



**First
Graduate Student
Research Conference**

MAY 27, 2016

Program

Schedule

- 7:30 - 8:30** **Breakfast and registration- Oakland Center Banquet Rooms.**
- 8:30 - 9:30** **Plenary Session: Interdisciplinary Oral Presentations- Oakland Center Banquet Rooms.**
- 9:30 - 9:45** **BREAK**
- 9:45 - 10:45** **Concurrent Sessions: Oral Presentations - Oakland Center break out rooms (see schedule)**
- 11:00 - 11:45** **Poster Presentations - Oakland Center Fireside Lounge**
- 11:45 - 12:00** **BREAK**
- 12:00 - 1:30** **Lunch and Keynote speaker- Oakland Center Banquet Rooms**
- Napoleon Harrington MA, NCC, LPC, (OU graduate 2002 & 2004)**
 Founder/CEO, Ambassador Counseling & Resource Group

8:30 - 9:30				
Plenary Session: Interdisciplinary Oral Presentations				
Oakland Center Banquet Room A				
8:30	Hamzeh Mahmoud Alzubi, Lyad Mansour, and Osamah Rawashdeh	SECS	Systems Engineering	A Novel Aquatic Quadcopter “Loon Copter
8:50	Christina J. Grabowski	SEHS	Educational Leadership	The Impact of a Holistic Admissions Review Process on a New Medical school
9:10	Julie Marsack, Irena Dukaj, and Lauren Trudeau	SHS	MPH	Predictors of Self-Rated Health Among Oakland University Students

9:45-10:45

Oral Presentation Schedule

Room 125

9:45	Shengnan Qiao	CAS		Multiple cone pathways are involved in photic regulation of retinal dopamine
10:00	Kharananda Sharma	CAS	Medical Physics	Membrane Forces and Mechanotransduction
10:15	Dionysios Panagiotopoulos	SEHS	Mech. Eng.	Space-Filling Design of Experiments with Grouping Properties

Gold Room A

9:45	Suran Kokila Galappaththige	CAS	Medical Physics	Strength – Interval Curves using a Minimal Ionic Model and the Bidomain Model
10:00	Alaa Elkadry	CAS	Statistics	Randomized Response
10:15	Manoj Bahuguna	CAS	Applied Statistics	Copula Transformation, Prediction and Exploration
10:30	Eralda Caushaj, Huirong Fu, Rahul Chandrashekar, Sai Akula, and Veera Raju	SECS	Computer Science and Informatics	Ad Networks and Violation of Android User's Privacy

Gold Room B

9:45	Ervisa Kosova	CAS	Applied Mathematics	Uncertainty Assessment in Restraint System Optimization for Occupants of Tactical Vehicles
10:00	Mingyuan Tao	SECS	Mech. Eng.	Prediction of two-stage ignition of primary reference fuels using a staged Livengood-Wu correlation under homogeneous reciprocating engine conditions
10:15	Murphy O'Dea, PE	SECS	Mech. Eng.	Further Developments in Numerical Simulations of Wind Turbine Flows Using the Actuator Line Method
10:30	Lu Lin	CAS		Applications of Ionic Liquid Electrochemical Sensors in Emission Gases

Room 128-130				
9:45	Ryan Nierman	CAS	Applied Mathematics	An Optimal Epidemic Intervention Experiment
10:00	Themistoklis Koutsellis	SECS	Mech. Eng.	Reliability Assessment, Warranty and Design of Repairable Systems Using Renewal Processes
10:15	William S. Edwards	SECS	Mech. Eng. with Concentration in ISE	MIFT - Downtime Management Philosophy for Optimized Production
10:30	Andres Jacoby Krateil	SECS	Embedded Systems	Trade-Off Evaluation in Terms of Resources, Accuracy and Performance for Dual Fixed Point CORDIC-based Functions
Gold Room C				
9:45	Aaron Hanson	SOM	MD	Financial Analysis of Outpatient Surgery Based on Payment Model
10:00	Chanteil Ulatowski	SOM	MD	International Experience and its Effect on Cultural Sensitivity Development in Medical Students
10:15	Jonathan Fergus	SOM	MD	An Electronic Medical Record Driven Order Set to Guide Appropriate Antibiotic Selection for Outpatients with Acute Respiratory Infections
10:30	Mayank Agarwal	SOM	MD	Potential Impact of Rapid Diagnostics in Management of Suspected Pneumonia
Lake Superior A				
10:00	Debra Johnson	SEHS	Reading and Language Arts	Relationships among Multiple Contextual Factors of the Accelerated Reader Program as Reported by Teachers of African American Students
10:15	Shaun Moore	SEHS	Educational Leadership	Developing Teaching Presence in an Online Training Course: A Case Study in Faculty Development
10:30	Steven Meyer	SEHS	Education Leadership	An Analysis of University Academic Department Chairpersons' Resource Management Decisions
Lake Superior B				
9:45	Andrew M. Capelli	SEHS	Elementary Education	Taking Another Look at the Matthew Effect
10:00	Sinsery Gardner	SEHS	Early Childhood Education	Father Involvement in Preschool Classroom
10:15	Stephen Bigelow	SEHS	Educational Leadership	High School Student Engagement in Online and On-Ground Courses
10:30	Sarah Guadalupe and Katie Homant	SEHS		Cultural Influence on Children with Autism

Heritage Room				
9:45	Talia Marie Sebastian	CAS	Biomedical Sci: Health and Environ. Chem.	Health and Environ. The fate of tungsten disulfide in a calcareous winter roadside soil environment
10:00	Nicholas Peraino	CAS	Biomedical Sci: Health and Environ. Chem.	Synthesis of Gamma-Lactones from Sulfoxonium Salts
10:15	Min Guo	CAS		The oxygen redox chemistry and its impact on the sulfur dioxide reduction in ionic liquids: Implications for sensor applications
Oakland Room				
9:45	Brittany Kelley	CAS	English	“A Rose by Any Other Name”: Female Empowerment and Transformative Potential in Adaptations of “Beauty and the Beast”
10:00	Emily Benoit	CAS	English	The Revenger Drags His Feet: “Hamlet” Redefined Through Stalling
10:15	Lara Zanzanian	CAS	Theoretical Linguistics	Reduplication in Armenian
Lake Huron Room				
9:45	Sarah Donaldson	CAS	Psychology	Mate-Guarding and Preferences for Self-Resemblance Across the Menstrual Cycle in Women and Their Male Partners
10:00	Autumn Cleverley	SHS	Exercise Science	Body Fat, V02 Max, and Vitamin D as Potential Risk Factors for Anemia and Reduced Athletic Performance in Collegiate Cross-Country Runners
10:15	Simon Reeve and Lisa Welling	CAS	Psychology	Transitory Environmental Threat Alters Human Mate Preferences for Physical Qualities of the Face and Body
10:30	Nicole Barbaro	CAS	Psychology	Mothers and Fathers Perform More Mate Retention than Individuals without Children

11:00 - 11:45

Poster Presentations

Oakland Center – Fireside Lounge

Ashley Superson	CAS	M.S.	Taxon sampling influence on phylogenetic accuracy within prokaryotes
Jia Li	CAS	Ph.D.	Degradation of Aromatic Hydrocarbons by Functional and Structural Models of Iron-Containing Dioxygenases
Eralda Caushaj, <i>Sai Praveen, Rahul Chandrashekar, Veera Raju, and Huirong Fu</i>	SECS	PhD Comp Sc + Informatics	AAPM: Educate, Inform and Empower Android Users from Malicious Apps
Eralda Caushaj, <i>Sai Praveen, Ali Alshehri, Hani Alshahrani, Rahul Chandrashekar, and Huirong Fu</i>	SECS	PhD in Comp Sc + Informatics	Impact of Android Application Permissions toward Mobile Threats
Danielle Ryba	SOM	Medicine	Genistein promotes early apoptosis in HIV infected U937 cells.
Eric Raynal	SOM	MD	Student, administrator, and faculty perspectives on lesbian, gay, bisexual, and transgender-related curriculum content
Kassem Faraj	SOM	Medicine	Assessing Potential Disparities in Outcomes Between Geriatric Surgical Patients Living in the Community and Those Living in Skilled Nursing Facilities
Lauren Quinn	SOM		The Experiences of Homeless Individuals Utilizing the Emergency Department : A Qualitative Study
Lola Adekanmbi	SOM		Survival Outcome of Elderly Patients with Acute Myeloid Leukemia
Annette G. Skowronska	SECS	PhD in Mech Eng	Optimal Design of a Microgrid with Vehicle to Grid Capability
Benjamin Nold	SECS		Development of an Immersive First Person View System for an Unmanned Vehicle
Ketan Raghavendra Kulkarni	SECS	M.S. Embedded Systems	Cache Usage in Multi-Core Processors
Waseem Sadeh	SECS	PhD in ECE	Development of a Fork-Join Dynamic Scheduling Middle-Layer for Automotive Powertrain Control Software
Wedad Alawad <i>and Awatef Balobaid</i>	SECS	Doctoral	Forensic Enabled Security as a Service (FESaaS) - a readiness model for cloud vendors and cloud forensic investigator
Oltion Mesi, <i>Abdelrahman Hassane, and Hamid Soltanian-Zadeh</i>	SOM	Medicine	Evaluation of Microgravity Effects on Spine and Supporting Muscles using Magnet Resonance Imaging
Rayhaan Akram, <i>Jason Adam Wasserman, and Justin Brox</i>	SOM	Medicine	What factors influence change in glycated hemoglobin over time in an underserved population?

