV (PLWH) as a chronic disease, and engage them in learning about diets and physical activity to decrease the risk of co-morbidities, such as cardiovascular disease, diabetes and obesity, which are common in PLWH. A nutrition intervention tailored to PLWH was developed to lower diabetes risk and other related comorbidities in this unique population. The intervention will be delivered during 6 months to be able to observe a significant change in attitude and biomarkers such as HbA1C, hs-CRP, 8OHdG and BMI when compared with a group receiving the usual nutritional treatment once a year. Based on other successful interventions, participants are being seen once a month for approximately 45 minutes where medical nutrition therapy, nutrition counseling and nutrition education will be conducted one-on-one with the participant. Stages of Change and Self-Efficacy are also being assessed with validated questionnaires. After assessing the eligibility and willingness of potential participants from the MASH cohort, approximately 50 participants are currently eligible; recruitment is ongoing. Most eligible participants were interested in the intervention with ~88% acceptance rate and expressed high receptivity of all of the educational material. Of the sessions, the participants seemed to be most interested in the Fruits and Vegetable session, acknowledging that they do not consume as much as they should and would like to consume more. The current protocol seems to be effective and accepted by the recruited participants. As PLWH face different nutritional needs compared to the general non-infected population, it is imperative to develop a protocol that will be effective and accepted among this unique and high-risk population. As this developed protocol for nutrition interventions has been shown to be highly accepted among this population, this finding can be extrapolated and implemented in large-scale interventions to lower risk of several comorbidities in this population.

Monday, March 19, 2018

3:30 PM - 3:45 PM

SASC 352

Computing and Information Sciences

Constructing the Knowledge Base for Cognitive IT Service Management

Qing Wang

The increasing complexity of IT environments dictates the usage of intelligent automation driven by cognitive technologies, aiming at providing higher quality and more complex services. Inspired by cognitive computing, an integrated framework is proposed for a problem resolution. In order to improve the efficiency of the problem resolution process, it is crucial to formalize problem records and discover relationships between elements of the records, records overall and other technical information. In the proposed framework, the domain knowledge is modeled using ontology. The key contribution of the framework is a novel domain-specific approach for extracting useful phrases, that enables an automation improvement through resolution recommendation utilizing the ontology modeling technique. The effectiveness and efficiency of our framework are evaluated by an extensive empirical study of a large-scale real ticket data.

Monday, March 19, 2018

3:45 PM - 4:00 PM

SASC 352

Mechanical and Materials Engineering

Thermally-Assisted Acoustofluidic Separation of Extracellular Vesicles from Cells

Elnaz Mirtaheri

Extracellular vesicles (EVs) have been gaining increasing attention given their role in communicating information between cells. Composition-based isolation of EVs is particularly of high significance as the proteomic and lipidomic characterization of their cargo could provide valuable clues to the role of EVs in mediating the biology of various conditions. This has, however, proved to be challenging as EVs, despite their abundance, are very small and difficult to be differentiated from the other constituents of host media. In addition, currently available methods like ultracentrifugation and filtration are cumbersome and capable of achieving mostly size-based separations. In this work, we demonstrate the possibility of separating submicron EV-like vesicles from cancer cells using a thermally-assisted acoustophoretic device. In a system composed of MCF-7 breast cancer cells spiked with two different types of same-size vesicles, composition-based isolation of vesicles was shown to be realizable through opposite focusing of the system's components at the node and antinodes of the overlaid ultrasonic standing wave. By proper choice of temperature in the microchannel, we were able to achieve separations with purities exceeding 93%. Furthermore, cells recovered from the channel were shown to be viable after the separation.

Monday, March 19, 2018

4:00 PM - 4:15 PM

SASC 352

Computer Science

Hierarchical Contextual Point-of-Interest Recommendation

Ramesh Baral

The user preferences on Point-of-Interest (POI) vary with locality and type of consumption experience. For instance, user1 and user2 might have closest preferences for restaurants but not for motels. Hence the study of locality-specific hierarchical preferences and their aggregation can be crucial in modeling the locality preference trends and recommendation generation. This study focuses on organizing the locality preferences as a hierarchical structure where the top level represents the preferred k items and the subsequent levels represent preference wise subsets. Given a locality and a target user, the goal is to find the closest visitor clusters in the locality and aggregate their preference hierarchy to model the personalized preferences for the target user. We divide the set of locations into uniform grids. We define multi-context location and user profile to devise preference-based user clusters in a locality. We then derive the Partition Membership Divergence (PMD) metrics from the preference hierarchy of each cluster and transform it into cluster-wise places similarity matrix for the locality. For a target user, we merge the matrices from the top- k matching clusters to get aggregated PMD matrix. As the PMD matrix does not satisfy ultrametric property, the hierarchy generated from it is topologically incorrect. We define a method to transform the PMD matrix into an ultrametric form which ensures generation of correct topology. The transformed aggregated hierarchy is then contextually exploited for POI sequence recommendation. Evaluation of the proposed model on two real-world datasets demonstrates its efficiency over several baselines. The model generated contextual and personalized POI sequences that have high pair-F-score, high diversity, and low displacement metrics. We formulated the locality-based implicit user preferences as a hierarchical structure, presented a technique to aggregate such hierarchy, modeled the personalized POI preferences in terms of aggregated popular trends of a locality, and demonstrated the quality of preference inference using two real-world datasets. The contextual preference hierarchy is significant for sequence recommendation and can be useful in many interesting applications, such as personalization, question answering, knowledge discovery, recommendation, and preference-based association mining.

Monday, March 19, 2018

4:15 PM - 4:30 PM

SASC 352

Biomedical Engineering

waveCSD: A method for estimating transmembrane currents originated from propagating neuronal activity in the neocortex: Application to study cortical spreading depression

Arash Moshkforoush

Recent years have witnessed an upsurge in the development of methods for estimating current source densities (CSDs) in the neocortex from their recorded local field potential (LFP) reflections using microelectrode arrays. Among these, methods utilizing linear arrays work under the assumption that CSDs vary as a function of cortical depth; whereas they are constant in the tangential direction (infinitely or in a confined cylinder). This assumption is violated in the analysis of neuronal activity which propagates along the neocortical sheet, e.g. propagation of alpha waves or cortical spreading depression associated with migraine aura. In this study, we have developed a novel mathematical method (waveCSD) for the CSD analysis of LFPs associated with a planar wave of neocortical neuronal activity propagating at a constant velocity towards a linear probe. Results show that the algorithm is robust to the presence of noise in the LFP data and the uncertainties in the knowledge of propagation velocity. Also, the method exhibits high level of accuracy in a wide range of electrode resolution. Simulation results indicate that the waveCSD method has a significantly higher reconstruction accuracy in comparison with the widely-used inverse CSD method (iCSD) in the analysis of transmembrane CSDs originating from the propagation of neuronal activity. Using in vivo experimental recordings from the rat neocortex, we employed the waveCSD method to characterize, for the first time, the transmembrane currents associated with cortical spreading depressions. The grand average CSD profile during cortical spreading depression was obtained after the nonlinear coregistration of reconstructed CSDs from five rats via a landmark-based Approximate Thin Plate Splines transformation. The average CSD profile suggests a complex, multipolar configuration of current sources in different layers of the cortex during cortical spreading depression. The first current sources which emerge during a cortical spreading depression event appear to be at the Supra-Granular layer. Subsequently, the transmembrane currents seem to originate in the Granular region, and propagate towards the Supra-Granular and Infra-Granular layers. We believe the waveCSD method has the potential to provide a theoretical platform to help unravel the underlying mechanisms of several neurological phenomena involving the propagation of neuronal activity.

Monday, March 19, 2018

4:30 PM - 4:45 PM

SASC 352

Health Promotion and Disease Prevention

State Firearm Legislation and Adolescent Suicide in the United States in 2015

Wissam Al Khoury

Background: Suicide is the second leading causes of death among US persons aged 15-19 years (adolescents). Because firearm injuries are more likely to result in death than non-firearm injuries, it has been hypothesized that restricting access to firearms may be associated lower suicide risk. Conversely, it has been suggested that migration to other modes of death (e.g., hanging, poisoning) may offset any protective effect of legislation to restrict access to firearms. Methods: To assess the potential role of restrictive firearm legislation on adolescent suicide, states were classified by strictness of legislation from most to least permissive. Numbers of suicides per 100,000 adolescents in 2015 by firearms and by other means were compared by state legislation permissiveness. States were classified according to gun law strictness level, 1 being strictest and 10, most permissive. Incidence of firearm and non-firearm suicides was calculated for states with strict legislation combined and compared to incidence in states with most permissive legislation, confining all analyses to states with ≥ 10 deaths in each category. Results: Only California met criteria for maximum firearm law strictness. Among the other states, 46% had legislation that ranged from somewhat lower to higher permissiveness. In 50% (25), firearm legislation was very permissive (10). Rates of firearm-related suicides ranged from 1.12-20.74, and varied inversely with decreasing strictness of legislation ($R=0.368$; $p=0.035$). Rates of non-firearm related suicides ranged from 3.12-28.27, and varied inversely with increasing strictness, with a much less steep slope than firearm-related suicides ($p=.315$). In 2015, 113 firearm suicides occurred in four stricter-legislation states (population of adolescents=5,144,794) and 409 firearm suicides in 16 states with most permissive legislation (population of adolescents= 7,683,448), 2.2 versus 5.3 per 100,000, $p<.001$. Similarly, the rate of non-firearm suicides in stricter states (352 non-firearm suicides among 6,889,906 adolescents) was lower than in states with more lenient legislation (428 among 7,072,153 15-19 year olds) (5.1 vs. 6.1; $p=.02$). Conclusions: These data suggest that strict firearm legislation was associated with a protective effect for adolescent suicide that was much stronger for firearm-related suicide, without evidence of migration.

Oral Presentations

Tuesday, March 20, 2018

9:00 AM - 9:15 AM

SASC 100

Biology (Marine Sciences)

Coral reef fish community structure in the French Scattered Islands (Mozambique Channel)

Camila Caceres

Coral reefs are among the most diverse marine ecosystems, as well as the most threatened. Coral reefs are vulnerable on a global scale, particularly in areas with high coastal human populations, from large-scale effects such as global warming and ocean acidification, to local effects from fisheries. Currently, there are very few coral ecosystems isolated and free from direct anthropogenic pressure, and many of these are islands with very small human populations that are difficult to access. This is the case with the French scattered islands in the Mozambique Channel, which provide an opportunity to study reefs that have experienced minimal, but growing, human impacts in comparison to most reefs around the world. Diving transects were conducted in all four islands across five years between 2002-2011 to estimate benthic and fish communities at the highest taxonomic level. For the benthos, coral species richness and percent cover of each category recorded. For the fish community, fish species richness, abundance and fish length were recorded. A regression tree was run to estimate which parameters had the largest effect on fish populations, giving us an insight into the drivers of coral reef assemblage.

Oral Presentations

Tuesday, March 20, 2018

9:15 AM - 9:30 AM

SASC 100

Chemistry and Biochemistry

Engineering an Adenosine specific aptamer and electrochemical detection in whole serum

Daniel Roncancio

Direct specific detection for Adenosine is increasingly valuable as knowledge of its function in the mechanisms of inflammation regulation and immune response are more explicitly understood. Unfortunately, the commonly reported Adenosine aptamer (A20) cannot be used to measure Adenosine concentration because of the inherent cross-reactivity of the aptamer to Adenosine phosphate derivatives such as Adenosine triphosphate (ATP) and Adenosine diphosphate (ADP) which share a common core structure (ribose and adenine) that is recognized by the aptamer. We aimed to solve this problem by engineering a DNA aptamer which could recognize all motifs of the molecule including the phosphate tail while maintaining the same stem-loop structure of the current adenosine aptamer. The new adenosine aptamer (termed T20) varies at a single nucleotide and exhibits reduced cross-reactivity for ATP and ADP. The reduced cross-reactivity is caused by steric hinderance in the binding pocket, resulting in decreasing affinity as the negative phosphate charge increases. The aptamer can be adapted into an electrochemical aptamer based (E-AB) platform for sensitive and selective detection of Adenosine in whole serum with similar sensor performance as compared to detection in buffer.

Oral Presentations

Tuesday, March 20, 2018

9:30 AM - 9:45 AM

SASC 100

Psychology

Social Comparison In Eating Disorder Recovery: Using PhotoVoice To Capture The Sociocultural Influences On Women's Recovery

Jessica F. Saunders

Upward and downward body, food, and exercise-related social comparisons have been implicated in ED etiology and maintenance. However, there is little research exploring the role social comparisons play during ED recovery and remission. The current study sought to qualitatively examine this social-cognitive process among adult women in recovery from eating disorders using the PhotoVoice method, a participatory-action research method centered on participants'™ subjective experiences. Participants were instructed to take photos of the daily sociocultural influences on their recovery process and then discuss these photos during a semi-structured interview. Drawing from the SHOWeD technique, an established PhotoVoice interview framework, participants (S) described what was seen in the image, (H) talked about what was happening, (O) discussed how the image related to our lives and (W) why things are this way, and (D) offered ideas for what can be done about it. Participants (N = 30) were women between the ages of 19-35 (M age = 25.94, SD = 4.19), previously diagnosed with a clinical ED and in self-defined recovery (M months in recovery = 23.7, SD = 20.01). Rather than following the typical patterning of upward and downward social comparisons, and their theorized motives and effects, thematic analysis yielded two distinct types of comparisons that occur during eating disorder recovery, recovery hindering comparisons and recovery promoting comparisons. These comparisons occurred along both body, food, and exercise-related domains, as well as domains central to ED recovery quality of life (relationships, achievements, and goals). Comparison to one's™ past self, used in a recovery promoting way, and comparison to sociocultural thin ideals, used in a recovery hindering way, were the two most frequent types of social comparison. These findings have important therapeutic implications, and will be used to develop a quantitative measure of social comparison in ED recovery.

Oral Presentations

Tuesday, March 20, 2018

9:45 AM - 10:00 AM

SASC 100

Business

Short sellers and managerial equity market timing

Mohammad Rahman

Capital structure literature shows that managers tend to issue equity when a firm's market valuation is high. Short selling literature shows that short sellers tend to short sell stocks with high market valuation if driven by mispricing. In this paper, we focus on this tension between managers and short sellers and investigate if the managerial market timing is affected by short sellers. By jointly considering the changes in the short position and market valuation, we show that short selling attenuates managerial equity market timing and lends way to increase in Leverage for overvalued firms. This reduction in the propensity of market timing is more pronounced in firms with independent boards suggesting that board independence facilitates the incorporation of important adverse information embedded in the short positions into the financing decisions. Furthermore, this impact is also more pronounced in firms with an increased likelihood of mispricing - smaller firms, firms with lower institutional ownership, and firms with higher intangible assets. Our study makes valuable contributions to multiple strands of literature. As far as we know, our study is the first to examine equity market timing in relation to short selling. Our findings that managerial equity market timing is sensitive to short selling contributes to a better understanding of managerial decision making with respect to external financing. By showing that short sellers provide important check and balances in the financial markets for proper asset allocation, we document the importance of the market-based monitoring mechanism of short selling. We also add to the governance literature by showing that board independence strengthens the disciplining impact of short selling on managerial market timing.

Oral Presentations

Tuesday, March 20, 2018

10:00 AM - 10:15 AM

SASC 100

Biomedical Engineering

Substrate stiffness modulates ALP activity in extracellular vesicles secreted by human coronary artery smooth muscle cells

Amirala Bakhshiannik

Cardiovascular diseases are the leading cause of morbidity and mortality in the US. Calcification of the arterial wall, the most significant predictor of morbidity, results when calcific mineral is deposited in atherosclerotic plaques. Formation of calcific mineral alters the local mechanical milieu and consequently stresses applied to the cells. In response to pathological stimuli such as inflammation and lipid accumulation, human coronary artery smooth muscle cells (HCASMCs) adopt an osteogenic phenotype. Extracellular vesicles (EVs) released by these cells mediate mineralization by concentrating calcium and phosphate ions. Alkaline phosphatase (ALP), an enzyme that hydrolyzes pyrophosphate to free phosphate ions, accelerates ectopic calcification within the EVs. The mechanical properties of the extracellular environment, including the extracellular stiffness, can modulate cell phenotype and ALP expression; however, the effect of substrate stiffness on EV release and ALP activity remains unknown. Calcification may occur as cells seek to increase the stiffness of the surrounding tissue. We hypothesized that HSCAMCs cultured in pro-calcific media on a soft substrate would release more ALP-positive EVs. To test this hypothesis, HCASMCs cultured on either stiff substrate ($E \sim 2\text{GPa}$) or soft substrate ($E \sim 0.025\text{GPa}$) were treated with pro-calcific media or control media for 21 days. Conditioned media from the cultures were collected on days 1, 3, 7, 14, and 21. To isolate EVs, the collected media were ultra-centrifuged at $100,000 \times g$ for 1 hour. A colorimetric assay showed that ALP activity in EVs from the pro-calcific cultured samples reached a maximum at day 14 in both substrates. Furthermore, higher EV ALP activity was observed in samples cultured on the soft substrate compared to the stiff substrate HCASMCs (414.3 ± 153.6 and 183.2 ± 153.6 g/nmol.L.h for soft and stiff substrates, respectively). These findings may provide insight into the role that the extracellular mechanical environment may play in the initiation of vascular calcification.

Oral Presentations

Tuesday, March 20, 2018

9:00 AM - 9:15 AM

SASC 302

Chemistry and Biochemistry

In Vitro Isolation of Small-Molecule-Binding Aptamers with Intrinsic Dye-Displacement Functionality

Haixiang Yu

Aptamer-based sensors offer a powerful tool for molecular detection, but the practical implementation of these biosensors is hindered by costly and laborious sequence engineering and chemical modification procedures. We report a simple strategy for directly isolating signal-reporting aptamers in vitro through systematic evolution of ligands by exponential enrichment (SELEX) that transduce binding events into a detectable change of absorbance via target-induced displacement of a small-molecule dye. We first demonstrate that diethylthiatricarbocyanine (Cy7) can stack into DNA three-way junctions (TWJs) in a sequence-independent fashion, greatly altering the dye's absorbance spectrum. We then design a TWJ-containing structured library and isolate an aptamer against 3,4-methylenedioxypyrovalerone (MDPV), a synthetic cathinone that is an emerging drug of abuse. This aptamer intrinsically binds Cy7 within its TWJ domain, but MDPV efficiently displaces the dye, resulting in a change in absorbance within seconds. This assay is label-free, and detects nanomolar concentrations of MDPV. It also recognizes other synthetic cathinones, offering the potential to detect newly-emerging designer drugs, but does not detect structurally-similar non-cathinone compounds or common cutting agents. Moreover, we demonstrate that the Cy7-displacement colorimetric assay is more sensitive than a conventional strand-displacement fluorescence assay. We believe our strategy offers an effective generalized approach for the development of sensitive dye-displacement colorimetric assays for other small-molecule targets.

Oral Presentations

Tuesday, March 20, 2018

9:15 AM - 10:30 AM

SASC 302

Mathematics

I See Me When I See You: Using Peer-Response as a Reflection Tool to Improve Mathematical Content Knowledge

Kadisha Mills

This mixed methods pilot study was designed to obtain information on the effectiveness of peer editing as an effective reflective strategy in teaching mathematical content knowledge. Peer editing, usually reserved for writing, is accepted as a collaborative tool used to guide the writing process. It is credited with creating a comfortable and trusting environment for students (Lui and Hnasen, 2005). Mathematics classrooms can be very tense and intimidating if the teacher should be considered the only seat of power where judgement is passed over a given strategy, peer editing decentralizes this power. Student teachers would benefit from this power decentralization as they are required to develop analytically, and be prepared to become leaders in their own mathematics community. The design strategy used in my research is the Concurrent Triangulation. The research instruments included pre-and post-mathematics test, semi-structured journaling, video based oral reflection, interviews, observations and assigned mathematics problems weekly. To test the hypothesis of no difference in elementary teachers' level of mathematical content knowledge before and after editing their peer's work, a paired sample t-test was performed. The results indicated that the test score at the end, ($M= 77.9$, $SD= 22.6$, $N=5$) was much higher (i.e., more correct answers) than after they completed Test 1 ($M=57.0$, $SD 22.6$, $N=5$), $t(4)+ 2.853$, $p < .001$, two tailed. The 95% confidence interval around difference between the group mean was 0.56 to 41.27. Though the sample size of 5 is too small for assumptions on statistics to be satisfied it can be concluded that peer editing has a significant effect on elementary teachers' level of mathematical content knowledge.

Oral Presentations

Tuesday, March 20, 2018

9:30 AM - 9:45 AM

SASC 302

Physics

Conformational changes in Marburg virus VP40 upon plasma membrane association

Nisha Bhattarai

Infections with the Marburg and Ebola viruses from the Filoviridae family cause hemorrhagic fever that often results in high fatality rates in human. The Marburg virus is a lipid enveloped virus and its viral matrix is formed by the matrix protein VP40. Like in Ebola virus VP40, the crystal structure of Marburg VP40 (mVP40) also contains basic residues that form lipid binding patch but the basic patch of mVP40 is significantly broad and extended than that of Ebola VP40 (eVP40). This suggests the possible differences in the plasma membrane (PM) binding and phospholipid specificity between VP40 dimers. Here, we investigate the roles of various residues and lipid types in PM association as well as conformational changes of mVP40 dimer in both lipid and lipid free environments using molecular dynamics simulations. Despite the significant structural differences in the crystal structure, mVP40 dimer is found undergo conformational rearrangements of the protomers and adopt a configuration similar to eVP40 after associating with membrane. These conformational changes upon lipid binding allow mVP40 to localize and stabilize at the membrane surface similar to the eVP40 dimer, but may give subtle differences in its function due to the differences in the solution conformations.

Oral Presentations

Tuesday, March 20, 2018

9:45 AM - 10:00 AM

SASC 302

Psychology

Conservative Criterion Explains The Non-Conscious Perception of Facial Expression Under Continuous Flash Suppression

Ali Pournaghdali

A main question in the scientific study of conscious perception is the nature of the dissociation between conscious and non-conscious perception. That is, it is crucial to use bias-free measures to evaluate perceptual sensitivity and response criterion of participants in the conscious and non-conscious tasks to evaluate this dissociation. The aim of this study is to evaluate sensitivity and criterion of participants, using signal detection methods, in a conscious detection and a non-conscious 2-alternative forced-choice (2AFC) tasks for facial expression perception while employing continuous flash suppression (CFS). We hypothesized that non-conscious perception of facial expression under CFS demonstrates real differences between conscious and non-conscious perception. We predicted that participants' sensitivity in the detection task will be significantly lower than their sensitivity in the 2AFC task. After rendering invisible images of faces with different facial expression (fearful vs. neutral) for five hundred milliseconds using CFS, participants judged the presence/absence of the faces with a yes/no detection task and the emotion of faces with the 2AFC task. After acquiring data, we evaluated participants' ability to discriminate signal from noise using d' (an index of sensitivity in signal detection theory) and their criterion for detection and 2AFC task. Our results indicate that there is no significant difference between sensitivity of participants in detection and 2AFC task, but we found higher criterion value for detection compared to 2AFC task. Our results indicate that participants' ability to discriminate signal from noise is diminished for both detection and 2AFC tasks while using CFS. Therefore, non-conscious perception of facial expression with CFS may be the result of a more conservative criterion in the detection task as compared to 2AFC task rather than from dissociable processes. These results provided additional evidence for the importance of using bias-free measures over the accuracy-based methods in visual consciousness research.

Oral Presentations

Tuesday, March 20, 2018

10:00 AM - 10:15 AM

SASC 302

Civil and Environmental Engineering

An Elitist Metaheuristic Approach for Optimization of Multi-Objective Airport Gate Assignment Problem

Syedmirasjad Mokhtarimousavi

Gate Assignment Problem (GAP) is one of the most substantial issues in airport operations. The ever increasing demand that leads to high occupancy rates of gates, the potential financial loss due to imbalances of demand and supply in congested airports, and the limitation in expanding facilities present further challenges and call for an advanced methodology for optimal supply allocation. In principle, GAP intends to maintain the maximum capacity of the airport through the best possible alignment of the resources (gates) in order to reach optimum outcome. There are a wide range of dependent and independent resources and limitations that are involved in the problem, which adds to the complexity of GAP from both theoretical and practical perspectives. In this study, GAP is extended and mathematically formulated as a three-objective problem taking into account all resources and restrictions, which can be directly linked with airport authorities' multiple criteria decision making process. The preliminary goal of multi-objective formulation is to consider a wider scope, in which a higher number of objectives are simultaneously optimized and therefore increase the practical efficiency of the final solution. The problem is solved by applying the second version of Non-dominated Sorting Genetic Algorithm (NSGA-II) as a parallel evolutionary optimization algorithm. Results illustrated that the proposed mathematical model could address most of the major criteria in the decision-making process in airport management in terms of passenger walking distance, robustness, and traditional costs. Moreover, the proposed solution approach shows promising performance in finding acceptable plausible solutions compared to other multi-objective algorithms (BAT, PSO, ACO, and ABC).

Oral Presentations

Tuesday, March 20, 2018

10:15 AM - 10:30 AM

SASC 302

Computer Science

Addressing the challenges of incomplete multi-modal datasets for Alzheimer diagnosis

Solale Tabarestani

One of the challenges facing the accurate diagnosis and prognosis of the Alzheimer's disease is the scarcity of sufficient data. Despite a large number of participants in the Alzheimer's disease Neuroimaging Initiative (ADNI) study, many of the observations have a lot of missing features which lead to their exclusion from many experiments. Motivated by the urge to explore all the participants, even those with missing some tests or image modalities, this paper draws attention to the impact of imputing data in ADNI dataset with numerical techniques. We present a comparative experiment of several states of the art algorithms for estimating the missing values in ADNI dataset. To clarify the imputation effects of such algorithms on different stages of disease diagnosis, we couple them with three high throughput classification algorithms and quantify their accuracy before and after applying imputation. Experimental results show that although eXtreme Gradient Boosting (XGB) performance is highly robust to missing values, Support Vector Machine (SVM) and Random Forest (RF) will be improved when they are coupled with a more sophisticated imputation technique like soft-impute. The classification accuracy has been increased by up to 2% in the multi-class cases.