11:00 - 11:45

Poster Presentations

Tania Kohal	SOM	MD	Efficacy of Outreach on Individuals Based on Prior HIV Testing and Counseling in Seeking Further Preventative Information
Ali Alqazzaz <i>and Abdulrahman Alzahrani</i>	SECS	PhD	Web Application Security Tools Analysis
Meredith Emery Deneweth	SECS	Ph.D. Systems Engineering	Conventional versus Realistic Constraint Modeling for Optimal Warehouse Locations
Anusha Gundam	SBA	Masters	Role of Big Data Analytic's in the Agriculture Industry
Avinash Pudota	SBA	Information Technology Management	Present and Future trends of XBRL reports
Brittany Elia	SBA	MBA	How Human Resource Management Can Best Support Employees with Autism
Anna Wysocki, <i>Lisa Welling, Benedict Jones, Lisa DeBruine, David Perrett, and Anthony Little</i>	CAS	Evolutionary and Comparative Psychology	Diurnal variation in women's face preferences
Justin Mogilski <i>and Lisa Welling</i>	CAS	PhD in Psychology	The Relative Importance of Sexual Dimorphism, Fluctuating Asymmetry, and Color Cues to Health During Evaluation of Potential Partners' Facial Photographs: A Conjoint Analysis Study.
Nicole L. Jarrett <i>and Jillian Hunsanger</i>	CAS	M.S. in Psychology	Mindfulness As A Mediator Of The Relationship Between Emotional Reactivity and Resilience

Abstracts: Plenary Session Presenters

Presenting author: Hamzeh Mahmoud Alzubi

Co-presenters: Iyad Mansour and Prof. Osamah Rawashdeh

A Novel Aquatic Quadcopter “Loon Copter”

Loon Copter is an unconventional aquatic quadcopter that capable of aerial flight, on-surface operation, and sub aquatic diving. In this research, an aquatic quadcopter prototype was developed to evaluate the performance of the vehicle in both mediums (air and water). Also, a control strategy to control the stability and maneuvering of the vehicle is presented. The control strategy is achieved by only manipulating the rotational speeds of the propellers at each rotor. Two of the rotors rotate in the same direction while the other rotors rotate in the opposite direction. Loon Copter consists of basic components, including main hull, four fixed-pitch propellers, two batteries, an external frame, depth control system, and electronics inside the main hull. The vehicle frame is constructed out of plastic hull for cost and ease of manufacturing reasons. The depth control system comprised of water pump, one cylinder and pump controller.

Presenting Author: Julie Marsack

Co-presenters: Irena Dukaj and Lauren Trudeau

Predictors of Self-Rated Health Among Oakland University Students

Self-rated health (SRH) is a powerful predictor of morbidity and mortality among adults. In previous studies performed in this field, the samples consisted primarily of adults that were recruited from the general population. This excludes other populations, such as undergraduate college students, to become a part of the discourse on SRH and health status and behaviors. The studies that have focused on undergraduate college students, reported on physical and mental health status, but most failed to measure SRH. The relationship between SRH and health is important because many health promoting (or damaging) behaviors are acquired during the college years and continue into adulthood. This study attempted to fill the gap in the literature. The study consisted of a cross-sectional design conducted in the fall of 2012 among Oakland University undergraduate students. Four-thousand students were randomly selected and invited from the American College Health Association (ACHA) to participate in the National College Health Assessment (NCHA), a web-based survey. The survey consisted of 66 questions, which assessed the students': health, health education and safety; alcohol, tobacco, and drug use; sex, behavior, and contraception; weight, nutrition, and exercise; mental health; physical health; impediments to academic performance; and demographic characteristics. These variables were recoded to parallel other studies and/or published guidelines (i.e. the American Heart Association recommended exercise guidelines). The statistical analyses were performed in SAS version 9.3. Of the 4,000 students randomly selected, 558 responded to the survey. The mean age was 20.4 years. The association between SRH was statistically significant for females, whites, and those who were in a relationship. In addition, the number of hours worked and grade point average were statistically significantly related to SRH. Poor mental health status was associated with poor SRH. Students who reported sleep or stress difficulties were more likely to rate their health as fair/poor compared to students without sleep or stress issues. Lastly, students who reported that academics, career-related issues, family problems or finances were traumatic events were more likely to report having poor SRH compared to students without those issues. The research team will be conducting further statistical analyses in preparation for the conference.

Presenter: Christina J. Grabowski

The Impact of a Holistic Admissions Review Process on a New Medical school

Diversity in the physician workforce lags behind the rapidly changing US population. Since the gateway to a career in medicine is medical school, diversity must be addressed in the admissions process. Many medical school admissions committees are changing the way they review applications. While academic preparation remains a key indicator of success, schools seek students with additional attributes and experiences that demonstrate they are poised to meet the needs of a diverse patient population. Restricting admission to applicants with the highest academic credentials unnecessarily eliminates students from the application pool who may contribute to diversity and the care of medically underserved communities.

In this study, I examined the holistic admissions review process at a new medical school. Holistic review involves evaluating applicants based on mission-driven criteria including experiences, attributes, and academic metrics. Using data from the first five application cycles, I compared the demographic and experiential differences between the applicants selected using holistic review to a test sample selected using academic metrics. The dataset consisted of 4,342 applicants divided into three groups: holistic review, academic selection, and the overlap group comprised of applicants selected using both holistic review and academic selection. I compared these three groups by different characteristics including gender, disadvantaged status, parental education, race and ethnicity, age, educational level, service activities, and paid employment experiences. Further, I analyzed student outcomes to understand whether students selected holistically were as successful as their peers nationally.

Results indicated that holistic review created a more diverse pool of students in terms of race and ethnicity, gender, disadvantaged status, and first-generation college status. And, holistically selected applicants spent more time in premedical experiences such as community service and paid employment. Importantly, the first class of students selected using holistic review met or exceeded traditional benchmarks for medical student outcomes including USMLE Step scores, 4-year graduation rate, and residency match. These findings support the use of a holistic review process in diversifying the medical student population and the physician workforce.

Abstracts: Oral Presentations

Presenting author: Shengnan Qiao

Multiple cone pathways are involved in photic regulation of retinal dopamine

Dopamine is an important neurotransmitter in the brain as well as in the retina. In the retina, dopamine mediates a variety of visual functions such as light adaptation. Yet, the cellular and circuit mechanisms by which light regulates levels of retinal dopamine are poorly understood. Utilizing a transgenic cone-function-only mouse model, we find that cones generated three classes of light responses in dopaminergic amacrine cells (DACs). These responses include initial and delayed responses at light onset (ON responses) and a transient response at light offset (OFF responses). We further demonstrate that the initial ON response is an excitatory postsynaptic current that is mediated by ON bipolar cells directly or indirectly via the melanopsin-expressing intrinsically photosensitive retinal ganglion cells (ipRGCs). In contrast, the delayed ON response is an inhibitory postsynaptic current that is mediated by glycinergic amacrine cells exclusively driven by AMPA receptor-expressing OFF bipolar cells (presumably type 1 OFF bipolar cells). Similarly, the OFF response is also an inhibitory postsynaptic current but mediated by GABAergic/glycinergic amacrine cells. Based on the pharmacology, these amacrine cells are exclusively driven by kainite receptor-expressing OFF bipolar cells (presumably type 2 and/or type 3a OFF bipolar cells). Furthermore, we find all

DACs recorded had excitatory ON responses consistent with their standard classification as ON amacrine cell type. The majority of them had OFF inhibition with or without delayed ON inhibition. Dye injections into these cells showed that DACs with and without apparent inhibition had similar morphological profiles. Our results demonstrate that DACs receive excitatory inputs from cones via bipolar cells and ipRGCs and these excitatory signals can be modulated by ON and OFF inhibition from other amacrine cells that are driven by distinct OFF bipolar cells. The parallel excitatory and inhibitory signals to DACs can efficiently regulate dopamine release upon photopic illumination which plays a central role in light adaptation of the visual system.

Presenting author: Kharananda Sharma
Membrane Forces and Mechanotransduction

Mechanotransduction describes how mechanical forces trigger remodeling in the heart. In our mathematical model, the mechanical bidomain model, the intracellular and extracellular spaces are coupled by integrin proteins in the cell membrane. Our hypothesis is that any difference between the intracellular and extracellular displacements, $u-w$, causes membrane forces on integrins that could lead to mechanotransduction. We obtain a set of coupled partial differential equations describing the displacement and pressure in the intracellular and extracellular spaces. In our preliminary studies, we analyzed small samples of tissue with simple geometries, for which the model equations were solved analytically. In the heart, cardiac muscle fibers curve, creating zones of membrane forces resulting in regions of mechanotransduction. In this study, we use the finite difference method to solve the bidomain equations numerically, with different fiber geometries. We also check the accuracy of our algorithm by performing a series of calculations. We consider the magnitude of the active tension T to be constant but its direction makes some angle with the x -axis. Our model predicts that $u-w$ depends on the strength of the intra-extracellular coupling, and has a different spatial distribution than u and w individually. Moreover, $|u-w|$ has a different distribution than the tissue strain. Therefore, the bidomain model predicts a different location for remodeling compared to traditional monodomain model. Our long-term goal is to use the mechanical bidomain model to suggest experiments and make predictions about remodeling in the heart.

Presenting author: Dionysios Panagiotopoulos
Space-Filling Design of Experiments with Grouping Properties

Reducing the development time of new products is of paramount importance. Computer Aided Engineering (CAE) is an important tool routinely used to simulate complex engineering systems. Virtual simulations replace expensive physical product prototypes reducing therefore, the development cost. For complex engineering systems however, the effectiveness of virtual simulations is often hindered by excessive computational cost. To minimize the cost of running expensive computer simulations, we usually develop surrogate approximation models (often called metamodels - models of a model) that are sufficiently accurate to replace the computationally expensive simulations. The metamodel accuracy improves if they are constructed using space-filling Designs of Experiments (DOEs). The latter provide a collection of sample points in the design space preferably covering the entire space. Computationally intensive analysis is performed at these sample points and the results are used to develop a fast running metamodel which replaces the expensive analysis. The placement of sample points affects the metamodel accuracy considerably. A full factorial design is the most basic DOE approach but it is impractical because it requires a large number of sample points. As an alternative, algorithms have been developed for Latin Hypercube (LH) design, Symmetric Latin Hypercube (SLH) design, and orthogonal LH design, among others. All these DOE methods have desired uniform projection properties in one dimension which is the minimum requirement for spreading the sample points in the design space. Good space-filling is achieved if the design has also uniform projection properties in two dimensions. In this research, we have developed an algorithm to create groups of space-filling multi-dimensional designs with uniform projections in one and two

dimensions. In addition to each group having space-filling properties itself, unions of groups have also space-filling properties. This allows the designer to sequentially add sample points without damaging the space-filling property of the previous design. As a result, accurate metamodels can be created using the minimum required number of sample points where an expensive analysis is performed. Our approach uses Sobol quasi-random sequences in one dimension, a maxi-min distance criterion and a column exchange algorithm to efficiently achieve uniformity in one and two dimensions. Examples will demonstrate all developments.