Oral Presentations

Tuesday, March 20, 2018

9:00 AM - 9:15 AM

SASC 352

Electrical and Computer Engineering

Control and Voltage Stability of a Medium Voltage DC Ship Hosting Pulsed load

Hassan H. Eldeeb

This research develops control techniques to improve the voltage stability of a medium voltage DC (MVDC) ship-board. The control system has two objectives; 1) limiting the current flow in the cables, and 2) Support voltage profile stability. This was achieved through two stages; 1) operating the ship-board converters in master-slave mode in nominal operation and 2) utilizing ultracapacitor (UC) to support the voltage stability in pulsed load conditions. The response of the proposed control was verified and examined by implementing the system in the PSCAD/EMTDC environment. The system was examined versus three operational case studies. Results proved that under nominal operation, coordination between the powers injected from the system's converters not only limited current flowing in the cables, but also supported voltage stability. Whereas during pulsed load condition, the proposed strategy employed effectively the UC to support the voltage stability. Furthermore, the system stability was supported by the UC through avoiding operating any of the generators in overloading conditions. Fast and accurate response of the proposed strategy was revealed in the simulation results.

Oral Presentations

Tuesday, March 20, 2018

9:15 AM - 9:30 AM

SASC 352

Business Administration

The Impact of Data Structure on Information Quality of User-Generated Content: Considering Type of Data in Designing Information Systems

Mahed Maddah

The ubiquitous use of online platforms, especially in social media and crowdsourcing, has resulted in an increase of user-generated content (UGC). As a result, companies are increasing their reliance on UGC to connect with consumer and generate revenue. A growing concern and challenge is the information quality of UGC. UGC is created in online platforms at varying levels of data structure; ranging from totally unstructured to highly structured format. Research on UGC indicates that we have a little understanding on the appropriate level of data structure for different kinds of UGC. Besides, to the best of our knowledge, previous studies in IS discipline did not consider type of to-be-recorded information in designing information collection interfaces. However, examining online interfaces and previous studies implies that type of UGC could be a factor in designing information collection interfaces. Therefore, in this research, we aim to understand and describe the effect of data structure on the quality of different types of UGC. We use Endel Tulving's categorization of declarative memory: semantic memory and episodic memory. Based on the psychology literature, semantic memory are facts about the world, while episodic memory is the capacity to re-experience an event in the context similar to the context it originally occurred. Considering categorization of declarative memory from psychology discipline, this work aims to understand the effect of data structure on the quality of UGC and improve UGC interface design. We develop design propositions and test these propositions with online experiments, by providing differently-structured interfaces for participants. This study will potentially contribute to the IS information quality literature as well as having practical contributions. First, this research will demonstrate a relationship between information system design and human memory. Second, it will extend the literature by enhancing our understanding about the structure-level of different kinds of UGC.

Oral Presentations

Tuesday, March 20, 2018

9:30 AM - 9:45 AM

SASC 352

Social Work

Suicide Interventions for Sexual Minority Youth: A Systematic Review

Michelle G. Thompson

Background: According to the National Center on Injury Prevention and Control, suicide ranks 2nd in leading causes of death for youth ages 15-24 years. Despite extensive attention to preventive methods for youth suicide, suicide remains a major public health concern. From 2009 through 2015, there has been a significant increase in the proportion of youth who seriously considered attempting suicide (from 13.8% to 17.7%), made a suicide plan (from 3.7% to 10.9%), or reported a history of suicide attempts (from 6.3% to 8.6%). A subgroup of youth at an especially elevated risk for suicidal ideation and attempts are sexual minority youth (SMY). SMY are up to seven times more likely than heterosexual youth to report a history of suicidal thoughts, behaviors, and attempts. Although the literature clearly suggests that there is a strong relationship between sexual orientation and suicide thoughts, plans, and attempts among youth, there is a notable gap in the literature on interventions that address the specific risk and protective factors for suicide among SMY. Method: This paper systematically and critically reviews psychosocial interventions for youth suicide of the past 10 years. Web-based searches were conducted using specific criteria. Each study was evaluated using two independent criteria designed to ascertain the degree of success and considerations for well-established or probably efficacious studies. An exploration of socioecological theory as a framework for youth suicide interventions and the applicability of addressing the unique experiences and challenges of SMY is also provided. Results: Systematic searches yielded 2,526 articles. Fifteen studies missed inclusion criteria by either a sample age of <15 or >25 years; two of which provided outcomes on suicidality as a secondary outcome and two of which did not provide outcomes on suicidality at all. None of the interventions tested in the studies could be considered well-established. None of the interventions reviewed mentioned sexual orientation or included, SMY. Implications: While many of the studies reported overall clinically significant improvements among their samples, none were able to establish statistical significance; highlighting the importance of developing a guideline or criteria for exploring and reporting clinical significance in psychosocial research.

Oral Presentations

Tuesday, March 20, 2018

9:45 AM - 10:00 AM

SASC 352

Computing and Information Sciences

Hierarchical Neural Address Parser

Shekoofeh Mokhtari

Address parser (AP) is a fundamental annotating process for geocoding services and record linkage. As a sequence tagging for address queries, AP aims to predict a tag for each element of address query. Parsing address query exposes some challenges. First, the address queries are not fully structured. Even though they are semi-structured, parsing is not straightforward. Semi-structured data has no absolute schema fixed in advance and its structure may be irregular or incomplete. Second, real address queries are noisy and may have abbreviations and misspelling errors. Additionally, they may have out-of-vocabulary (OOV) words. We propose a hierarchical neural network model to address the above challenges: 1) the model has the hierarchical structure which mimics the hierarchical structure of address data (characters from words), 2) it leverages the character data in order to tackle OOV problem, abbreviations, and typographical errors. The model consists of two layers: character-level convolutional neural network (CNN) and bidirectional long short term memory (LSTM). The bottom layer composes word representation from characters and feeds it to bidirectional LSTM. Bidirectional LSTM helps to use both past (via forwarding LSTM) and future features (via backward LSTM) for tagging each word in address query. We conduct experiments on large real and synthetic dataset. Our model outperforms existing model.

Oral Presentations

Tuesday, March 20, 2018

10:00 AM - 10:15 AM

SASC 352

Dietetics and Nutrition

Nutritional Status and Academic Performance of School-age children enrolled in two feeding programmes in Ghana

Justina Owusu

Background and objectives: School-age children (SAC) are vulnerable to malnutrition which can negatively influence their academic attainment. There is limited information on relationship between nutritional status and school attendance and performance of school age children enrolled in school feeding programmes in Ghana. We assessed the association between current nutritional status of SAC participating in school feeding programmes, and attendance and performance in selected subjects in the past term. Methods: This was a cross sectional study involving one hundred and eighty-two school age children enrolled in either the Ghana School Feeding Programme or a Non-government Feeding Programme. Haemoglobin concentration, and weight and height of all children were measured using standard procedures. Data on school attendance and performance of SAC were abstracted from class and academic performance registers. Independent t-test was done to assess the differences in school attendance and performance by nutritional status of SAC. Results: About two-thirds (67.0%) of children were either stunted, underweight, or anemic. No significant associations were observed between hemoglobin levels, body mass index (BMI)-for-age, or height-for-age z-score and either performance or school attendance in the past school term. Albeit, having at least one nutritional deficit was associated with lower scores in mathematics (mean difference = 4.62), English (mean difference = 4.49) and creative arts (mean difference = 4.50) in the past term than better nourished participants ($p < 0.05$). Conclusions: Addressing malnutrition among SAC is an important contribution to academic success.

Oral Presentations

Tuesday, March 20, 2018

10:15 AM - 10:30 AM

SASC 352

Economics

Internal Migration To Cope With Natural Hazards: The Role of Transient Versus Permanent Shocks

Md Tanvir Pavel

In this paper, I explore the nature and extent of internal migration caused by natural disasters in Bangladesh. By controlling the different factors of migration decisions, I investigate whether transient shocks (flood, cyclones) or permanent shocks (e.g. river erosion that leads to permanent loss of lands) have more influence on inter-regional migration. To answer this key research question, we analyze the survey data collected from nine coastal districts and two major cities (Dhaka and Khulna) of Bangladesh. While I use the discrete choice logit model to identify the drivers of migration, the multinomial logit model explains which shocks influence the households to migrate and to which locations. Findings of the study suggest that the permanent shock (river erosion) have stronger influence on internal migration decision. The effects of transitory shocks are mixed. Also, households prefer to move into the nearest city when the environmental shock is temporary whereas households tend to relocate to further distance when the environmental shock is more permanent in nature. The study also examines the impacts of migration on the welfare of households who moved to the nearest versus distant location. With some caveats, the welfare impacts of migration indicate that the forced migrants can improve their livelihood by moving to the nearest metropolitan city (Khulna) compare to the distant capital city (Dhaka).

Oral Presentations

Tuesday, March 20, 2018

10:30 AM - 10:45 AM

SASC 352

Health Promotion and Disease Prevention

Medical Cannabis Legislation and Reported Illicit Prescription Drug Use in US High School Students

Chintan Bhatt

Objective: To explore associations between enactment of state medical cannabis laws and self-reported use of prescription drugs without physician prescription in high school students. Methods: Observational study of medical cannabis legislation and proportions of high school students reporting the illicit use of prescription drugs in 2011- 2015. Data on enactment of legislation establishing a medical cannabis program in each state and Washington, DC, by year and state, were abstracted from the National Conference of State Legislatures website. Proportions of high school students responding affirmatively that they "Ever took prescription drugs without a doctor's prescription (such as Oxycontin, Percocet, Vicodin, codeine, Adderall, Ritalin or Xanax, or more times during their lives" (illicit prescription drug use) in the national Centers for Disease Control and Prevention Youth Risk Behavior Surveillance System (YRBSS) 2011, 2013 and 2015 surveys were obtained from the CDC Youth Online portal. Mean proportions of students reporting illicit prescription drug use were compared for each survey year by whether the state had medical cannabis program legislation. Results: Eight states had medical cannabis laws prior to 2001; 16 others enacted medical cannabis legislation between 2001 and 2015. In 2015, reported illicit prescription drug use ranged from 10.8% of Maine YRBSS respondents to 19.2% of Alabama respondents. Proportions of students reporting illicit prescription drug use in 2015 were 1.66% lower in cannabis legislation states and Washington, DC (mean=13.9%) than in non-cannabis legislation states (15.5% [p=.028]). Lower likelihood of reported high illicit prescription drug use was observed in medical cannabis legislation states (10/15 [66.7%]) than in states without medical cannabis legislation (100%; relative risk=.67; 95% confidence interval=.47-.95; p=.026). Conclusion: Enactment of medical cannabis legislation was associated with lower levels of reported illicit prescription drug use in high school students.

Oral Presentations

Tuesday, March 20, 2018

10:30 AM - 10:45 AM

SASC 100

Biomedical Engineering

Real Time Viability Evaluation and Monitoring of Rat Cardiomyocyte's Contractability Using Surface Plasmon Resonance

Maedeh Mozneb

Being the leading cause of death globally, Cardiovascular Diseases (CVD) vary from different types of strokes, cardiomyopathies, hypertension, and heart failure. Animal and human trials are the foremost option for drug testing, disease modeling, and biomarker analysis. These approaches have the benefit of providing a systematic view rather than just assessing the heart, however, they require significant labor, time, and cost. Microfluidics and lab-on-chip devices are fast emerging in the recent years. They are meant to decrease the need for clinical trials and fast forwarding the drug marketing development. However, there still lies a need for better optochemical technologies to detect desired biomarkers and study CVD models in their original physiological condition. Surface Plasmon Resonance (SPR) technology employs an incident laser light and its refractive angle to respectively stimulate and read from resonant oscillation of conduction electrons at the interface between negative and positive permittivity material. In this research, we report a novel live-cell SPR platform to measure and characterize the contractibility of beating cardiomyocytes. Rat cardiomyocytes were isolated from neonatal rat hearts day 1 through 3 and cultured on SPR gold chips. Their spontaneous contraction under normal and drug induced conditions were monitored using SPR technology. Our research provides not only live monitoring of beating characteristic for cardiomyocytes, but also a comprehensive kinetic analysis of their released biomarkers using detection-specific designed gold chips.

Oral Presentations

Tuesday, March 20, 2018

10:45 AM - 11:00 AM

SASC 100

Civil Engineering

Downbursts- Their importance and possible Simulations in Wall of Wind Experimental Facility

Krishna Sai Vutukuru

Downbursts pose a major threat to infrastructures and buildings across the U.S. and the globe; they along with other high-intensity non-synoptic wind storms have caused serious fatalities and injuries as well as significant damage to critical infrastructures than synoptic winds and hurricanes. Downburst winds are defined as short-duration non-stationary downdraft winds that induce intensive divergent outflow in radial directions, which are spatially and temporally localized, when they strike ground surface. Unlike the case of Atmospheric Boundary Layer, the spatial localization of the downburst causes non-uniform and non-symmetric loading on long and/or multi-span structures such as transmission lines and bridges. The localized nature of the event, both in size and duration, has resulted in a relatively limited number of field measurements. This consequently highlights the critical need for experimental investigations of downburst fields and analyses of their effects on vulnerable structures. A preliminary investigation was conducted by the authors to achieve downburst simulation at the Wall of Wind (WOW), as a part of the NSF's Natural Hazard Engineering Research Infrastructure (NHERI) program, such that the dynamic and kinetic characteristics of downburst flows are properly captured. For this purpose, we have started the examination of ideas using the 1:15 small-scale WOW at Florida International University. The small-scale WOW based simulations have been found to be very cost effective to identify the most efficient simulation method before implementation at the full-scale WOW. This presentation discusses the characteristics of the small-scale WOW downburst simulation and their validation. In addition, a discussion about implementing the downburst simulator into the full-scale WOW is provided.

Oral Presentations

Tuesday, March 20, 2018

11:00 AM - 11:15 AM

SASC 100

Economics

Catastrophic Healthcare Expenditure and Health Reform

Amin Shoja

A high rate of out-of-pocket healthcare expenditure can lead to catastrophic healthcare expenditure (CHE), forcing households to cut down consumption, minimize their needs or face poverty. This makes financial protection against high levels of out-of-pocket health expenditure and its consequences an important goal for any health care system adopted by governments including Iran. As of May 2014, the Iranian government has carried out the health reform program aiming different targets such as provision of universal health insurance, decreasing out-of-pocket health expenditure, and decreasing rate of CHE. This paper seeks to analyze the degree to which Iranian universal health insurance protects households from a high rate of out-of-pocket health expenditure. Our interest in this paper is to evaluate the effect of the program on the CHE. To that aim, we draw on rotating panel data of Iranian household budget for 2013-2014 and use Difference-In-difference (DID) methodology to compare the households who received the benefit from universal health insurance with the households who are not part of the program. The results show that the program was successful in decreasing the rate of out-of-pocket health expenditures and CHE in Iran during the sample period.

Oral Presentations

Tuesday, March 20, 2018

11:15 AM - 11:30 AM

SASC 100

Psychology

Nonconsensual porn (aka “revenge porn”) among U.S. adults: An examination of perpetration, victimization, and health correlates of victimization

Yanet Ruvalcaba

Sexual violence is defined as unwanted sexual acts which can be penetrative, non-penetrative, and nonphysical (Basile, Smith, Breiding, Black, Mahendra, 2014), occurring despite a victim’s refusal or inability to consent (Basile et al., 2014). Digital sexual violence is when technology is used to perpetrate acts of sexual violence (Henry & Powell, 2016; McGlynn et al., 2017), such as upskirting or nonconsensual porn- the nonconsensual distribution of sexually-explicit images (Citron & Franks, 2014). Consistent with sexual scripting theory (Masters, Casey, & Morrision, 2013), and research on other forms of sexual violence (Breiding, 2015), rates of NCP victimization and perpetration would be differential between men and women. We also expected that victimization and perpetration rates will vary by age, with emerging adults age 18-29 having the highest rates of both NCP victimization and perpetration compared to other age groups. To test these predictions, we distributed an online survey via Facebook, and received 3,044 responses (54% women); Facebook Ads Manager was used to apply a proportional quota sampling technique. This is the first study to examine NCP victimization and perpetration rates, as well as the health correlates of victimization. Women reported significantly higher rates of victimization (10.15%; 151/ 1488) than men (7.09%, 93/1312), $\chi^2 = 6.90$, $p = .009$. Women reported significantly lower rates of perpetration (3.47%; 55/1584) than men (7.99%, 104/1301), $\chi^2 = 25.021$, $p < .001$. Women on average reported being victimized at age 22.62 (SD = 8.39) while men on average reported being victimized at age 31.64 (SD = 13.98). Women perpetrators on average reported first perpetration at age 24.50 (SD = 14.76) while men on average reported first perpetration at age 27.77 (SD = 14.11). There were significant differences in overall psychological well-being for victims compared to non-victims, $F(1, 3042) = 165.48$, $p < .001$, and significant differences in somatic symptoms for victims versus non-victims, $F(1, 3042) = 161.52$, $p < .001$. Results support NCP as a gendered form of sexual violence with negative outcomes for victims.

Oral Presentations

Tuesday, March 20, 2018

11:30 AM - 11:45 AM

SASC 100

Leadership and Professional Studies

The Relationship between District Concert Band Music Performance Assessment Participation and Student Achievement in Miami-Dade County Public Middle Schools

Arthur Scavella

Since the implementation and achievement score pressures of the No Child Left Behind Act of 2001, elective course offerings such as music have been drastically reduced, especially in the middle school setting. This reduction of electives, also known as exploratory courses, antagonizes what research has defined as the role and purpose of middle school education. Consequently, research continuously shows that middle schools across the country exhibit the largest instance of an achievement gap. The research has stated that an effective middle school is supposed to be exploratory in nature and should contain an exploratory curriculum. A plethora of additional correlational research also has shown a positive connection between music education in school and students' overall academic achievement. This dissertation, which was a non-experimental ex post facto study, examined the correlation between those middle school students that participated in the District Concert Band Music Performance Assessment (MPA) versus those middle school students that did not regarding their 2016 English language arts (ELA) and mathematics achievement scores on the Florida Standards Assessments (FSA). Two high-achieving and two low-achieving middle schools from the Miami-Dade County Public School district were used for this study. Further statistical tests were conducted with those middle school students' achievement scores that did participate in the District Concert Band MPA: the level of music their band played as well as the band's overall final MPA rating in relation to their ELA and mathematics achievement scores. The findings showed a statistically significant difference between those students that participated in the MPA and those that did not regarding their ELA and mathematics achievement scores and between the ELA and mathematics scores and the level of music that was performed. There was not a statistically significant difference between the ELA and mathematics achievement scores and the band's overall final rating. The results indicated a positive correlation between music study and student achievement and administrators could use this information when making decisions about which programs to include in the school's curriculum to positively contribute to its overall academic achievement and academic culture.

Oral Presentations

Tuesday, March 20, 2018

11:45 AM - 12:00 AM

SASC 100

Politics and International Relations

Humanitarian intervention: a custom of international law?

Alejandro Abad Alvarez-Querol

This study examines the non-profit leader's vision and its implementation for the sustainability of non-profit organizations in an inner-city context. Using in-depth interview data obtained from ten non-profit leaders working for an inner city in Florida, I traced their vision content and how they implement it? Findings suggest that apart from the leader's vision as imperative for the long-term sustainability of the non-profit organizations, successful vision implementation is the most critical. Often the vision of the non-profit leaders fails as there is no agenda for collaborative visioning process among the non-profit leaders, community members, and local government agency. One of the core aspects of non-profit organization's performance and sustainability is the role of leader's vision and strategy. Leader's vision entails employing the diverse workforce to achieve the strategic goals of the organization by creating the compelling image of the desired future. Furthermore, vision is the starting point for the development, communication, and implementation of the strategy. However, research in this area, particularly in the non-profit sector is negligible. Additionally, inner cities in America are the places of crime, poverty, and negligence. The increased number of shootings in the United States has received continuous criticism from the public toward the government negligence of inner cities. Non-profit organizations key agenda is the social and economic advancement of the disadvantaged population particularly in the case of inner-cities. Albeit, there is a serious oversight of inner-city non-profits from government agencies and private businesses. It leads to the lack of collaborative action among various stakeholders and the failed development efforts. Furthermore, the growing criticism about the inability and declining interest of the governments in addressing social, economic, and cultural issues of the society has created an untapped space for the non-profits. Scholars suggest that the expanding role of the non-profit organizations in inner cities is substantive. However, non-profits serving the low-income communities face several challenges. Therefore, building non-profits which can triumph these challenges and sustain over a longer period are critical for long-term economic development of inner-cities.

Oral Presentations

Tuesday, March 20, 2018

12:00 PM - 12:15 PM

SASC 100

Electrical Engineering

UAV Procedures to Extend Flight Time for Search and Rescue Operations Using WiFi Probe Requests

Virgil Acuna

Search and Rescue (SAR) operations demand quick responses and ultimate efficiency. By incorporating a UAV, the immediate response to get to an area of interest is crucial, while covering the area efficiently and delivering real-time situational awareness to the rescue team. Through their agility, fast deployment, and ability to carry multiple sensors to collect data about a missing/distressed person, UAVs have shown to be a proven tool for day-to-day SAR operations. However, UAVs have limitations in navigational performance and extended flight time, which are critical components for SAR operations, since time is of the essence. In this study, we present procedures and experimental results to improve UAV performance optimization. Understanding the effect of propellers and Li-Po battery functionalities are vital factors to extend the flight time and the overall navigational performance to operate the UAV most efficiently. Additionally, how the UAV is maneuvered during flight is analyzed considering different SAR flight patterns and Li-Po battery consumption rates of the UAV. For probe request detection, a WiFi sniffer device is attached to the UAV. As the UAV flies over the designated search area, it detects WiFi probes along its path, and the number of probes detected is determined by the chosen search flight pattern. Lastly, an overview of Search Theory Method is presented to optimize SAR allocation efforts in designated search areas and to increase the probability of detecting a lost/distressed person(s) in the least amount of time.

Oral Presentations

Tuesday, March 20, 2018

12:30 PM - 1:45 PM

SASC 100

Group A - # 1

Biomedical Engineering

Bioscaffold Mitral Valve Hydrodynamic Evaluation in Child versus Adult Hemodynamic Settings

Elnaz Pour Issa

Introduction: Valve replacement in the treatment of congenital valve disease is severely limited in children suffering from the condition. We recently have investigated the use of PSIS (Porcine Small Intestinal Submucosa) for pediatric valve replacement. PSIS is FDA approved, and in our preliminary experience thus far, PSIS valves have performed well clinically under compassionate care treatment. An important aspect of PSIS valves is their hydrodynamic functionality. However, a key distinction between adult and pediatric patients is the different hydrodynamic environments. We evaluated the hydrodynamics of PSIS valves between adult and child/infant cardiovascular conditions in the mitral position. Materials and Methods: Valves made from PSIS were inserted in the mitral location of a commercially available pulse simulator. Saline solution was used as the fluid with a concentration of 0.9 mg/ml, which was poured into the atrial compartment. Two pressure transducers were connected to the atrial and the ventricular chambers. A pump facilitated a physiologically-relevant pulsatile flow profile which was monitored using an electromagnetic flow-meter. The values used for the stroke volume and the heart rate were 25 ml and 145 bpm for pediatric conditions; corresponding adult conditions were 80 ml and 70 bpm respectively. Flow and pressure data were logged onto a computer. The cardiac index (CI) was calculated approximately as $CI = (\text{Stroke Volume} * \text{Heart Rate}) / \text{Body Surface Area}$. Therefore the stroke volume and heart rate combinations for child and adult were comparable. A t-test was conducted to determine if statistical significance occurred between child and adult groups ($p < 0.05$). Results and Discussion: As would be expected, significant differences ($p < 0.05$) were observed in the instantaneous forward flow rates and effective orifice areas (EOAs), with the child group being much smaller in the case of both metrics. Conversely, the transvalvular pressure drop (ΔP), regurgitation fraction (Rf) and Energy Loss were not significantly different ($p > 0.05$) between the child and adult hemodynamic settings; the ΔP was clinically non-remarkable in both cases. Conclusions: PSIS mitral valve hydrodynamic evaluation reveals similar acute performances for both the pediatric and adult patient. However, additional valves need to be tested to reach conclusive results.

Oral Presentations

Tuesday, March 20, 2018

12:30 PM - 1:45 PM

SASC 100

Group A - # 2

Music

Citizen Art and Science: Using Environmental Data to Inspire Musicianship and Stewardship

Bryan Aguilar

The value of arts education, especially music, is often mistaken for the contributions it can make to learning in the common core or STEM subjects. One way of satisfying this expectation while also highlighting the benefits of music for its own sake might involve gathering and interpreting environmental data as prompts for student music compositions. The process of synthesizing research as the basis for emotive musical (and possibly lyrical) commentary should make an effective synergy between multiple disciplines and music with the added benefit of raising environmental awareness and contributing to a sense of global stewardship. This project will use a dataset from the Florida Coastal Everglades Long-Term Ecological Research (FCElTER) describing the effects of saltwater intrusion to coastal ecosystems as indicators of climate change. After observing various examples of ways science can be used as the basis for art, students will learn to analyze statistical data, acquire strategies for assessing environmental changes' effects on their own lives, and develop basic music literacy toward creating unique musical compositions inspired by their understanding of the research. Compositions can be realized through the use of digital music software, or orchestrated collaboratively for ensemble performance. Further projects may have students engaging in active research by gathering data in the field, which would also provide more material for synthesis and artistic reflection.

Oral Presentations

Tuesday, March 20, 2018

12:30 PM - 1:45 PM

SASC 100

Group A - # 3

Teaching and Learning

Understanding L2 Learners' Attitudes and Needs in Academic Writing in EAP Context

Renata Pavanelli

Academic writing is widely recognized as a key skill that influences L2 learners' ability to succeed in post-secondary education. The ability of L2 learners to successfully develop academic writing skills and strategies and complete academic writing tasks might be influenced by culturally and linguistically diverse factors. Some studies indicated that practices in EAP writing courses do not match the writing demands that L2 learners need to address in disciplinary courses (Leki & Carson 1997; Grabe, 2001; Carroll & Dunkelblau, 2011). The purpose of the study is to explore L2 learners' attitudes toward learning academic writing and to identify academic writing needs of L2 learners enrolled in the advanced EAP writing course. Using a qualitative approach, this study will initially explore the viewpoints and experiences of EAP faculty members and EAP current learners in terms of academic writing tasks, skills, and strategies that facilitate or impede their success in the advanced EAP writing course. EAP former learners will also be interviewed to better understand which tasks, skills and strategies are appropriate to be taught in the advanced EAP writing course so that L2 learners can succeed in their academic writing assignments. Based on the results from qualitative instruments, the present study will then quantitatively examine EAP current learners' attitudes toward learning academic writing and identify their academic writing needs for current and future writing tasks, skills, and strategies across the curriculum and for material design and curriculum development. Finally, an investigation on whether there is a relationship between EAP learners' attitudes and their writing needs will be analyzed and determined in order to examine whether or not attitudes toward academic writing are a unique and separable construct from EAP learners' academic writing needs when considering EAP learners' ethnic, educational, and socioeconomic differences. By providing insights into L2 learners' diverse backgrounds, this study contributes to the recognition of L2 learners' attitudes toward learning academic writing and helps to identify their writing needs to help L2 learners improve their levels of motivation, learn for meaningful purposes, and succeed in their academic writing courses. Data have not been collected yet.