Presenting author: Suran Kokila Galappaththige
Strength – Interval Curves using a Minimal Ionic Model and the Bidomain Model

Over the years, different models have been used to study the complex behavior of cardiac tissue when stimulated by an electrode. Each of these models have varying degrees of complexity with different number of variables, parameters and ion currents, with their own strengths and weaknesses. Models with a larger number of variables make it difficult to identify how each variable affects the action potential (AP), the action potential duration (APD) and the excitation threshold. There are models with fewer number of variables, but they may not produce realistic results. The Strength-interval (SI) curve plays a major role in understanding the response of the cardiac tissue to electrical stimulation. Previous studies done on cardiac tissue using the bidomain model with the Beeler-Reuter model or Luo-Rudy dynamic model have been helpful in understanding the complex behavior of cardiac tissue, and the strength-interval curves obtained in both of these models have shown similar results for both cathodal and anodal stimulation.

A recently developed minimal ionic model, with fewer variables and parameters and only two ion currents, is the focus of this study. The two ion currents represent a sodium current that activates rapidly upon depolarization I_{Na} , and a time-independent inwardly rectifying repolarization current I_{rep} . The minimal model reproduces many experimentally measured human ventricular APs, and combined with the bidomain model produces SI curves that are similar in shape to the previous studies. Even this simplest of ion current models produces the distinctive dip in the anodal SI curve and predicts the transition of excitation from break to make in both cathodal and anodal SI curves, implying that the bidomain nature of the tissue is crucial to the tissue excitability. A simple model with an excitable sodium current and a non-linear repolarization current with the bidomain model is sufficient to predict the dip in the anodal SI curve.

Presenting author: Alaa Elkadry
Randomized Response

A review of the randomized response model introduced by Warner (1965) is given, then a new randomized response model applicable to continuous data that considers a mixture of two normal distributions is introduced and analyzed in a parallel assessment to the work provided by McDonald (1994). This article provides a study of the efficiency, an estimation of some unknown parameters and a discussion of contaminated data issue. Also, this article includes inference for two or more populations of the same structure as the randomized response model introduced.

Presenting author: Manoj Bahuguna
Copula Transformation, Prediction and Exploration

Copulas have been used in various applications in biomedical sciences and finance. In this talk, we suggest copula as a generic all-purpose transformation which can enable one to apply various standard procedures more efficiently and with better statistical properties and results. We evaluate and illustrate various applications including those in regression, principal component analysis and factor analysis, where analysis using the copula transformation results in improvement in implementation, interpretation as well as

prediction. Specifically, emphasis is in introducing the multivariate normality using this all purpose transformation.

Presenting author: Eralda Caushaj

Co-presenters: HUIRONG FU, RAHUL CHANDRASHEKAR, SAI AKULA, VEERA RAJU
Ad Networks and Violation of Android User's Privacy

Mobile user's privacy can be jeopardized by advertisement associated especially with free apps available in Google Play. Most of the free apps are profitable from the ads network associated with their product. We identified in a pool of 797 top free apps out of each category in Google Play, that there are apps that are associated with 13 ads network and the information collected by these apps is sent to all the ads network in parallel as well as to the legitimate third party server. Privacy violation occurs when the user is not notified, if the app is accessing sensitive information, and if the information is misused by third party-servers. Google Play by early 2016 will make available to the users if every app is associated with ads network or not, but not notifying them how many ad networks are accessing end-users data. We measure the throughput and delay in the network and in case ads network are associated with the app the throughput will be less and delay larger, compared to the one when no ad are used from the app. Therefore we can claim that mobile user's privacy is violated when throughput is less than the threshold $\theta(0.84)$ and delay greater than $\theta(2.5)$. Our analysis shows that MobileApp Tracking is an ad associated with 50 apps out of 797 in our pool of data and this ad is a serious threat to the users. Also three adware are some of the top Android privacy threats in 2014.

Presenting author: Ervisa Kosova

Uncertainty Assessment in Restraint System Optimization for Occupants of Tactical Vehicles

We have recently obtained experimental data and used them to develop computational models to quantify occupant impact responses and injury risks for military vehicles during frontal crashes. The number of experimental tests and model runs are however, relatively small due to their high cost. While this is true across the auto industry, it is particularly critical for the Army and other government agencies operating under tight budget constraints. In this study we investigate through statistical simulations how the injury risk varies if a large number of experimental tests were conducted. We show that the injury risk distribution is skewed to the right implying that, although most physical tests result in a small injury risk, there are occasional physical tests for which the injury risk is extremely large. We compute the probabilities of such events and use them to identify optimum design conditions to minimize such probabilities. We also show that the results are robust to various assumptions that the statistical simulations use.

Presenting author: Mingyuan Tao

Prediction of two-stage ignition of primary reference fuels using a staged Livengood-Wu correlation under homogeneous reciprocating engine conditions

In the current work, we utilize a recently extended Livengood-Wu (L-W) correlation to evaluate and predict the two-stage ignition behavior of different primary reference fuels (PRFs) under homogeneous reciprocating engine conditions with/without exhaust gas recirculation (EGR). Based on the understandings of the global and detailed kinetics of low-temperature chemistry, simplified Arrhenius-based global expressions were developed for both ignition stages, and a linear correlation was proposed for the cool flame temperature rise at the end of the first stage, for various PRFs including RON0, RON20 and RON60 under constant volume conditions. These data reflects increased total ignition delay in the negative-temperature coefficient (NTC)

regime with larger RON number, but with insensitive variation for the low and high temperature range. For their performance under homogeneous charge compression ignition (HCCI) conditions in a wide parameter range, it is shown that for the same engine speed, the inlet temperature range allowing for two-stage ignition shrinks with increasing RON numbers, and eventually two-stage ignition will turn into single-stage ignition with high enough RON numbers. For the two-stage ignition of each PRFs under engine conditions, with increased inlet temperature, both the first-stage ignition delay time and the cool flame temperature rise decreases, while the second-stage ignition delay time increases. With the same inlet temperature, both the first-stage and second-stage ignition delay time increase while the temperature rise decreases with increasing RONs. It is further shown that with different EGR addition, both the first and second ignition delay time increase while the cool flame temperature rise slightly decreases. Based on the ignition database, the performances for all PRFs under HCCI conditions are predicted with the staged L-W integral method with satisfactory accuracy, including the first and total ignition delay time as well as the cool flame temperature rise.

Presenting author: Murphy O'Dea, PE

Further Developments in Numerical Simulations of Wind Turbine Flows Using the Actuator Line Method

Current large-scale wind turbine installations are sited using layouts based on site topology, real estate costs and restrictions, and turbine power output. Existing optimization programs attempt to site multiple turbines based on simple geometric turbine wake models, which typically overestimate individual turbine output. In addition, advanced Computational Fluid Dynamics (CFD) modeling of individual turbine wake fields have revealed complex flow patterns and "wake meandering" which have not been taken into account in current optimization and flow field models. CFD models of entire turbine fields have had limited application because of the enormous compute resources required; limitations of the simplified turbine models used which do not provide high resolution results in the wake field; and the lack of efforts to adapt the results of complex CFD output to analytical models which can be incorporated into wind turbine siting optimization routines. The long term objective is to model several turbines in various flow field configurations, and develop turbine output models to be used in siting optimization programs. In this paper, we report on our efforts to simulate flow past wind turbines using a new adaptation of the Actuator Line method for turbine blade modeling. This method creates a geometric representation of each rotating turbine blade. Grid points in the CFD flow field are selected within the outline of the blades and near downstream planes, and the aerodynamic forces are calculated using traditional blade element equations. The forces are distributed using an automated routine which dynamically determines the application area based on the number of applied grid points at each time step. Turbine blades are rotated in time with progressing CFD field calculations. This method distributes blade forces without using a geometric distribution function used in other recent research. Blade forces are then input as body forces into the Navier Stokes equations in the host CFD program. A Smagorinsky LES turbulence model is employed to model turbulent effects. To improve accuracy and reduce computing power requirements, the advanced parallel CFD code, NEK5000, is used in this study. NEK5000 is an open source, incompressible Navier Stokes solver in active development at Argonne National Laboratory. NEK5000 uses a continuous, nodal formulation with Legendre polynomials and a Gauss-Lobatto-Legendre element grid. NEK5000 has been proven to provide high-resolution results with significantly reduced compute resources. We propose that large scale, multiple turbine simulations will require such computational efficiencies. FORTRAN subroutines are written to generate the actuator line and blade geometry, and to calculate the blade lift and drag forces. These subroutines are then linked to the solver source code and compiled. Details of the actuator line setup and calculations, LES turbulence model, CFD flow simulation setup, and results from multiple turbine runs will be presented. Current results are consistent with published research. Lessons learned, and a roadmap to ongoing development will also be discussed.