Oral Presentations

Tuesday, March 20, 2018

12:30 PM - 1:45 PM

SASC 100

Group A - # 4

Chemistry and Biochemistry

Bacterial Topoisomerase IA as a Potential Target for Antibiotic Discovery

Ahmed Seddek

For several decades, the world has been suffering from antimicrobial drug resistance, which is defined as the ability of a microorganism to resist the effects of an antimicrobial agent, to which it was normally susceptible. *Mycobacterium tuberculosis*, the tuberculosis-causative organism that resulted in a 1.5 million death toll in the entire world in 2015, is an interesting example of resistant species. Hence, the discovery of novel antimicrobial agents is an urgent need. The DNA topoisomerases enzymes have attained much interest lately as potential antibiotic targets. These enzymes control the topological features of DNA in both prokaryotic and eukaryotic systems. They work by getting bound to the target DNA molecule, cleaving one or both strands of the double helix, passing another single or double strand through the break, and resealing the DNA at last. Bacterial Topoisomerase IA relaxes supercoiled DNA by performing a nucleophilic attack on one of the DNA ends through a 5' phosphodiester bond. If this enzyme is inhibited, the supercoiled DNA will not be relaxed, leading to cellular death. No bacterial Topoisomerase IA inhibitors have been approved for use so far, rendering it a novel target for antibiotic discovery. This project seeks novel inhibitors of bacterial topoisomerase IA in *Mycobacterium tuberculosis* and *Escherichia coli* via the screening of various chemical libraries. A DNA agarose gel electrophoresis-based assay that shows the formation of supercoiled DNA in the presence of inhibiting compounds, and an assay that shows the cellular growth inhibition in the presence of topoisomerase inhibitors, have been used in the screening process. Some promising candidates were found to inhibit the Topoisomerase IA of both *Mycobacterium tuberculosis* and *Escherichia coli*, and to inhibit the cellular growth of *Escherichia coli* and *Mycobacterium smegmatis*, which is a non-pathogenic homologue of *Mycobacterium tuberculosis*. The next step will be to conduct some enzyme-ligand binding studies that measure the degree of interaction between the enzyme and the candidate. Based on that, it is concluded that the application of diverse screening approaches to various chemical libraries is effective at finding novel inhibitors of bacterial Topoisomerase I, which may turn to be effective novel antibiotics.

Oral Presentations

Tuesday, March 20, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 1

Earth and Environment

Managing South Florida Invasive Plants through Biochar Production

Shagufta Gaffar

Maintaining and improving the quality and health of soil and environment has long been the focus of research. Biochar, a product derived from carbon-rich organic materials has the potential to fulfilling this goal. Use of biochars can improve soil quality and enhance the natural rates of carbon sequestration. Biochars produced from different biomass and under different production process effects the environmental and agronomic impacts of its application in different ways. This means biochars can be designed to achieve desired goals. Globally invasive species have become a serious problem. An invasive species is defined as a species that is non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. In south Florida several plant species have come to dominate and severely alter ecosystems. Production of biochar from certain invasive plants may be incentive to deal with these noxious plants in a profitable way, should biochar application to soil yield promising results. Therefore, advanced understanding of biochars is of utmost importance. The objective is to characterize the potential of biochars produced from different south Florida plant species as a cost effective management strategy which will aid in the improvement of soil and environmental quality.

Oral Presentations

Tuesday, March 20, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 2

Environmental Health Sciences

Molecular Determinants of Brain Vascular Disorders from Exposure to Polychlorinated Biphenyls

Christian Perez

Autism is a brain-based disorder resulting in a wide spectrum of abnormal behaviors and difficulties with social communication and interaction. Recent studies on human autistic brain vessels have shown a significant increase in plasticity markers CD34 and nestin; and suggest that autistic brains undergo a constant state of angiogenesis. The constant fluctuation in the cellular structure of blood vessels may impact the blood delivery system to the brain and ultimately be neurologically limiting. Environmental risk factors associated with the development of autism are largely unknown. Population studies have recently demonstrated an association between autism spectrum disorder in children with maternal pregnancy serum levels of polychlorinated biphenyl 153 (PCB153). PCB153 is one of the largest contributors for total PCB body burden in humans that has been shown to accumulate specifically in the brain in vivo. We have previously shown that PCB153 activates the transcription regulator ID3 in exposed human blood brain barrier endothelial cells. ID3 is biologically relevant to neurological and behavioral research because of its involvement in the stress response, neural plasticity, and neural circuitry. Here we propose to apply transcriptomic technology to test if PCBs target an ID3 regulated gene network that may explain brain vascular toxicity and allow for comprehensive examination of genomic and epigenomic molecular changes. Using transcriptome studies of PCB exposed children, we identified an ID3 gene regulatory network that can be used to predict molecular risk factors of autism in the population. Gene network enrichment analysis using genome wide ChIP-seq data identified ID3 target genes associated with PCB exposure and brain vascular processes. Bayesian algorithm BANJO suggest that modified expression of several 'key Markov genes' may be required for the development of autism and its application may be useful in identifying individuals who are susceptible to brain vascular toxicity from exposure to PCBs.

Oral Presentations

Tuesday, March 20, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 3

Human and Molecular Genetics

A survey of opinions for teaching biochemistry and nutrition in undergraduate medical education

Jake Levine

PURPOSE: Opportunities exist to optimize training in biochemistry and nutrition during undergraduate medical education. Existing research suggests that nutrition coverage is inadequate and the expansion of biochemistry content is arduous to learn and teach. This study surveyed physicians and educators about their opinions regarding the most important nutrition and biochemistry topics to teach to medical students. **METHODS:** Physicians and educators from Florida International University (Miami, FL), St. Georges University (Grenada, West Indies), the Association of Biochemistry Educators, and the Association of Professors of Human and Medical Genetics were surveyed. Participants were asked to rank, in order of importance, the ten most important biochemistry and nutrition topics for medical students to learn during undergraduate medical education. The suggested topics provided by the participants were coded into standardized topics and organized into narrow and broad categories. Microsoft Access was used to categorize topics, and Microsoft Excel pivot tables facilitated analysis. **RESULTS:** In total, 182 physicians and educators participated in the study, providing 879 suggested nutrition and biochemistry topics. Approximately 25% of participants did not provide any suggested topics. Of the responses received, many were either vague or were overly broad. Commonly mentioned topics included metabolic disorders, inborn errors of metabolism, and relationships between nutrition and various clinical conditions. **CONCLUSIONS:** We received approximately half the responses we expected from our participants. We suggest that this reflects a historical lack of educational time devoted to biochemistry and nutrition and/or insufficient relevant clinical perspectives presented during medical school basic sciences. The prioritized topics obtained from the survey can be used to focus development of learning objectives and case scenarios illustrating the clinical relevance of the most important topics in biochemistry and nutrition. We endeavor to improve medical education in this area and to increase the applicability of nutrition/biochemistry topics to clinical medicine.

Oral Presentations

Tuesday, March 20, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 4

Electrical and Computer Engineering

A Multiagent-based Game-Theoretic and Optimization Approach for Market Operation of Multi-Microgrid Systems

Mohammad Mahmoudian Esfahani

This paper proposes a multiagent-based energy market for multi-microgrid systems using game-theoretic and hierarchical optimization approaches. The proposed method is tailored to achieve the optimal operation of smart microgrids in distribution systems. Because of rapid load variations in distribution systems, it is necessary to develop fast optimization algorithms which minimize the power mismatch in and among microgrids. In this paper, a three-level market framework is proposed. The first level comprises a game-theoretic double auction mechanism for the day-ahead market while the next two levels are optimal rescheduling and inter-microgrid reverse auction model for the hour-ahead and real-time markets, respectively. Using the hierarchical optimization algorithm in a multi-agent based area, it is anticipated to not only minimize the optimization solution time but also reduce the dependency on the network in grid-connected mode or load shedding in islanded mode. Using this approach, load Demand Response (DR) capabilities along with rescheduling of Distributed Energy Storage Systems (DESSs) and Distributed Generations (DG) could be utilized in all market levels which will lead to optimal operation of multi-microgrid systems. Agents are developed in DIgSILENT PowerFactory and Dynamic Data Exchange (DDE) is activated for communication among agents communicating through a Data Distribution Service (DDS) which utilizes the Real-Time Publish-Subscribe (RTPS) communication protocol. The developed framework is applied to the modified 37-bus IEEE distribution test feeder system to validate the effectiveness of this market structure.

Oral Presentations

Tuesday, March 20, 2018

12:30 PM - 1:45 PM

SASC 100

Group B - # 5

Civil and Environmental Engineering

Identification of Possible Influential Factors to the Bicycle Crashes in Florida

Armana Sabiha Huq

Bicycle is the most vulnerable mode of transportation due to its unsafe infrastructure. Because of increasing safety risk to bicyclists, bicycle crashes need serious concern in Florida. This research work is an extended part of project conducted by the Florida Department of Transportation (FDOT). The specific objective of this study is to identify significant contributing factors to bicycle-motor vehicle injury severity crashes to address specific crash causes. The analysis is based on four years of crash and traffic data from 2011 to 2014. Three FDOT Crash Analysis Reporting (CAR) system databases were used e.g., crash level data file, non-motorist level data file and vehicle, driver, and passenger level data file. It is found that a total of 26,036 crashes with 503 fatal crashes and 22,146 injury crashes involved 26,462 bicyclists. Bicycle fatal crashes accounted for 5.6% of all traffic fatal crashes, while they constituted only 1.9% of total crashes. On average, there are 6.48 fatalities and 287.14 injuries per million population annually. These statistics prove that bicycle crashes are often severe. In this study, a logistic regression model is developed for analyzing crash injury severities classified into three levels: fatal, injury (possible, non-incapacitating and incapacitating injury) and property damage only (PDO). The categorical covariates includes temporal (e.g. crash date, time), environmental (e.g. lighting, weather condition), bicyclist-related (e.g. age, gender, impairment, bicyclists action), crash location-related (e.g. presence of work zone), and vehicle-related regressors (e.g. vehicle type, vehicle maneuver). Several famous techniques were adopted for best fitted model such as random forest, lack of fit test, statistical significant test, and log transformation. The statistical test results exhibit that the proposed logit model performs reasonably well. The estimation results reveal that the following factors more likely to be fatal crashes: occurring on weekends, elder bicyclists, dark lighting conditions, bicyclists failure to yield right of way, working/standing on roadway, improper turn/merge, involvement of trucks, vehicle leaving traffic lane. Moreover, this study provides insights for developing cost-effectives countermeasures or appropriate injury prevention strategies by identifying a meaningful risk factors and their impacts on crash injury severities.

Oral Presentations

Tuesday, March 20, 2018

2:00 PM - 2:15 PM

SASC 100

Mechanical and Materials Engineering

Development of the oxidation- and hot-corrosion-resistant coatings for turbine blades

Iman Khakpour

Zr-doped aluminide coating successfully formed on Inconel 738 superalloy by means of $ZrOCl_2 \cdot 8H_2O$ as an activator in pack aluminizing process. A two level factorial technique used to study the effect of main processing parameters on the specifications of coatings. Cyclic Oxidation tests were carried out at 1150°C in an open tube furnace. Each cycle consisted of 1 hour of heating in furnace and 10 minutes of cooling in the air and continued up to 1500 hours. Microstructural study and phase analysis of the coatings and oxide scales were investigated by means of X-ray diffraction method and SEM equipped with EDS. The results showed that a uniform aluminum rich layer was formed on the samples by high activity method. The results also showed that it is practicable to achieve a high resistant Zr-modified aluminide coating by optimizing the coating process parameters; for example one of the coating in this study could resist against high temperature oxidation up to 1460 hours. High temperature coatings are formed for protection of engineering components from environmental degradation.

Oral Presentations

Tuesday, March 20, 2018

2:15 PM - 2:30 PM

SASC 100

Health Promotion and Disease Prevention

Late and No Entry into Prenatal Care in Florida: Analysis of March of Dimes Data, 2012-2014

Etinosa Oghogho

Background and Objectives: Premature births, low birthweight, and infant mortality are all associated with pregnant women receiving late or no prenatal care. Late prenatal care is defined as receiving prenatal care beginning from the third trimester of pregnancy. Our objective was to identify factors associated with late or no entry into prenatal care in Miami, Miami-Dade County and Florida and assess correlations between late or no entry into prenatal care and infant mortality rates. Methods: We analyzed 2012-2014 data of women that received late or no prenatal care in Miami, Miami-Dade County, and Florida. We used publicly available data from March of Dimes Peristats dataset. Comparison was made between Miami, Miami-Dade County, and Florida. Factors considered included age, race and ethnicity, residence in each of these areas, and infant mortality rates. Results: Overall, rates of late or no prenatal care were much lower in Miami-Dade County (3.7%) and Miami (4.7%) compared to Florida (6%). Younger women (<20 years) had higher rate of late or no prenatal care receipt with more than 10% compared to 6.6% (20-29 years), 4.6% (30-39 years) and 5% (>40 years). American Indians/Alaska Natives (9.6%) and Non-Hispanic African-Americans (8.4%) in Florida had higher rates of receiving late or no prenatal care compared to Hispanic (5.6%), White (5.2%) and Asian/Pacific Islander (5.2%). Groups that had higher levels of late entry into or non-receipt prenatal care tend to have higher infant mortality rates than groups with lower levels with Non-Hispanic African-Americans having 11.4 infant deaths per live births compared to 4.4 infant deaths per live births in whites. Conclusions: More attention should be paid to the African-American community in Florida to improve access to early prenatal care services, especially adolescents, who tend to delay recognition of pregnancy. Strategies to decrease late/no prenatal care should focus on improving access to Medicaid, improved pre-pregnancy health and living condition of the woman, and contraception for reduction of unplanned pregnancy and poverty.

Oral Presentations

Tuesday, March 20, 2018

2:30 PM - 2:45 PM

SASC 100

Computing and Information Sciences

Watch, Listen, Read, and Learn: Deep Multimodal Representation Learning for Video Analytics

Samira Pouyanfar

Real-world applications usually encounter data with various modalities, each containing valuable information. To enhance these applications, it is essential to effectively analyze all information extracted from different data modalities, while most existing learning models ignore some data types and only focus on a single modality. This paper presents a new multimodal deep learning framework for event detection from videos by leveraging recent advances in deep neural networks. First, several deep learning models are utilized to extract useful information from multiple modalities. Among these are pre-trained Convolutional Neural Networks (CNNs) for visual and audio feature extraction and a word embedding model for textual analysis. Then, a novel fusion technique is proposed that integrates different data representations in two levels, namely frame-level and video-level. Different from the existing multimodal learning algorithms, the proposed framework can reason about a missing data type using other available data modalities. The proposed framework is applied to a new video dataset containing natural disaster classes. The experimental results illustrate the effectiveness of the proposed framework compared to single modal deep learning models as well as conventional fusion techniques.

Oral Presentations

Tuesday, March 20, 2018

2:45 PM - 3:00 PM

SASC 100

Hospitality Management

Examining millennials' online gambling behavior: a comparison of generational differences

Andrew McKenna

Purpose: This study aims to examine Millennials and generational differences in online gambling activity by comparing online gambling behavior across four different generations: Silent Generation, Baby Boomers, Gen Xers and Millennials. **Design/methodology/approach:** The sample comprised tracked gambling data at the individual player level provided by an online casino accepting real money wagers in a major US gambling market. Attributes of gambling behavior were examined and compared across different generations using Kruskal-Wallis test and pairwise comparisons. **Findings:** Generational differences were observed in 13 of the 16 behavioral variables. Millennials spent the least amount of time on gambling and exhibited the lowest scores on the number of days for slot gambling, trip length and trip frequency among all generations. However, their average table gaming volume per play day was greater than those of other generations. **Practical implications:** The results of this study provide a better understanding of the generational differences in online gambling behavior. They also help casino operators and gaming machine manufacturers develop casino games and products that can appeal to different generational groups in the online gambling market. **Originality/value:** Despite the on-going industry discussion about Millennials and their potential influence on the online gambling market, there appears to be a paucity of empirical research on the online gambling behavior of the Millennial generation. This study fills that gap in empirical evidence, addressing generational differences in online gambling.

Oral Presentations

Tuesday, March 20, 2018

3:00 PM - 3:15 PM

SASC 100

Economics

The Indebted Hand-to-Mouth

Nazmul Islam

In the literature wealthy hand to mouth (W-HtM) households, those who hold no liquid assets but sizable amounts of illiquid assets, poor hand to mouth (P-HtM) households, those who have no liquid assets and no illiquid assets, and non-hand to mouth (N-HtM) households, those who hold both the liquid and illiquid assets. However, some group of households those who have negative liquid and negative illiquid assets, which I referred to as indebted HtM (I-HtM), did not get any attention yet in economic modeling and empirical studies. I used Survey of Consumer Finance (SCF) 1989- 2013 nine waves for U.S.A to document the share of such households and their demographic characteristics. In my study, I found that about 12% of households are P-HtM, about 1% of households are I-HtM and 8% of P-HtM households are I-HtM. I also found almost the same share of I-HtM households in Panel Study on Income Dynamics (PSID) survey data on U.S. household portfolios. Number of empirical studies show that the richer households have lower marginal propensity to consume (MPC) than that of the poor households'. But my study shows the contradictory finding. As the SCF data is not longitudinal, I used PSID survey data on U.S. household portfolios to find their consumption responses to transitory income changes (MPC), and compare them to P-HtM and W-HtM households. I used the methodology proposed by Blundell, Pistaferri, and Preston (2008) and further examined in Kaplan and Violante (2010) and Kaplan et.al. (2014) to estimate the MPC of different types of households. The I-HtM households face some financial obstacles due to recession or other reasons for several periods. They have to borrow liquid assets for their livelihood. They need to pay the mortgage payments and other debts for long time though their asset's (e.g. housing) value declines over time. Therefore, they do not respond more to the transitory income changes for consumption. Moreover, I found in "my model" that this group of households smooth their consumption like the N-HtM households.

Oral Presentations

Tuesday, March 20, 2018

3:15 PM - 3:30 PM

SASC 100

Biomedical Engineering

A Multimodal Imaging Platform with Integrated Simultaneous Photoacoustic Microscopy, Optical Coherence Tomography, Optical Doppler tomography and Fluorescence Microscopy

Arash Dadkhah

Various optical imaging modalities with different optical contrast mechanisms have been developed over the past years. Although most of these imaging techniques are being used in many biomedical applications and researches, integration of these techniques will allow researchers to reach the full potential of these technologies. Nevertheless, combining different imaging techniques is always challenging due to the difference in optical and hardware requirements for different imaging systems. Here, we developed a multimodal optical imaging system with the capability of providing comprehensive structural, functional and molecular information of living tissue in micrometer scale. This imaging system integrates photoacoustic microscopy (PAM), optical coherence tomography (OCT), optical Doppler tomography (ODT) and fluorescence microscopy in one platform. Optical-resolution PAM (OR-PAM) provides absorption-based imaging of biological tissues. Spectral domain OCT is able to provide structural information based on the scattering property of biological sample with no need for exogenous contrast agents. In addition, ODT is a functional extension of OCT with the capability of measurement and visualization of blood flow based on the Doppler effect. Fluorescence microscopy allows to reveal molecular information of biological tissue using autofluorescence or exogenous fluorophores. In-vivo as well as ex-vivo imaging studies demonstrated the capability of our multimodal imaging system to provide comprehensive microscopic information on biological tissues. Integrating all the aforementioned imaging modalities for simultaneous multimodal imaging has promising potential for preclinical research and clinical practice in the near future.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:45 PM

SASC 100

Group A - # 1

Teaching and Learning

Analysis of school related arrests: Toward a better understanding of results by county and school

Daniel Wynne

In the wake of school zero-tolerance policies and their unintended consequences, increasing attention has been afforded the structural inequities some minority students face during encounters with municipal police and school resource officers (SRO). Critical consideration of publically available data has spurred a rethinking of disciplinary policies and the role of school resource officers. Florida school arrest data indicates an overrepresentation of minority students in arrests for felonies and misdemeanors on school properties, consistent with concerns identified by Ayers (Ayers, B., 1997) and others. Embedded within the data is an uninvestigated story of SRO practices as contrasted by practices of municipal police departments. In this research, State of Florida data was aligned with SES and school performance data to illustrate widely varying results from counties throughout the State and widely varying results by school level. Initial assessment revealed issues in coding data as collected by juvenile assessment centers throughout the state. This research project aims to describe differences in school related arrest data by county as applied to an analysis of variance, demonstrating significant variance. Underlying the significant differences in data by county and school is the policies applied by SROs and municipal police departments in approaches to school related delinquency.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:45 PM

SASC 100

Group A - # 2

Biomedical Engineering

Effect of vibrotactile feedback and grasp interface compliance on grasp force and hand opening control of a sensorized myoelectric prosthetic hand

Andres Pena

Current myoelectric prosthetic limbs are limited in their ability to provide direct sensory feedback to users, which increases attentional demands and reliance on visual cues. Vibrotactile sensory substitution (VSS), which can be used to provide sensory feedback in a non-invasive manner, however has demonstrated only limited improvement in myoelectric hand control. In this work, we use VSS to investigate the effect of vibrotactile paradigms and added grasp interface compliance on the quality of control of grasp force and hand opening by able-bodied participants using an instrumented myoelectric hand. We developed a system that delivers vibratory patterns to the forearm based on sensor readings from a prosthesis, instrumented with grasp force and hand opening sensors. A single burst-rate modulated actuator conveyed signal intensity by adjusting the driving tone burst rate and period. An array of five coin-shaped tactors conveyed signal intensity by varying tactor activation location. We tested the accuracy of myoelectric control during virtual target tasks, monitoring error rates, task durations and level discrimination performance. All tasks were completed with and without visual (computer display) or vibrotactile feedback. Eight subjects completed grasp force and hand opening tasks, receiving feedback from the actuator or the array. We found that feedback from the array seems to help improve myoelectric control regardless of the task performed, as opposed to a single actuator. We also found that force tasks were more difficult to perform than hand opening tasks. This seems to hinder discrimination of levels from the single actuator. While considering factors that may help reduce force control difficulties, we looked at adding mechanical compliance to the hand by introducing a compliant interface. Ten subjects received feedback from the actuator or the array, and reached force targets while grasping with a stiff or compliant interface. We found that added compliance could potentially improve control quality, lowering error rates when receiving feedback from a coin array, and lowering task durations with feedback from a single actuator. These results can potentially inform the design of non-invasive feedback-enabled prostheses for combined grasp force and hand opening feedback.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:45 PM

SASC 100

Group A - # 3

Public Administration

Leader's Vision Implementation: An Agenda for Non-Profit Sustainability and Inner-City Development

Pallavi Awasthi

A high rate of out-of-pocket healthcare expenditure can lead to catastrophic healthcare expenditure (CHE), forcing households to cut down consumption, minimize their needs or face poverty. This makes financial protection against high levels of out-of-pocket health expenditure and its consequences an important goal for any health care system adopted by governments including Iran. As of May 2014, the Iranian government has carried out the health reform program aiming different targets such as provision of universal health insurance, decreasing out-of-pocket health expenditure, and decreasing rate of CHE. This paper seeks to analyze the degree to which Iranian universal health insurance protects households from a high rate of out-of-pocket health expenditure. Our interest in this paper is to evaluate the effect of the program on the CHE. To that aim, we draw on rotating panel data of Iranian household budget for 2013-2014 and use Deference-In-difference (DID) methodology to compare the households who received the benefit from universal health insurance with the households who are not part of the program. The results show that the program was successful in decreasing the rate of out-of-pocket health expenditures and CHE in Iran during the sample period.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:45 PM

SASC 100

Group A - # 4

Biomedical Engineering

Optochemical Carbon Dioxide Sensor for Respiratory Feedback

Teshaun Francis

With the introduction of diaphragm pacing (or diaphragm stimulation), respiratory function can be partially restored to those who suffer from neuromuscular disorders. What these systems lack, however, is a feedback mechanism to adjust the tidal volume and breathing rate under changing cardiovascular conditions. Carbon dioxide in the blood and cerebrospinal fluid is a strong indicator of respiratory health, and thus makes the perfect target analyte for a continuous feedback system. Our aim is to design an optochemical sensor that can reliably monitor carbon dioxide levels in vivo. In this presentation, we describe the materials and methods used to fabricate our prototype fluorescent-based sensor, and we demonstrate its performance in response to physiologically relevant concentrations of carbon dioxide.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:45 PM

SASC 100

Group A - # 5

Biomedical Engineering

Optogenetics to target neuroinflammation in lesion-based epilepsy

Lakshmini Balachandar

Seizure perpetuation in epilepsy might originate from long term neuroinflammatory responses associated with lesions. It has been demonstrated that astrocytes are among the critical cell types mediating the pathway between microglial immunological responses and gene transcription in neurons. Astrocytic calcium activity is believed to be the regulatory mechanism underlying such multicellular interactions. Optogenetics, a modern technique in neuroscience, has recently been expanded from the conventional method of controlling excitable cells with light to control electrically non-excitable cells, e.g. astrocytes. However, the mechanisms by which light-activated channelrhodopsins affect the behavior of such non-excitable cells have not been clearly identified or quantified. Also, a methodology to control calcium signaling in astrocytes and their implications in the neuroinflammatory environment is required. The goal of this study is to develop a technique to quantify and validate calcium signaling in astrocytes using light, to elucidate their role in the case of epilepsy. We hypothesize that reducing abnormal calcium signaling in astrocytes reacting to the lesion may help delay the non-desirable transcription of genes in neurons. This neuronal environment might be prompted to hyperexcitability, otherwise. We have established a protocol to stimulate astrocytes with light in vitro, to find the ideal light stimulation parameters to achieve calcium signals in transfected astrocytes. A biophysical model (Stefanescu et al., 2012) was employed to quantify the spontaneous calcium oscillations in astrocytes. To validate the expression of the optogenetic virus which confers light sensitivity to astrocytes, in vivo, a serotype evaluation of the construct was performed. The viral construct of interest, to target astrocytes in our experiments is AAV-GFAP-hChR2 (H134R)-mCherry. The plausible serotypes for the study were narrowed down to serotypes 1, 5 and 8, based on previous studies in the spinal cord and the rat brain targeting neurons. The validation of viral expression has been performed by post mortem histological analysis. From our preliminary data, serotype 8 of the virus shows promising transduction patterns in astrocytes in the cerebral cortex, in terms of the highest transverse and radial spread. This evaluation would help us understand the expression of the gene conferring light sensitivity to the astrocytes, and thereby allowing us to control them using light. The optogenetic methodology will be employed to delve into the response of astrocytes to light stimulation allowing the study of neuroinflammatory and functional changes associated with glioreactivity.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:45 PM