Presenting author: Lu Lin

Applications of Ionic Liquid Electrochemical Sensors in Emission Gases

Utilizing the unique features (e.g. non-volatile, thermal and electrochemical stable) of ionic liquids(ILs), IL-based electrochemical gas sensors have significant potential to not only establish novel gas sensing methodologies, but also contribute to the gas sensor revolution (i.e. secure the safety for wearable sensors, prolong the sensor lifetime, and facilitate multi-sensor design, etc). Unlike traditional solvents, ILs can be employed as both solvents and electrolytes, and have the capability to promote new electrochemical reactions that are not feasible in traditional aqueous and non-aqueous electrolytes. In this presentation, sensing prototypes for the detection of several small molecular gases (e.g. oxygen, hydrogen, methane) are discussed in terms of the sensitivity, selectivity, and reliability. The sensing of these gases is of tremendous interest because they are critical emission gases in the natural gas well pads and the transportation pipelines. Also, the establishment of a volatile organic compound (VOC) sensor is discussed as well. VOC emissions bring serious impact toward the global environment and have gained more and more attention worldwide. Here, 2,4-toluene diisocyanate (2,4-TDI) is selected as one VOC representative to demonstrate the feasibility to deploy IL-based electrochemical sensors.

Presenting author: Ryan Nierman

An Optimal Epidemic Intervention Experiment

Our research focuses on how to apply various levels of control over a finite time horizon with respect to a population experiencing an epidemic. There are numerous epidemiological models with various epidemiological classes, often abbreviated by M, S, E, I, and R, used in epidemic intervention and modeling techniques. Here, M represents the class of infants who have passive immunity, S represents the susceptible class, E represents the exposed class (a latent period, in which the individual is infected, but not yet infectious), I represents the infected class, and R represents the recovered class (consisting of those with permanent infectious-acquired immunity or temporary immunity). The basic epidemiological models include MSEIR, MSEIRS, SEIR, SEIRS, SIR, SIRS, SEI, SEIS, SI, and SIS. Many models rely on the use of continuous mathematics, i.e., ordinary or partial differential equations to entirely, or in part, model the spread of a disease or discuss various optimization questions. However, this presentation will focus on the exploration of an optimal control problem for a discrete-time Susceptible/ Infective/Susceptible (SIS) deterministic epidemic with a finite time horizon. Previous work relied on dynamic programming to find the optimal solution for a binary control process, in which one has the option of either “applying the control” or “not applying the control” subject to a finite budget (resource) constraint. In contrast, our research seeks to explore the use of constraint programming techniques to first solve the same binary control problem, and then, refine the granularity of the control to improve the solution (by allowing for k-levels of “partial control”) under the same budget constraint. In both the binary control case and the k-ary control cases, we plot the optimal solution in two different cases: 1) the case where there is excess control at the end of the finite time horizon and 2) the case where there is no excess control at the end of the finite time horizon. Finally, we will show, that even under a huge exponential growth of the search space, the problem can be solved to optimality.

Presenting author: Themistoklis Koutsellis

Reliability Assessment, Warranty and Design of Repairable Systems Using Renewal Processes

Most multi-component engineering systems are repairable. Their components can be replaced or repaired if system failure occurs, to put the system back into service. Each time a failure occurs, it is important to assess which components should be replaced or repaired. This can be achieved using a tradeoff analysis between the system cost and reliability. The system reliability is estimated using a Generalized Renewal

Process (GRP) model which accounts for the system reliability improvement if a component is replaced or repaired. In the latter case, a rejuvenation factor accounts for the reduction of the component's effective age (i.e., renewal). For a multi-component repairable system, the design engineer faces the following questions: What is the expected life of a given repairable system (useful life)? How many expected repairs are worth to perform during the useful life of the system? What is the system expected life after the nth repair? What is the probability that the system survives for a specific period after the nth repair? We answer these questions using a GRP reliability model which is accurate and efficient avoiding therefore, a costly Monte Carlo simulation. In this research, we solve the GRP integral equation numerically. This allows us to also perform warranty forecasting for fleets and depot maintenance. The former is very important for the automotive industry and the latter is important to the US Army. We will present initial results on a generalized renewal process model to assess the reliability of a repairable system based on the concept of virtual or effective age. The model accounts for repair assumptions such as "same-as-old," "good-as-new," "better-than-old-but-worse-than-new" and "worse-than-old" and is suitable for reset and depot maintenance strategies as well as warranty prediction and forecasting of vehicle fleets.

Presenting author: William S. Edwards

MIFT - Downtime Management Philosophy for Optimized Production MIFT – A Downtime Management Philosophy for Optimizing Production

Based on current research in the Theory of Constraints & Bottlenecks it is important to minimize their adverse effects on manufacturing production systems. However, almost all models and managements of downtime event fall in a traditional model of downtimes event with some reliable statistical models. These models breakdown when the downtime event a rare event which has major impact on the entire production system. Those these events may be rare, but their impact on manufacturing production systems have a high level of impact. My research, MIFT -- Move It Forward Theory, wishes to 1) Examine rare event downtimes on manufacturing production. 2) Maximize production during this rare event downtime, and 3) establish a favorable production environment for optimal manufacturing when full production resumes. 4) Establish an Improved Production Management Philosophy which will carry over into all downtime situations. This management philosophy has addition benefits as well. Among these benefits are quality improvements, opportunistic maintenance, and opportunistic management of human capitol. Furthermore, I wish to define and examine rare event downtimes in an effort to reduce their occurrences. Also, this research will analyze the current Machine Downtime Modeling Techniques. Finally, prediction of rare "Black Swan" events can be challenging. However, their Impacts cannot be ignored or dismissed. I wish to establish certain indicators that a rare catastrophic event is eminent if corrective action is not taken. In summary, I wish to establish a production philosophy to best manage these rare event downtimes in manufacturing production system. This knowledge of the manufacturing philosophy will allow plant managers to enact quick decisions in complex manufacturing systems which will mitigate the impact of this rare events and to best manage their resources in the catastrophic and unexpected downtimes.

Presenting author: Andres Jacoby Krateil

Trade-Off Evaluation in Terms of Resources, Accuracy and Performance for Dual Fixed Point CORDIC-based Functions

This work presents a hardware implementation that computes common trigonometric and hyperbolic-based functions (atan, sin, cos, atanh, sinh, cosh, exp, log, sqrt, xy). By utilizing a non-standard numerical representation (dual fixed point arithmetic), we provide a trade-off between the resource-intensive, highly accurate floating point arithmetic and the resource-efficient fixed-point arithmetic implementations. The hardware description is customizable and it allows for the generation of a large set of hardware configurations (by varying both the hardware parameters and

the numerical format). To assess the advantages and drawbacks of our hardware implementation with dual fixed point arithmetic, for every function, we provide extensive comparisons with hardware implementations in both fixed point and floating point arithmetic for a large set of numerical formats. As expected, dual fixed point arithmetic features higher accuracy and higher resource count than fixed point arithmetic, while utilizing fewer resources than floating point arithmetic for a small drop in accuracy. Results are given in terms of resources, accuracy, and performance, from which a multi-objective space was generated. Moreover, an optimal set of hardware configurations (in the multi-objective sense) was extracted, which identifies the optimal numerical formats for each function. It also allows for rapid and optimal trade-off evaluation of resources, accuracy, and performance.

Presenting author: Aaron Hanson
Financial Analysis of Outpatient Surgery Based on Payment Model

With annual increases in premiums and deductibles, cost to patients for health services is an important factor in determining access to healthcare. In addition, rising enrollment in high deductible health plans are generating bad debt to providers due to non-payment. Seemingly to address these issues, direct patient contracting practice (DPCP) payment models are on the rise. Financial data for the 2013 fiscal year was gathered from various Beaumont Health System facilities as well as the Surgery Center of Oklahoma. Charges, revenue, costs, and income for select surgical procedures were analyzed based on surgery center facility and patient payment model. These variables were used to determine the cost to the patient as well as profit margins or losses of the payment model for the facility. Proactive self-payment models provided lower charges to patients and have anecdotally higher profit margins. Both the traditional payment model and the retroactive self-payment model yielded losses for the facility, with one exception, and incurred a higher cost to the patient. Direct, indirect, and total costs varied greatly by facility. The profit margins of the traditional payment model for outpatient surgery relied on keeping direct and indirect costs low. Future studies are needed to confirm the profit margins of proactive self-payment practices and how this model impacts the access to care, especially for the underserved.

Presenting author: Chanteil Ulatowski
International Experience and its Effect on Cultural Sensitivity Development in Medical Students

Introduction: A study by Didion (2014) revealed that 18-21 year old students demonstrated less cultural sensitivity than older students due to lack of international experience. The median age of Oakland University William Beaumont School of Medicine (OUWB) students is approximately 25, only slightly older than the cohort in the Didion study. The goal of this study was to measure the degree of cultural sensitivity among OUWB students and correlate this with the type and duration of their cross-cultural experiences. Methods: This study examined cross-cultural experiences of first through fourth year OUWB students. Using Qualtrics, prospective participants were emailed a slightly modified, validated measure ("Promoting Cultural and Linguistic Competency: Self-Assessment Checklist for Personnel Providing Primary Health Care Services"), created by the National Center for Cultural Competence at Georgetown University. Michelle Jankowski, OUWB biostatistician, analyzed respondents' assessment of their cultural sensitivity with the durations of their foreign visits using Kendall's tau-b method and ANOVA. Results (or Anticipated Results): Sixty-two OUWB medical students completed the voluntary survey. Using Kendall's tau-b method and ANOVA, correlations between cultural sensitivity and cross-cultural experiences were examined. We found that students who traveled abroad for longer periods of time (>60 days), reported more cultural awareness of

folk and religious influence on families' responses to medical care. We also determined that students who traveled abroad >60 days were more aware of specific health and mental disparities within certain ethnic groups. Further results are currently under analysis by Michele Jankowski. Conclusion: International travel among OUWB medical students should be encouraged as it can promote the development of cultural sensitivity in future doctors, which is valuable in the clinical setting. Using the findings from this study, future research can be conducted to see if programs implemented in medical school curricula have any effect on the development of cultural sensitivity among students.

Presenting author: Jonathan Fergus

An Electronic Medical Record Driven Order Set to Guide Appropriate Antibiotic Selection for Outpatients with Acute Respiratory Infections

Antimicrobial stewardship programs were developed to promote more appropriate use of antibiotics and to minimize adverse effects associated with antibiotic use. These methods have been effectively implemented in inpatient settings. However, application of these programs in outpatient settings has been challenging and demonstrated mixed success. As a result, novel methods of limiting antibiotic use and potential adverse consequences are needed for outpatient settings. Our objective was to decrease rates of antibiotic use for acute upper respiratory infections (URIs) and to increase adherence to accepted guidelines for antibiotic use. We conducted a prospective preintervention/postintervention study at the Beaumont Health System Adult Outpatient Clinic. Our intervention was a monthly 30-minute educational program and an electronic order set that is currently being implemented for a period of six months. Following our intervention in January 2016, we collected data on acute URI antibiotic use and described the types of antibiotics being used. These data were compared to data from January 2015 from the same clinic. After one month following the application of our intervention, a total of 84 and 77 patients were identified with an acute URI in January 2015 and January 2016, respectively. Of these patients, 13% and 32% were prescribed antibiotics, respectively ($p = 0.003$) and azithromycin and amoxicillin/amoxicillin-clavulanate were the most commonly used antibiotics for both timeframes. In conclusion, although our study demonstrated that the overall use of antibiotics in treating acute URIs was lower compared to the national average and that antibiotic use did not decrease following the implementation of our intervention after one month.

Presenting author: Mayank Agarwal

Potential Impact of Rapid Diagnostics in Management of Suspected Pneumonia

Introduction: Bacterial cultures for pathogen identification and antibiotic resistance testing can take days during which patients may receive unnecessary or inappropriate antibiotics. The Curetis AG Unyvero System is a rapid molecular diagnostics platform currently undergoing clinical trial for patients with suspected pneumonia at Beaumont Health System. We hypothesized that once approved, the use of such as system in a clinical setting could improve outcomes and decrease lengths of stay. Methods: A retrospective chart review was performed for patients age 18 or older with culture data available from endotracheal aspirates and bronchoalveolar lavages (BAL) during the peak pneumonia season of 2013. Data on the admitting diagnosis, outcome, length of stay, antibiotic treatment, antibiotic changes, microbiological isolates and resistances, other positive cultures, and vitals were collected. The data was analyzed for appropriateness of antibiotic treatments based on the culture results to predict the potential benefits of the Unyvero System. Results: The study population included 395 unique patients (499 cultures) obtained from January-March 2013 at Beaumont Health System. The average time for culture results was 2.7 days, 63% of patients were overtreated, 22% were undertreated, and only 15% were receiving the appropriate antibiotic regimen. Conclusion: When managing patients with suspected pneumonia, the Unyvero System has the potential to decrease the time to optimization of antibiotic treatment from days to hours. Theoretically the majority of patients, who are intubated or undergo BAL, could have shorter stays and improved outcomes if the Unyvero System or similar rapid diagnostic system is utilized, once FDA approval is obtained.

Presenting author: Debra Johnson
Relationships among Multiple Contextual Factors of the Accelerated Reader Program as Reported by Teachers of African American Students

Reading achievement gaps by race still persist among the nation's school children (Flowers, 2007). The reading achievement levels of African American students have long been a major concern in American education. African American students often attain lower reading scores than other students and their lives may be negatively impacted as the direct result of a reading deficiency (Melton, Smothers, Anderson, Fulton, Replogue, & Thomas, 2004). It is imperative that teachers of African American students seek practical solutions to improve African American students' reading skills (Flowers, 2003).

Presenting author: Shaun Moore
Developing Teaching Presence in an Online Training Course: A Case Study in Faculty Development

This qualitative single-case study was undertaken to determine how Mid-West American College (MWAC) trains their faculty to create quality online courses by developing teaching presence, which is the design, facilitation, and instruction of an online course. This study focused on the online teaching certification (OTC) program MWAC requires its online faculty to take. With online learning enrollment far outpacing the overall higher education growth rate, paired with poor online retention rates, this was a critical topic to investigate. Four faculty members who teach online at MWAC and the three instructional designers who created and ran the OTC comprised the population study. Garrison, Anderson, and Archer's (2000) Community of Inquiry (CoI) framework was used as a theoretical lens while investigating teaching presence in the OTC. Data collection began with four individual one-on-one interviews with the online faculty, followed by a focus group with the three instructional designers, and finally observational field notes of a previously run OTC. The three sources allowed for triangulation of the data, which were analyzed and coded into themes that fit the three indicators of teaching presence: instructional design and administration, facilitating discourse, and direct instruction. Findings showed that MWAC trained faculty to develop teaching presence in the following ways: (1) course design and development, (2) setting curriculum, (3) delivery methods, (4) time parameters, (5) evaluation review, (6) face-to-face analogs, (7) faculty training, (8) community of learners, (9) presenting content, (10) feedback and support, (11) and confirming understanding. The study also showed a positive impact on the teaching of faculty participants who had gone through the OTC, specifically in the following areas: (1) pedagogy practices, (2) course design and delivery methods, (3) resources, (4) student point of view, (5) and face-to-face changes. These findings have implications for not only e-learning centers and how they train faculty, but also for campus administrators looking to improve student satisfaction and retention in online classes, for the faculty teaching the classes, and ultimately for the students taking the classes.

Presenting author: Steven Meyer
An Analysis of University Academic Department Chairperson's Resource Management Decisions

This mixed method study explored how resource decisions are made in academic departments. Department resources are needed to accomplish critical objectives that support the university's academic mission such as assisting faculty research and granting academic degrees. The process by which department chairs decide how to use their resources impacts how successful they are in achieving these objectives. In addition, many academic departments struggle with the limited amount of resources available, so it is important to understand how they decide to use the resources they have in light their limited availability. Data collection began with a survey of department chairs that yielded 227 participants. I analyzed the survey's qualitative data from open-ended questions using an open coding method to identify themes that described the decision making process. I then analyzed the quantitative data using traditional crosstab and descriptive statistical methods. I then conducted interviews to expand on the themes that were identified from the analysis of the survey responses. The study had the following significant findings: (1) Most of the participating department chairpersons identified themselves as the primary resource manager for the department, but there was substantial variation in the duties they performed in this role; (2) the process for making resource decisions frequently involved consulting department members about both routine and strategic decision; (3) only a few participants maintained formal work flows for making resource decisions; (4) prioritizing and allocating resources amongst competing interests was a significant challenge to managing resources; and (5) internal department stakeholders provided the greatest challenge to managing department resources. Consulting with members of the department is presumed to be a conflict avoidance strategy. However, the findings from this study suggest that despite consulting, department chairs are still challenged by internal conflicts over resources, which means the consultations are not as effective as they were thought to be. Thus the findings from this study demonstrate the need for universities to train their department chairs on methods for consulting and negotiating that lead to productive decisions while still maintaining constructive relationships with members of the department.

Presenting author: Andrew M. Capelli
Taking Another Look at the Matthew Effect

"For to everyone who has will more be given, and he will have an abundance. But from the one who has not, even what he has will be taken away" – Matthew 25:29 (English Standard Version). Based on the New Testament passage known as the Parable of Talents, the "Matthew effect" was coined by sociologist Robert K. Merton, and was applied 30 years ago to the subject of reading by psychologist and educator Keith Stanovich. In a seminal article, Stanovich referred to the term in his assertion that the "reading rich" get richer, while the "reading poor" get poorer. Now that the Matthew effect is celebrating its third decade in academia, this presentation seeks to reexamine the doctrine and explore recent research to determine if the idea is still relevant. Is the Matthew effect real? If so, what are the implications? Other questions to be addressed include: Does evidence show whether high or low levels of vocabulary or phonological awareness in Kindergarten lead to increased disparities in reading ability among students as they progress through school? If so, what does that mean for both students and educators? Unchecked, how wide will gaps in ability become? What can educators do, particularly at lower grade levels, to identify the Matthew effect and limit its impact on at-risk children? Also discussed will be one-sided and two-sided Matthew effects, which refer to how particular groups of students may become weaker or stronger readers while other groups remain unaffected. The research at the core of this presentation is culled from peer-reviewed academic journal articles, published within the last few years. Attendees can expect to gain a better conceptual understanding of the Matthew effect, to review applicable research on the topic, and to discern how the idea may apply to their own experiences in the educational field.

Presenting author: Sinsery Gardner
Father Involvement in Preschool Classroom

This exploratory study investigates preschool teacher perception of father involvement in the classroom. Data was gathered from preschool teachers in different setting throughout Michigan. Participating teachers completed a short online survey access through Survey Monkey© that queried their personal view and observation of father involvement in the preschool classroom.

Presenting author: Stephen Bigelow
High School Student Engagement in Online and On-Ground Courses

The effectiveness of any educational program relies on its ability to engage the learner – student engagement. Within the context of high school courses, student engagement refers to attention, motivation, and cognitive development of students through participation in class activities. Online courses offer hope for engaging students not successful in traditional on-ground courses. What remains unknown is how the level of engagement in online high school courses compares to on-ground courses – are students more engaged, less engaged, or is there no difference in the level of engagement? Additionally, do students traditionally vulnerable for dropping out of school experience greater engagement in online versus on-ground courses?

This study is an examination of high school student perceptions of engagement within on-ground and online courses. High school students concurrently enrolled in both on-ground and online courses completed an adapted, abbreviated version of Midgley et al.'s (2000) Patterns of Adaptive Learning Scales (PALS) which measures perceived engagement in both online and on-ground environments, while high school students enrolled in only on-ground courses completed an original version of PALS, which does not account for online engagement. Achievement Goal Theory (AGT), specifically student personal achievement goal orientations, provides the theoretical grounding. The following questions are addressed:

1. What are the factors fostering engagement or disengagement among on-ground and online instructional mediums?
2. Are the factors fostering engagement or disengagement similar for at-risk students?
3. When students are enrolled in both online and on-ground courses, is there a difference in engagement based upon the instructional medium?