SASC 100

Group B - # 1

Religious Studies

The Lure of the ISIS Message

Emmanuel Dennis

About the power of rules, the primary contribution herein suggests the present practice of humanitarian intervention does not constitute a norm/rule of customary international law, because said practice is deficient in both a general, consistent state practice and an absence of acceptance by the generality of states and other international persons of said practice as legally binding called 'opinio juris.' This research asks: is the norm/rule of humanitarian intervention a customary norm of international law? For the diagnosis of state practice, this research will look at how the characteristics establishing state practice: general, constant/uniform are satisfied in conflicts that included gross violations of fundamental human rights on a large scale during the post-Cold War era. To determine the requirement of 'opinio juris,' this research analyzes through the 'operational code belief system' and discourse analysis: the attitude of the parties and top decision-makers of states towards certain General Assembly resolutions; and the debates generated by the speeches of several Secretary-General of the UN to the General Assembly. This study hypothesizes that a renewed belief in Just War Theory principles, especially the 'just cause' principle, could have slowly reawakened the belief in the duty of humanitarian intervention instead of the principle of absolute sovereignty.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:45 PM

SASC 100

Group B - # 2

Chemistry

Development and Validation of a Novel Phage Display Library for Detection of Human Hemoglobin

Stephanie A. Delabat

Recreational drugs classified in Schedule I by the Drug Enforcement Administration are associated with a significant potential for abuse, physical dependence, and adverse psychological effects. Covalent binding is noted in the interaction of electrophilic xenobiotic substances with nucleophilic mammalian proteins such as hemoglobin and albumin. High-sensitivity immunoassay systems such as enzyme linked immunosorbent assays (ELISA) are cost-efficient, reliable, and amenable to high-throughput screening. When coupled with phage display, customized antigen recognition through several rounds of biopanning can be achieved with relative expedience as compared to the maturation process for commercially available monoclonal antibodies. A Human Domain Antibody Library consisting of 3×10^9 heavy chain antibody fragments cloned in an ampicillin-resistant phagemid vector and transformed into the electroporation-competent TG1 strain of *Escherichia coli* cells was utilized to develop a novel phage display library with selective affinity to human hemoglobin. Amplification the KM13 helper phage creates a working stock for infection of the transformed bacteria. The antibody library is grown in nutrient media to obtain phage supernatant through purification using polyethylene glycol. The amplified bacteriophage is then exposed to human hemoglobin solution in three rounds of biopanning to recruit clones with affinity for the target ligand. Finally, the phage clone affinity generated in each round of selection is assessed by colorimetric absorbance readings in an ELISA platform. Phage titer in the range of 10^{13} is obtained from 1 ml of supernatant and preserved for use in three rounds of selection. The first round conferred over 50% enrichment of binding clones. Each successive round provided at least 100 infective phage as assessed through colony counting. Increasingly selective phage were obtained by enhancing the stringency of the washes and reducing the ligand concentration in each round. Human hemoglobin, when targeted by xenobiotic drugs of abuse to form hapten molecules, presents a biosensor for use in validation studies. Development of a phage display library that selects for drug-protein adducts may be applied in future research to screen for exposure to drugs of abuse.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:45 PM

SASC 100

Group B - # 3

Electrical and Computer Engineering

A multivariate calibration model for precise detection of alcohol in fuel cell sensor

Ahmed Jalal

Accurate measurement of alcohol is imperative for the prevention of drunk driving accidents and point of care monitoring. Precise detection of sub-ppm level of alcohol is a challenge for any wearable sensors due to their drifting and interference of the signals, aging effect, and cross-selectivity. In this work, proton exchange membrane with three electrodes fuel cell sensor was explored for alcohol measurements. These measurements show the sensors' signals are dependent variable of the humidity and temperature. Hence, devising a calibration method for this sensor is critical for measurements in the multivariant environment. To address the drifting in the signal, principal component analysis (PCA) is employed which eliminates the redundancy of the variables and provides further linear regression fitting for the precise calibration. Measurements were carried out in physiological range from 5 ppm to 100 ppm where 25 data points (steady state current, I_{ss}) were considered for each concentration. Along with I_{ss} , difference (\hat{I}^T) in between of I_{ss} and reference signal was also considered as a variable (25 data points) for PCA and regression analysis. The calibration curve (concentration vs. I_{ss}) shows poor linearity ($R^2 = 0.6192$), sensitivity ($0.95 \hat{\mu}A/ppm-cm^{-2}$) and significant overlapping (max. 6.4% RSD value). Resolving this issue, PCA was modelled on data matrix, $D_{50 \times 5}$ and it classified different concentrations in the subspace. The variances were found 60.58 (96.14%) and 2.43 (3.86%) which inferred the command of 1st principal component. However, PCA cluster model can isolate each concentration (cluster) well though it has a limitation to provide linear fitting for unknown measurement. Hence, a regression model was obtained from PCA for a fitting of the unknown concentration (y) considering the loading fraction (x) as equation below:

$$y = \hat{I}^T e^{-x/\hat{I}^2}; \quad \hat{I}^T = 6255, \hat{I}^2 = 0.1055.$$

An unknown concentration can be determined by fitting the value of x in this regression model. PCA regression eliminates the signal overlapping and drifting. This calibration method improves the reliability and accuracy of alcohol fuel cell sensor. The significance of this research lies in its versatility dealing with the existing challenge of calibration of sub-ppm level measurement of alcohol or other volatile compound in fuel cell sensor.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:45 PM

SASC 100

Group B - # 4

Electrical and Computer Engineering

Zinc Oxide Nanoflakes based Flexible Platform for Lactate Monitoring

Fahmida Alam

Being a key molecule in the anaerobic energy system of humans, lactate is primarily considered as a biomarker for tissue oxidative stress when the energy demands of tissues cannot be met under normal aerobic conditions. Therefore, continuous lactate monitoring is integral to systemic healthcare in military and high-risk personnel, in clinical emergencies, sports, and general medicine. We report on both highly sensitive and flexible L-lactate enzymatic sensors. The demonstrated biosensors are fabricated based on two-dimensional (2D) zinc oxide (ZnO) nanoflakes (NFs), which were synthesized on flexible Au-coated polyethylene terephthalate (PET) substrate using simple one step sonochemical approach for noninvasive lactate monitoring in human perspiration. PET/Au/ZnO NFs sensor demonstrated detection of lactate in the physiological range of 10pM-10 μ M for the electrode area of 0.5 cm^2 . ZnO nanostructures show significant potential for use in biosensors because of their diverse range of morphologies, high isoelectric points and biocompatibility. The fabrication of Au-coated PET substrates follows the steps below: i. PET substrates were cleaned with isopropanol and DI water in an ultrasonic bath for 15 min each, ii. they are dehydrated through nitrogen drying, iii. a thin film of 20 nm of titanium (Ti) as an adhesive layer was deposited on PET, and iv. a layer of 60 nm thickness of Au was deposited on PET substrates by e-beam evaporation. The process of growing ZnO NFs was as follows: i. cleaning the substrate, ii. preparation of the solution for the synthesization of ZnO NFs, and iii. synthesize of ZnO NFs on PET substrate. For cleaning, the Au-coated PET substrates were washed with deionized water and subsequently were dehydrated by N₂ drying process. PET/Au/ZnO NFs based lactate sensor (without linker) shows 4 times better response than conventional gold electrode with linker. High isoelectric point Of ZnO NFs allows a direct, stable pathway for rapid electron transport without any mediator when an analyte is immobilized on NFs and improves electron transfer rate. The LoD of this sensor was found 10 pM and the sensitivity was calculated as 2.23 $\mu\text{A}/\text{M}/\text{cm}^2$. The sonochemical method and the designed sensor would help realizing wearable continuous lactate monitoring sensing platforms.

Oral Presentations

Tuesday, March 20, 2018

3:30 PM - 3:45 PM

SASC 202

Health Promotion and Disease Prevention

Perceptions of College Students on the Non-Verbal Communication of their Health Care Provider on Quality of Care

Rumi Agarwal

The Problem Statement: Ineffective non-verbal communication between health care professionals (HCP) and patients impedes the ability to express sincere concern for their care which can impact health outcomes. Research Objective: The study explored the perceptions of college students on their HCP non-verbal communication and its impact on perceptions of quality of care. Methods: Using a semi-structured question guide, a two-stage focus group study was designed. The first stage, comprising of four focus groups was conducted amongst a purposive sample of 28 university students in Fall 2017 (n=28, 17 males and 11 females). Thematic analysis was employed to explore the perceptions of college students on their HCP non-verbal communication. The second stage, comprising of two focus groups (n = 20) is scheduled for Spring 2018, with the purpose of an in-depth understanding of the identified themes. Results: Three themes emerged from the first stage of focus groups. Physical appearance, culture/ethnicity and trust. Male participants viewed physical appearance (described as the presentation of self and age of the HCP) as more important in the perception of quality of care compared to female participants. The culture/ethnicity of the HCP was seen by some male participants as important, while most participants agreed that it did not influence perceptions of quality. Several dimensions of trust were also observed. Non-verbal gestures such as eye contact, smiles, and the initial handshake were important for all participants. Trust was also influenced by the experience and physical movements of the HCP. Participants agreed that the touch by a HCP also affected trust, but was dependent on its context. Conclusion: Non-verbal communication habits practiced by HCP significantly impacts the patients' perception of quality of care. It is essential that HCP are cognizant of their communication style when interacting with patients to improve health outcomes.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:00 PM

SASC 202

Economics

National Financial Literacy Initiatives and Financial Inclusion: Evidence from Zambia and Malawi

Faisal Awwal

The Bank of Zambia (BOZ) launched annual national financial literacy campaigns named “Financial Literacy Week” beginning in 2013 to stimulate the savings behavior and the pace of financial inclusion of its citizens. To evaluate the impact of the outreach, I gathered a random sample of 3,990 individuals in Zambia and Malawi for periods before and after its launch. Comparing the trend of savings activity in both countries allows me to assess the incremental impact, if any, of the financial education campaign in Zambia. I find that outreach has boosted the pace of savings for the general Zambian population relative to that of Malawi. More specifically, less educated (high school completion or less) groups in Zambia have generally increased savings activity; Zambian women are utilizing informal channels to save their money due to access constraints to formal financial institutions; and the BOZ should tailor outreach to target the savings behavior of poor individuals, who are centrally located in rural areas.

Oral Presentations

Tuesday, March 20, 2018

4:00 PM - 4:15 PM

SASC 202

Chemistry and Biochemistry

Cd²⁺ Binds to DREAM and Alters Interactions between DREAM and Intracellular Partners

Samir Azam

Cd²⁺ is a toxic, nonessential and carcinogenic transition metal. Cd²⁺ exposure has been associated with different cancers, including lung, prostate, renal, liver and stomach cancers. Increasing evidence demonstrated that Cd²⁺ exposure leads to neurodegenerative diseases, such as Alzheimer's disease, and Parkinson's disease; however, the mechanism of Cd²⁺ induced neurotoxicity is not demystified yet. Here we show that Cd²⁺ associates to EF-hands in DREAM (downstream regulatory element antagonist modulator) with an equilibrium affinity higher than that determined for Ca²⁺. Cd²⁺ association alters the secondary and tertiary structures of the protein, based on the Trp 169 emission and CD spectra. The hydrophobic cavity in the C-terminal domain of DREAM is solvent exposed in the presence of Cd²⁺ as determined using a hydrophobic probe 1, 8-ANS. Cd²⁺ binding modulates interactions between DREAM and intracellular partners. We titrated presenilin-1 helix 9 "PS1HL9" and Kv4.3(70-90) "site 2" with Cd²⁺-bound DREAM. Titration data shows that Cd²⁺-bound DREAM has similar affinity for "PS1HL9" as Ca²⁺-bound DREAM; likewise, Cd²⁺-bound DREAM has an analogous binding affinity for Kv4.3 site 2 as Ca²⁺-bound DREAM. The isothermal titration calorimetry (ITC) data reveals that Cd²⁺ binds to DREAM endothermically and through the entropy-driven mechanism. DREAM protein is expressed in the hippocampus region of the brain, the part of the brain controls memory and learning processes. A plethora of evidence demonstrated that amount of Cd²⁺ is high in the hippocampus regions. So, results of our study suggest that DREAM and possibly other neuronal calcium sensors bind Cd²⁺ with a high affinity and could provide insight into cadmium-induced neurotoxicity.

Oral Presentations

Tuesday, March 20, 2018

4:15 PM - 4:30 PM

SASC 202

Dietetics and Nutrition

The effect of vitamin d3 supplementation on biomarkers of oxidative stress and glycemic status in adults with type 2 diabetes

Sahar Ajabshir

Objectives: The aim of this study was to investigate the effect of 4000 IU and 6000 IU daily supplementation of vitamin D3 for 3 and 6 months on biomarkers of DNA/RNA oxidative stress (8-OHdG), in individuals with type 2 diabetes and serum vitamin D insufficiency/deficiency.