The results of this study determined there was no significant difference between online and on-ground students based upon gender, ethnicity, or economic status. Results suggest that among students enrolled in both online and on-ground courses, there was greater engagement in on-ground courses than online courses. The results also suggest that in on-ground courses, students are more likely to place importance in appearing engaged than in online courses.

Presenting author: Talia Marie Sebastian
The fate of tungsten disulfide in a calcareous winter roadside soil environment

Civilization has seen considerable social and economic advancements with the advent of motor vehicle transportation. These advancements, however, have come at the expense of the environment, of which motor vehicle transportation has become one of the largest contributors to environmental pollution. Due to their location, roadside soils often incur significant physical degradation and chemical contamination due to motor vehicle transportation. Seasonal

maintenance activities, such as the application of road salt in harsh winter regions to manage snow and ice, only further exacerbate the detrimental effects of motor vehicle transportation on roadside soils by increasing soil erosion and contaminant mobilization. In an effort to reduce the environmental burden of motor vehicle transportation, new lubrication additives, such as tungsten disulfide, are being incorporated into some lubrication products to reduce environmental pollution by increasing fuel efficiency and reducing motor vehicle wear. Although tungsten was once thought to be insoluble, and therefore environmentally benign, it is now known that tungsten can become soluble in certain soil environments under certain environmental conditions. Heavy metal pollutants, like tungsten, are of particular environmental concern, because they are nondegradable, persistent, and are often toxic in small concentrations. Therefore, this new lubrication application has the potential to introduce a new source of tungsten contamination into an already heavily burdened roadside soil, where its fate and transport has not been substantially qualified or quantified. The investigation to be presented was conducted to characterize the geochemical behavior of tungsten disulfide in calcareous salt-laden roadside soil environments. A column leaching experiment was conducted on two soils with different compositions of oxide/oxyhydroxide, organic matter, and clay constituents. Soils were amended with tungsten disulfide as either a solid dry lubricant or as a conventional synthetic lubricant oil with tungsten disulfide incorporated as an additive. Columns were leached with 1M sodium chloride solutions for 10 weeks to simulate a winter season, followed by 5 weeks with deionized water to simulate a spring season. A total of 3 winter and 3 spring seasons were conducted. Weekly leachate solutions were analyzed for tungsten and other select element concentrations, as well as total organic carbon, pH, and electrical conductivity. Overall, tungsten was observed to become increasingly more mobile in soils having less iron oxide/oxyhydroxide, organic matter, and clay constituents with deionized water leaching following sodium chloride leaching in soils amended with tungsten disulfide as a solid dry lubricant. In soils amended with tungsten disulfide as an additive in synthetic lubricant oil, oil contamination was observed to almost completely restrict tungsten mobility. Increasing tungsten concentrations were accompanied by the increased flushing of other elements, oxide/oxyhydroxides, organic matter, increases in pH, and reduced conditions. Results from these works expand the current knowledge of the geochemical behavior of tungsten, and can be applied to other salt –laden or –rich environments, such as but not limited to coastal areas, semi-arid to arid regions, or any other area susceptible to salt water intrusions.

Presenting author: Nicholas Peraino

Synthesis of Gamma-Lactones from Sulfoxonium Salts

Gamma-lactones are five-membered cyclic esters present in 10% of known naturally occurring organic compounds. Substitution pattern and stereochemistry determine the biological effects of these compounds spanning from antibiotic activity to epileptic toxicity. Current synthesis protocols are limited in scope or involve highly specialized starting materials. Development of a general procedure which allows full control of product distribution would be useful in the development of novel drug synthesis. These compounds can also be used as building blocks for more complex molecules. Development of a general, stereo-selective, and cheap synthetic protocol can cut down steps in the total synthesis of these complex molecules and allow for easier diversification of possible lead compounds for drug development. We hoped to develop our methodology based on a well-established protocol which uses sulfoxonium salts and aldehydes to form epoxides. By intercepting the reactive intermediate in this protocol with a ketene, we were able to form gamma-lactones in good yields and high selectivity. Ketenes are fairly limiting to the scope of the reaction

but mechanistic studies led to the development of a new protocol which allowed us to diversify the procedure by using carboxylic acids as ketene surrogates. Our studies have shown the α,β -unsaturated sulfoxonium salt to be a useful reagent to affect synthesis of 3,4 trans γ - lactones from 2-substituted acetic acids in excellent yields and selectivity for the trans product, but all products were racemic. Investigation of the addition of a recoverable and reusable tetra-amine ligand has led to moderate yields, good diastereoselectivity, and moderate to high enantioselectivity. We also found a curious switch of the major diastereomer from trans to cis when the tetra-amine was used, allowing for greater versatility of the protocol. Because of this switch, we propose the reaction proceeds through an “open” transition state in the presence of the tetra-amine as opposed to the “closed” transition state previously seen.

Presenting author: Min Guo

The oxygen redox chemistry and its impact on the sulfur dioxide reduction in ionic liquids: Implications for sensor applications

The reduction of SO₂ in non-aqueous solvents has been studied by various groups since 1980. It was shown that the solvent and the electrolyte have a strong influence on the mechanisms of electroreduction of SO₂. Due to significant interests in ionic liquids (ILs), recent years, the SO₂ electroreduction and the absorption of SO₂ in various ILs have also been studied. Complex redox mechanisms were suggested but many steps need to be further clarified. In this work, we systematically studied SO₂ electroreduction mechanism in several ILs and compared their redox behaviors at Pt, carbon and Au electrodes by Cyclic Voltammetry and Electrochemical Quartz Crystal Microbalance. Mechanistic interpretation of the one major reduction peak and two oxidation peaks during SO₂ reduction in ILs were proposed. The gold electrode was found to have better sensitivity because of the stronger adsorption of SO₂ on Au than Pt and Carbon. Our results showed that the diffusion coefficient is more important than solubility to affect SO₂ reduction current in IL. The reversible physical absorption of SO₂ in ILs (e.g. [C₂mim][NTf₂]) suggesting that ILs could be a promising solvents for SO₂ electrochemical sensor development. Amperometric sensor method was developed to quantify SO₂ concentrations based on the above mechanistic study. The SO₂ amperometric sensor was based on the more reversible SO₂ reduction process which revealed good sensitivity and selectivity, excellent stability for short and long term usage. Besides that, our results showed that the SO₂ sensor had higher sensitivity with O₂ coexistent than O₂ free environment due to the interaction between O₂ and SO₂ reduction products. Since SO₂ contributes significantly to the environmental problems like acid rain and also has been link to human health issues like asthma, we believe our work is very significant in contributing to understanding of the fundamental electrochemistry of SO₂ in ILs and the development of electrochemical SO₂ sensor by using ILs as promising electrolytic media.

Presenting author: Brittany Kelley

“A Rose by Any Other Name”: Female Empowerment and Transformative Potential in Adaptations of “Beauty and the Beast”

As the Disney film observes, “Beauty and the Beast” is truly a “tale as old as time” (Griswold 15). Tracing its roots back to the “Cupid and Psyche” Roman myth by Apuleius in 150 A.D., the fairy tale has endured “[f]or more than two millennia” and has been retold in animal bridegroom folktales around the world (15). French filmmaker Christophe Gans has reinvented and reinvigorated the

fairy tale for modern-day audiences in his 2014 film adaptation, *La Belle et la bête*. Using psychoanalysis and feminist theory, one can better understand Gans' adaptation of the fairy tale's empowering portrayal of the heroine's transformation from girl to woman and her quest for love and happiness in a reciprocal relationship. The focus of this project will center on Gans' *La Belle et la bête*, using three literary versions of the "Beauty and the Beast" fairy tale—versions by Villeneuve and Beaumont, as well as the "Cupid and Psyche" myth—and two other film adaptations—the Disney and Cocteau films—as a means of comparison and contrast, in order to illustrate how Gans' adapts the major themes of this tale in innovative ways which characterize an even more powerful transformation of the heroine from girl to woman. At the beginning of Christophe Gans' 2014 adaptation of *La Belle et la bête*, Beauty is a dutiful daughter trapped in an oedipal situation. She must continue to grow and transform from little girl and obedient, doting daughter to mature adolescent, independent woman and empowered wife, and the Beast encourages her transformation through his continued patience, generosity, and trust. In exchange for the sacrifice of one single rose, both Beauty and the Beast create new lives for themselves, and we can imagine that they are still living happily ever after. By combining and reinventing elements from all of these versions of the "Beauty and the Beast" fairy tale, the Gans film is able to focus equally on the transformation stories of Beauty and the Beast, respectively, illuminating not only their development as individuals, but also their mutual journey as a couple, until they are able to found their own happily ever after. Key to my analysis of this film, in relation to other adaptations of the "Beauty and the Beast" fairy tale, are the images of the rose, the magic mirror, and the symbolic colors of Beauty's dresses, as well as Gans' inventive incorporation of the "Cupid and Psyche" myth.

Presenting author: Emily Benoit

The Revenger Drags His Feet: "Hamlet" Redefined Through Stalling

Although Thomas Kyd's "The Spanish Tragedy" and William Shakespeare's "Hamlet" are both considered revenge tragedies, only Kyd's narrative can actually be considered as such. Shakespeare's contributions to "The Spanish Tragedy" are reflected in his retelling of the story through "Hamlet," but his deviations from the source material raise the question of how these two plays achieve their differing resolutions, and what effect this has on our consideration of them as "revenge tragedies." Featuring a revenger whose madness is channeled into a singular desire for vengeance against the murders of his son, Kyd's protagonist Hieronimo is able to cultivate a meta-theatrical device that slays his enemies and fulfills his revenge. "Hamlet" features an avenger who affects madness in order to craft his vengeance; but despite being specifically entreated to do so, Hamlet does not technically succeed in taking revenge. Revenge in "The Spanish Tragedy" is bound up with action and pursuit of vengeance to its completion, spurred onward by Hieronimo's internal desire to free himself from the trauma of his son's death. Kyd uses the revenger's madness as a component of the vengeful act, but Shakespeare's use of madness is the inciting incident towards the stalling behaviors that will ultimately lead to tragedy, but not revenge. Hamlet's revenge, while textually citing the same aim, so entraps the revenger in his own thoughts that he is too distracted (or simply spiritually unable) to defend himself when his own moment of mortal entrapment arrives. By creating Hamlet as one of the most considerate, intellectual, and psychologically troubled character within his folio, Shakespeare is able to turn an inveterate trope against him and place him in a situation from which there is no escape. Operating under the guise of the revenge narrative, "Hamlet" traps its revenger in his own emotions and dooms him before his vengeance is fulfilled. Questions addressed concern the differences between "The Spanish Tragedy" and "Hamlet" as both relate to the revenge tragedy genre, as well as the ways in which

that genre is understood according to how well each play fulfills its requirements. Key findings (as indicated above) were obtained through a careful reading of both texts in the context of Elizabethan theatrical conventions, and were further considered according to the cultural and religious opinions of audiences during this time. Noting the differences between both plays not only informs the qualifications of the revenge tragedy genre, but may also indicate a greater historical and/or cultural impact on the plays' subject material than originally anticipated.

Presenting author: Lara Zanazanian
Reduplication in Armenian

For my thesis, I will be conducting research on the phenomenon of reduplication and its effects in Standard Western Armenian (SWA). I have taken Optimality Theory, with Dr. Rosenthal's guidance, and have conducted much of my research through Bert Vaux's text entitled *The Phonology of Armenian*. Other portions of my research derive from a popular Armenian comedian, Vahe Berberian, who has been writing witty and contextually exact material for decades. He continuously makes a point to discuss the Armenian language and humorous linguistic themes that native speakers, such as myself, will not second guess when speaking. SWA has a few types of reduplication which I have noticed in my speech and have used for as long as I can remember. The first form I would like to review is known as fixed segment reduplication, the second is m-reduplication, and the third is, what I will call, full form reduplication. The examples in this paper are combined data from Vaux's text, topics Berberian discusses, as well as my own knowledge of Armenian. Fixed segment reduplication: Fixed segment reduplication occurs when a specific part of the lexicon is repeated either before or after the root word. In SWA, the fixed segment that is reduplicated is the CVC syllable. CVC represents a [consonant, vowel, consonant] syllable; the final consonant is known as a 'coda'. The set of codas that are used alternately are [p] and [s]. Vaux states that to form an intensive adjective, one prefixes to the root a CVC syllable consisting of the following components: root-initial consonant (if applicable), followed by the leftmost root vowel, which is then followed by [p] or [s], depending on the quality of the vowel that is copied into the reduplicant (Vaux 242). Vaux's research shows that if the copied vowel is an [a, i, o:], the coda consonant is [s]. However, if the copied vowel is [e, o], the coda consonant is [p]. M-Reduplication: Vaux states that if the word begins with a vowel, the [m-] attaches to the left edge of the reduplicant. If the word begins with a consonant, [m-] replaces the word-initial consonant. However, should the word begin with an [m], changes are made to the leftmost vowel in the reduplicant. The words that typically undergo m-reduplication are nouns and verbs.

Presenting author: Sarah Donaldson
Mate-Guarding and Preferences for Self-Resemblance Across the Menstrual Cycle in Women and Their Male Partners

Men exhibit increased mate retention behavior around their female partner's ovulation, although these studies collected data exclusively from women. Therefore studies comparing the couple, from both the male and female perspective are needed. Additionally, no study has directly investigated how men's preferences change in accordance with their female partner's cycle. Since men are more vigilant to threats of cuckoldry and engage in more mate retention behaviors when their partners are most likely to conceive, and given that mate retention behavior is related to preferences for self-resemblance (a cue to paternity) in infant faces among men, it is likely that men's

preferences for self-resemblance will also vary as a function of their partner's menstrual cycle. The current study uses measured hormone levels to investigate changes in mate retention behaviors and preferences for self-resemblance across the menstrual cycle among women and their male partners. We found that fertility status affected perception of mate retention behaviors in women, however, further analyses are ongoing for men. Also, because women increase their preferences for cues to kinship in adult faces in the luteal (i.e., nonfertile) phase of the menstrual cycle, we predict to find similar results in women's preferences for self-resembling infant faces.

Presenting Author: Autumn Cleverley

Body Fat, V02 Max, and Vitamin D as Potential Risk Factors for Anemia and Reduced Athletic Performance in Collegiate Cross-Country Runners

Runner's anemia in female athletes is a complex phenomenon, with implications on health and performance. Inadequate nutrient intakes, footstrike hemolysis, blood-loss through menstruation and/or gastrointestinal bleeding are thought to contribute to runner's anemia. A recent study on 10,410 children found a link between anemia and vitamin D deficiency, which has not been previously explored in female endurance athletes. Therefore, the primary aims of this study are to assess: 1) the incidence of anemia in female high school (HS) and collegiate cross country runners; 2) the relationship between anemia and vitamin D levels; and 3) possible associations between race performances, anemia and vitamin D levels across a single season. This observational study of collegiate cross country runners will test runners before and after the competitive season to assess changes in: maximal aerobic capacity; body composition; dietary intake; menstrual history, urinary indices, complete blood count, and both serum ferritin and 25(OH)Vitamin D. Main outcome measures are serum ferritin and Vitamin D. Significance of a positive relationship between iron stores (ferritin) and Vitamin D would highlight the significance of Vitamin D as a modifiable risk factor for anemia and poor race performance in female runners.

Presenting author: Simon Reeve

Co-presenter: Lisa Welling

Transitory Environmental Threat Alters Human Mate Preferences for Physical Qualities of the Face and Body

The Environmental Security Hypothesis (ESH) proposes that when the environment is less secure, people will show greater preference for mates with survival-promoting traits (Pettijohn & Jungeberg, 2004). In two studies, we manipulated perceived environmental security and measured preference for different body and face characteristics. In Study 1, participants (N=100) received a cover-story designed to lead experimental, but not control, participants to believe they would be required to handle a poisonous snake. Participants then selected the three opposite-sex face and body types that they found most attractive from image matrices depicting physical characteristics varying systematically across two dimensions. Female bodies varied in body fat and waist-to-hip ratio, and male bodies varied in muscle mass and waist-to-chest ratio. Face stimuli varied in masculine-feminine facial shape and masculine-feminine facial coloration. Results indicated that, compared to controls, men in the environmental-threat condition showed a preference for higher body-fat, and women in the environmental-threat condition showed a preference for higher muscle mass and more masculine faces. In Study 2, participants (N=272) received a similar cover-story except control participants where lead to believe they would handle a non-threatening animal (a young rabbit) instead of no animal. Participants then ranked an orthogonal array of body and face images

depicting physical characteristics varying systematically across three dimensions. Both male and female body images varied in (1) total body volume, (2) fat-to-muscle body composition ratio and (3) masculine/feminine body shape; these varied across four possible increments per dimension (a total of 19 images are required for effective conjoint analysis; 16 in the orthogonal array with 3 holdout test images). Both male and female body images varied in (1) masculine/feminine face shape, (2) facial symmetry and (3) perceived health in facial coloration; these varied across three possible increments per dimension (a total of 11 images are required for effective conjoint analysis; 9 in the orthogonal array with 2 holdout test images). Results support and expand on those from Study 1 with men in the environmental-threat condition placing greater priority on a greater body volume relative to other dimensions, and women in the environmental-threat condition placing a greater priority on a greater level of body muscle relative to fat as well as placing a greater priority on more masculine shaped faces. In line with the ESH, our findings predominantly support a context-specific pattern of mate preference. That is, when exposed to a potential environmental safety threat, men and women seem to show an adaptive shift in mate preference towards larger women or more muscular men with greater facial masculinity (respectively), indicative of a preference towards immediate survival traits over traits more associated with long-term reproduction.

Presenting author: Nicole Barbaro

Mothers and Fathers Perform More Mate Retention than Individuals without Children

Human life history is unique among primates, most notably the extraordinary length of infant dependency and the formation of long-term pair-bonds. Because bipedal locomotion requires a skeletal frame that inhibits a large brain from passing safely through the birth canal, human infants are born at a much earlier stage of brain development than other great apes. The unique traits in human infants may have been a primary selection pressure for pair-bonding in humans, because pair-bonding in humans facilitates bi-parental care. Men and women, therefore, are motivated to remain pair-bonded to maintain the distribution of male-provisioned resources to a woman and her offspring, or to protect offspring from infanticide. Men and women can employ several strategies to retain their mate and prevent their partner from defecting from the relationship, including individual mate retention behaviors (i.e., behaviors performed alone) and coalitional mate retention behaviors (i.e., behaviors performed by a close ally). When children are introduced into a relationship, partner infidelity may impose greater costs on men and women than when children are not present. Research assessing mate retention behaviors, however, has not investigated the effect of having children on performance frequencies of mate retention behaviors in men and women. The current research investigates whether men and women with children perform more frequent mate retention behaviors than men and women without children. Participants ($n = 1,003$) currently in a heterosexual romantic relationship completed a survey, reporting whether they had genetic children with their current romantic partner, and reported how frequently they performed various mate retention behaviors. The results indicate that men ($n = 262$) and women ($n = 234$) who share genetic children with their current partner performed more frequent individual mate retention behaviors and requested more frequent coalitional mate retention behaviors than men ($n = 280$) and women ($n = 227$) who do not share genetic children with their current partner. The primary finding of the current research—that mothers and fathers perform more mate retention than individuals without children—points to the importance of both Male-Provisioning and Male-Male Competition in the maintenance and evolution of pair-bonding in humans. The results are interpreted as they relate to factors concerning the evolution of pair-bonding in humans, and mate retention behaviors, more generally. Limitations of the current research are discussed, and we suggest profitable avenues for future research in this domain.