Methods: Measurements of variables for 68 participants were conducted at baseline, after 3 months and after 6 months of supplementation. Mixed model was used to compare treatment groups. Covariates in the adjusted model included age, gender, BMI, insulin, HbA1C, years with type 2 diabetes, perceived stress, physical activity, and sun exposure. **Results:** Sixty-eight participants completed the study, males (n=27) and females (n=41), and were included in the present study's analysis. Mean age was 54.94 $\hat{\pm}$ 7.93 years. The unadjusted mixed model showed no difference between the 4000 IU and 6000 IU groups regarding the oxidative stress level and the interactions between time and treatment were not significant. The model showed a statistically significant difference in 8-OHdG level between baseline and 3 months ($P < 0.001$), 3 months and 6 months ($P < 0.001$), and baseline and 6 months ($P = 0.016$). Mean serum 25(OH)D3 at baseline, after 3 months and after 6 months were 22.34 $\hat{\pm}$ 6.67 ng/mL, 40.77 $\hat{\pm}$ 13.63 ng/mL, and 40.41 $\hat{\pm}$ 14.5 ng/mL, respectively. Paired t-test comparisons showed a statistically significant change in 25OHD3 level between baseline and 3 months ($P < 0.001$), and baseline and 6 months ($P < 0.001$). After adjusting for covariates, the model remained statistically significant; Pairwise comparisons showed significant changes in 8-OHdG level between baseline and 3 months ($P < 0.001$), between 3 months and 6 months ($P < 0.001$), and between baseline and 6 months ($P = 0.020$). **Conclusions:** The results of the present study showed daily oral supplementation with higher doses of vitamin D, 4000 IU and 6000 IU, for 6 months could significantly improve oxidative stress status among a group of individuals with type 2 diabetes and vitamin D deficiency/insufficiency. Furthermore, 8-OHdG may be a predictive biomarker of DNA/RNA damage among individuals with type 2 diabetes with vitamin D deficiency/insufficiency.

Oral Presentations

Tuesday, March 20, 2018

4:30 PM - 4:45 PM

SASC 202

Biomedical Engineering

Network Architecture & Connectivity Analysis of Cortical Brain Tissue through Simultaneous Immunofluorescent Staining of Neurons, Astrocytes, Vasculature and Nuclei

Jared Leichner

Problem Statement: Comprehending the interwoven network architecture of neurons, astrocytes and vasculature within cortical brain tissue requires a resolution fine enough to identify detailed cellular morphology and a stitched multi-panel dataset large enough to extract tissue-level characteristics. Additionally, datasets must undergo deconvolution and volumetric modeling to extract quantitative network parameters. **Research Objectives:** Utilizing the morphological cellular information generated from this sprawling topology, network analysis is performed to identify quantifiable changes in cellular connectivity that can serve as unique “fingerprints”™ for specific brain regions. These region-specific characteristics will ideally aid in later identifying specific regions of diseased tissue within a larger cortical zone. An additional facet of this work is the use of point-spread-function analysis and deconvolution to analytically sharpen the microscope images and remove the effects of anisotropic broadening of fluorescence emission due to aberration induced defocusing. **Research Methodology:** These goals are accomplished through confocal fluorescence microscopy. This project proposes a novel combination of simultaneous immunofluorescent staining targets alongside an optimized staining and imaging methodology for cortical brain tissue that highlights four key components “neurons, astrocytes, vasculature and nuclei” while collecting large cortical column datasets [800 μm x 3 mm x 70 μm] at extremely fine spatial resolutions [0.2 μm x 0.2 μm x 1 μm]. Through a novel depth-dependent PSF collection scheme, the large cortical column datasets can be iteratively deconvolved to ensure a morphologically accurate final volumetric rendering of individual cellular processes. This technique is similarly tested for deconvolution of large [1 mm x 1 mm x 1 mm] data cubes of immunofluorescently stained, optically cleared cortical vascular networks. **Results/Conclusions:** The combination of our novel immunofluorescent staining target combination, large-scale data collection methodology, deconvolution and volumetric modeling is capable of generating unique and accurate quantitative parameters from a variety of imaging scenarios. These scenarios include both the high-magnification methodology accompanied with analyzing detailed cortical architecture as well as the low magnification techniques used for deep imaging within optically cleared tissue. **Contribution/Significance:** Through these improvements in sample preparation, data collection, post-processing and quantitative feature extraction, these techniques hold vast potential for generating new golden standards for quantitative analysis of the network architecture of neurological tissue slices.

Oral Presentations

Tuesday, March 20, 2018

3:30 PM - 3:45 PM

SASC 352

Chemistry and Biochemistry

Implementing high performance liquid chromatography-trapped ion mobility mass spectrometry (HPLC-TIMS-MS) for the analysis of juvenile hormone III

Alan McKenzie

Mosquito related diseases affect 700 million people and claim 1 million lives per year. To combat the pervasiveness of the mosquito population efforts have been focused on understanding mosquito physiology. Research on the role of juvenile hormones in mosquito development and reproduction has revealed that although occurring naturally and essential in a normal lifecycle the hormones serve as an antagonist to metamorphosis preventing larvae from prematurely turning into adults and influences whether ovaries will be reabsorbed; adult female mosquitoes will reabsorb ovaries to reallocate resources as a survival tactic under adverse conditions. Numerous juvenile hormones have been discovered and have similar structural motifs with juvenile hormone III being the most common form in adult insects. Previous work from our group produced an extraction procedure followed by high performance liquid chromatography electrospray ionization (HPLC-ESI)-mass spectrometry/mass spectrometry (MS/MS) analysis which featured increased sensitivity, reproducibility, and reduced analysis time compared to traditional techniques. The research also presented a detailed description of the fragmentation of the protonated form of juvenile hormones III. In our current work we seek to characterize the fragments of juvenile hormones III. To do this, we implement trapped ion mobility-mass spectrometry (TIMS-MS) which in combination with computational chemistry is becoming an effective method in unravelling the structure of biomolecules. TIMS-MS has shown greater efficacy in separations from complex mixtures and in resolving conformational isomers than traditional ion mobility-mass spectrometry. From this research we seek to develop a method for the quantitative abilities of HPLC-TIMS-MS for the analysis of juvenile hormone III that can be extended to other juvenile hormones.

Oral Presentations

Tuesday, March 20, 2018

3:45 PM - 4:00 PM

SASC 352

Electrical and Computer Engineering

Connectivity Dynamics of Interictal Epileptiform Activity

Hoda Rajaei

Problem statement - Epilepsy is a prevalent neurological disorder distinguished with unprovoked and recurring seizures. Epileptic seizures are characterized as generalized or focal. In addition to seizure attacks, which are the main characteristic of epilepsy, interictal epileptiform discharges are other non-trivial disease symptoms that inherit some attributes of the disorder. Due to the unpredictability of seizures, thorough investigation of interictal events could enhance our understanding of the disease and promote the diagnosis process. **Research objective** - In this research, we have used various interictal epileptiform discharges (IEDs) that appear in interictal (between seizure) epileptic electroencephalography (EEG) to investigate the functional interactions among brain modules. We have extracted the connectivity maps of IEDs using the phase synchronization assessments of the EEG electrodes and compared the maps by quantification of strong connections that resulted from the epileptic activity. These results augment the prospects for diagnosis and enhance the recognition of the disease type via EEG-based connectivity maps. **Methodology** - The scalp EEG signals of four adult individuals, diagnosed as epileptic, were collected. Nineteen electrode EEG signals were recorded based on 10-20 international system with the sampling frequency of 200 Hz. 43 files that included different IED patterns including spikes, spike-wave complexes and poly spike-waves, were separated and used in the study. The connectivity maps of all segments are extracted using a nonlinear data driven method of correlations of probabilities of recurrence. The maps are assessed regionally by graph theory analysis and comparing the number of strong connections in clinical brain regions. **Conclusions** - According to results, the comparison of activities in brain regions resulted in different connectivity patterns among spike categories. This difference is confirmed statistically by ANOVA test which resulted in significant difference among the average connectivity maps (P -value $\ll 0$). This statistically proven distinction indicates significant differences between connectivity maps related to focal epilepsy (spike group) and generalized epilepsy (complex and repetitive group). The graph theory analysis resulted in higher synchronization in addition to the abnormal regularized network topology. We concluded that the connectivity patterns (the connection strength and pattern of spread on brain regions) were related to the type of epilepsy.

Oral Presentations

Tuesday, March 20, 2018

4:00 PM - 4:15 PM

SASC 352

Psychology

Common and distinct brain networks associated with risky and ambiguous decision-making

Ranjita Poudel

Introduction: Making a decision when outcomes are uncertain is pervasive aspect of everyday life and dysregulated decision-making is linked with various neuropsychiatric conditions (e.g., drug abuse and conduct disorder). Two types of uncertain decision-making have been widely considered in cognitive neuroscience research: risky decision making (RDM, outcome probabilities are well estimated) and ambiguous decision-making (ADM, outcome probabilities are unknown). Evidence suggests that these types of decision-making are distinct mental operations, however it remains unknown if they are associated with activation of common or distinct brain regions and/or brain networks. As such, we employed emerging neuroimaging meta-analytic tools to elucidate brain regions associated with these two types of decision-making. Method: We performed literature searches for neuroimaging studies reporting whole-brain results for both RDM and ADM tasks. To identify convergent brain activations across literature common to both, a coordinate-based meta-analysis with all studies within RDM and ADM was performed via Activation Likelihood Estimation (ALE) framework ($P_{corrected} < 0.001$). Similarly, we performed ALE meta-analysis for experiments in these two groups of studies independently to identify distinct brain regions associated with RDM and ADM ($P_{corrected} < 0.001$). Finally, we ran contrast analysis for direct comparison of RDM and ADM ALE maps to characterize potential brain activation differences between these forms of decision-making. Results: Convergent activation for common decision-making was observed in bilateral ACC, bilateral inferior frontal gyrus (IFG), right insula, bilateral caudate, right inferior parietal lobe (IPL). Similarly, convergent activation for RDM was observed in right insula, right anterior cingulate gyrus (ACC), bilateral caudate, and right IPL, whereas that of ADM was observed in bilateral IFG, bilateral angular gyrus and right insula. Direct statistical comparison of RDM and ADM ALE maps revealed higher RDM convergence compared to ADM (RDM > ADM) in right IPL, right Insula, bilateral caudate, and right ACC. Similarly, the reverse (ADM > RDM) was observed in bilateral IFG and angular gyrus. Conclusion: RDM and ADM are associated with common (right insula) and distinct brain regions (RDM: ACC, IPL and caudate; ADM: IFG and angular gyrus). Overall, our findings support the existence of discrete decision-making network and this could further augment our understanding of decision-making related psychiatric conditions.

Oral Presentations

Tuesday, March 20, 2018

4:15 PM - 4:30 PM

SASC 352

Immunology

HIV Tat protein and TGF- β 2 suppresses CFTR biogenesis and activity by microRNA mediated gene silencing

Rajib Kumar Dutta

Background: Complications in respiratory system are common in HIV patients, specifically in HIV-infected patients who smoke. HIV infected person who smoke are six times more likely to get infected with pneumonia with higher mortality rate as compared with non-infected age controls. Obstructive lung diseases like COPD, pulmonary hypertension, and pneumonia are the prominent factor for morbidity and mortality despite of having combination antiretroviral therapy (cART). Tobacco smoke and HIV infection was identified as pivotal causes to suppress nasal mucociliary clearance (MCC) as well as bronchial MCC, primary innate defense mechanism in airway system. Methods: All experiments were performed with primary human bronchial epithelial cells, re-differentiated at the air-liquid interface (ALI). NHBE ALI cultures were exposed to whole cigarette smoke (CS) using a SCIREQ inExpose smoke robot. At the end of experiments, cells were lysed and total RNA was extracted and analyzed to quantify CFTR mRNA. Using chamber experiments were performed to determine CFTR function in NHBE ALI cultures exposed to cigarette smoke and/or TGF-beta. Results: Our study showed that TGF-beta signaling is enhanced by HIV Tat protein and cigarette smoke. We found that HIV Tat protein and cigarette smoke inhibit CFTR biogenesis and activity in normal human bronchial epithelial (NHBE) cells via a common TGF- β signaling pathway. Chromatin immunoprecipitation with RNA Polymerase II demonstrated that transcription from the CFTR promoter is unaffected and blocking the miRNA processing pathway with Aurin Tricarboxylic acid (ATA) restore CFTR inhibition caused by TGF- β 2. MicroRNA array result concluded that several microRNAs are induced by HIV Tat protein and TGF-beta capable of targeting CFTR. Conclusions-Implications: HIV Tat and cigarette smoke suppress CFTR biogenesis and function via TGF-beta signaling

Oral Presentations

Tuesday, March 20, 2018

4:30 PM - 4:45 PM

SASC 352

Biomedical Engineering

Degradation of Reflex Pathways in Rats Aged Related Neuropathy

Arezoo Gerami-Pour

Underactive bladder (UAB) is a condition in which the strength or duration of bladder contraction decreases. A large portion of elderly people (9-48%) have UAB [1] because of the reduction in detrusor contractility or disturbances in sensory and motor nerves which can lead to death in vulnerable elderly populations [2]. The focus of this study was to investigate the mediation of urethra and bladder reflexes by sensory information in older animals and their role in UAB. Three groups of young (n=7, 4-7 month), mature (n=6, 11-14 month), and old (n=3, 19-24 month) urethane-anesthetized female Sprague-Dawley rats were used to investigate bladder and urethra reflexes in the lower urinary tract. The bladder was filled slowly at a constant flow rate and independently the urethra was infused with different flow rates using computer-controlled infusion pumps. The results showed that when there is a critical volume in the bladder, fluid infusion into the urethra can trigger a bladder contraction. However, in old animals, a higher urethra flow rate is required to evoke bladder contractions than in young and mature rats. This may be caused by sensitivity loss in the urethra in older rats. In conclusion, reduced function of the urethra to bladder reflex in old animals can be a possible cause of UAB. Understanding the etiology of UAB can help researchers to find an appropriate treatment for patients who suffer from this bladder dysfunction.