Abstracts: Poster Presentations

Presenting author: Ashley Superson

Taxon sampling influence on phylogenetic accuracy within prokaryotes

The tree of life is a representation of ancestral-descendant relationships of extant species on Earth and is used beyond evolutionary biology to address pressing societal issues from preserving healthy environments to identifying habitats conducive to the origin of life. Reconstructing evolutionary histories relies on mathematical models to interpret past relationships based on current genomic data. The upsurge in molecular data from enhanced sequencing technologies carried an expectation that this interpretation would become more accurate, that is converge towards a stable Tree of Life. Unfortunately, this expectation has not been realized, especially within microbes that, because of complex evolutionary processes and deficiencies in sampling a large diversity of species, still present unstable deep phylogenetic relationships. This study aims to determine how taxon sampling affects the accuracy of phylogenetic reconstruction within poorly represented bacterial phyla. To do this, we implemented a computational pipeline that allows for a systemic analysis of bacterial data sets to determine if there is a threshold at which a stable phylogenetic reconstruction is achieved. We utilized datasets of fully sequenced proteomes for seven phyla that compose the Terrabacteria superphylum. Recent studies have shown conflicting phylogenies for this group, particularly in the placement of the Deinococcus-Thermus phylum. For that reason species permutations were created for this phylum, each altering the number of species being analyzed by removing a variable number of species belonging to Deinococcus-Thermus while keeping intact the remaining phyla. Each permutation had a Maximum Likelihood phylogenetic tree that was analyzed using the Robinson-Foulds metric to quantify the level of discord amongst permutations. Our results are showing that bias caused by different taxon sampling does affect phylogenetic reconstruction in empirical data suggesting that to obtain a stable and accurate tree of life sequencing efforts should be more evenly distributed across taxonomic categories.

Presenting Author: Jia Li

Degradation of Aromatic Hydrocarbons by Functional and Structural Models of Iron-Containing Dioxygenases

Enzymes are important macromolecules in living organisms, which catalyze specific chemical reactions to control metabolism. Although having a complicated three-dimensional structure, only a very small part of the structure, called the “active site”, is directly involved in the catalytic process. Many active sites show a structure that metal Fe center is coordinated by one N atom each from three Histidines. Using synthetic chemistry, we can synthesize a model complex to mimic the structure of those active sites with similar catalytic ability. This methodology will help us to understand the mechanism that how the enzyme works, which might be employed to develop a new catalyst in the future. At the starting point, we use aliphatic triazamacrocycles compound “tacud” as a ligand to synthesize a model complex for the enzyme called 2, 4'-dihydroxyacetophenone dioxygenase (DAD). After we used X-ray, IR, UV-vis, and ESR to characterize this iron complex, it was further investigated for the degradation to a substrate-like molecule called 2-hydroxyacetophenone (2-HAP). Based on the LC-MS and NMR data, it shows that the complex can mimic DAD to decompose 2-HAP with O₂ involved. Since the ligand tacud does not have

imidazole ring structure like Histidine, we try to move forward and look for some other ligands that are more like natural structure of those active sites. Ligand tris(1-ethyl-4-isopropyl-imidazolyl-κN)phosphine (T1Et4iPrIP) is a perfect candidate because it has three imidazole groups connected by a phosphorus atom. Our Fe complex with ligand T1Et4iPrIP give a structure that an iron center was coordinated with three imidazole groups as well as two equiv of triflate molecules. We use nitric oxide to react with this complex and find it can bond to the NO reversibly, which is as the same as the active site. After we characterize it with X-ray, UV-vis, IR, and ESR, we use this complex to mimic salicylate 1, 2-dioxygenase (SDO) by reacting it to salicylate with presence of O₂. Although the reaction to O₂ is sluggish, unexpectedly, it showed that the reaction to a higher oxidant H₂O₂ is fast and interesting. The LC-MS and NMR data prove that the complex can decompose salicylate anion with presence of O₂ and H₂O₂. The reaction mechanism is still under investigation, which will give us an idea that how to modify our complex to increase the catalytic ability of this complex to mimic the active site in the future.

Presenting Author: Eralda Caushaj

Co-presenters: Sai Praveen, Rahul Chandrashekar, Veera Raju, Huirong Fu

AAPM: Educate, Inform and Empower Android Users from Malicious Apps

The Android apps cannot be installed without prior requesting access to device resources and data, such as storage, GPS location, camera, microphone, SMS, phone identity, network information etc. Application permissions should be granted at once before the installation begins or you cannot use the app at all. The legitimate mobile app, advertisement and threats all require to have access to mobile resources and data in order to properly function. Application permissions are required and should be granted by the user. How to minimize the risk of threats and ads on mobile devices? We have implemented Android Application Permission Manager (AAPM) app that will educate, inform and prevent the users from installing malicious apps. Our framework considers 9 features such as (1) category, (2) free/paid, (3) number of application permissions, (4) range of application permissions, (5) ads associated, (6) not necessary app permission for the functionality of the app, (7) the most required app permission in each category, (8) number of threats each app permission is exposed and (9) dangerous combinations. The features of our app are identified by analyzing 1590 top free/paid apps from Google Play, the official Android market. We evaluate the accuracy of our framework by testing it in a pool of 400 malicious apps.

Presenting Author: Eralda Caushaj

Co-presenters: Sai Praveen, Ali Alshehri, Hani Alshahrani, Rahul Chandrashekar, Huirong Fu

Impact of Android Application Permissions toward Mobile Threats

Android OS based devices have more market share than any other smartphone platform device, 82.8% as of May 2015. Also the market share for smartphone security threats is much larger for Android platform compared to iOS. As of 2014 there are over 1.5 million new samples of Android malware. The Android malware are camouflaged as legitimate apps in official app market, or as advertisement networks associated with legitimate apps. The Android apps cannot be installed without prior requesting access to device resources and data, such as storage, GPS location, camera, microphone, SMS, phone identity, network information etc. The main attacks use legitimate doors to gain access into the device and applications are the target. The malware

associated with legitimate apps benefits from the access to very important resources in the device. Application permissions should be granted at once before the installation begins or you cannot use the app at all. Therefore advertisements and malware associated with legitimate apps can require more application permissions in order to accommodate themselves. Our goal is to identify the most required app permissions required by malware, advertisement networks to attack legitimate Android apps. Also we identify the most dangerous combinations of app permissions and how the user can minimize the threat without compromising the functionality of the app

Presenting Author: Sarah Guadalupe
Cultural Influence on Children with Autism

This presentation will focus on a review of current research and literature available on the cultural aspects related to autism. The rate of autism is significantly rising globally. It is important for providers, educators, medical professionals, researchers and families to understand autism; the ability to identify and recognize the symptoms of a child with autism and the importance of early detection with subsequent early intervention. Once, the autism is identified, it is very important that the child be provided with effective, evidenced-based practices, as soon as possible. However, there are many cultural implications that can interfere with the identification and treatment of autism. There are distinct differences among the Latino-American, African-American, Arab and Asian cultures in how they identify and seek treatment for a child with autism. For example, the Latino culture seeks alternative treatments, which typically have religious components because they often believe autism is an act of God. Whereas, the Arab culture tends to have noticeable differences between boys and girls when they are identified as having autism. This presentation will explore the family's culture and how it effects the identification and early intervention treatments the child with autism receives. It will also help professionals understand the cultural implications that occur with autism and how to better address the cultural divide. This will enable the professional to provide culturally appropriate evidence-based practices to the family.

Presenting Author: Danielle Ryba
Genistein promotes early apoptosis in HIV infected U937 cells.

HIV infection is still a prominent health issue, and current therapies continue to have limitations, the most important being development of viral resistance. The soy isoflavone Genistein, a tyrosine kinase inhibitor, has been shown to induce caspase-3 mediated apoptosis in T lymphoma cells, as well as prevent infection of macrophages with HIV. It is possible that in HIV infected U937 cells, biologically achievable concentrations of Genistein could provide an additional damage signal that, when combined with the integrase inhibitor Raltegravir, would lead to early induction of apoptosis. This combination theoretically would lead to an accumulation of un-integrated DNA within the cells, triggering apoptosis. DNA fragmentation was detected by DNA extraction and gel electrophoresis. Caspase-3 activity, an indicator of apoptosis, was detected with a DEVD fluorescently labeled substrate. HIV infected cell cultures were treated with 50nM of Raltegravir and 20 μ M or 60 μ M of Genistein, and assays were performed at the 48-hour time point. A DNA fragmentation assay showed banding that was consistent with apoptosis. A caspase-3 assay performed at 48 hours showed an increase in activity in cultures treated with either 20 μ M or 60 μ M of Genistein when compared to Raltegravir alone. The experiments will be repeated at additional time points, to determine the time of induction of cell death. Assessing p53 activation and mitochondrial

depolarization will be done to determine their involvement in the pathway of cell death. Both the banding patterns and caspase-3 detection assay indicate that there is an increase in apoptosis in cultures treated with HIV, Raltegravir, and genistein. If the data continues to support the observed results, it is possible that Genistein could become an adjunctive HIV therapy, and promote early elimination of virally infected cells.

Presenting Author: Eric Raynal
Student, administrator, and faculty perspectives on lesbian, gay, bisexual, and transgender-related curriculum content

The lesbian, gay, bisexual, and transgender (LGBT) minority historically has been neglected by medical professionals. However, medical schools today are shifting their attention to preparing medical students to better care for these patients. This study compares two subgroups (students and administrators/faculty) regarding their perspectives on the integration of LGBT-related education and training opportunities in a medical school curriculum. Differences in the subgroup responses may indicate a mismatch in teaching effectiveness, or some other gap in the curriculum. Conversely, similarities may indicate that the faculty/administration teaches LGBT content effectively. Data for comparison was collected using an adapted survey that was distributed via email. The analyses detected no significant differences in independent samples t-tests comparing mean scores on knowledge and attitudes towards various teaching points between students and faculty/administrators. However, the results nonetheless pointed at significant lapses in curricular material. Across all responses, mean scores for feelings of how well various curriculum topics are taught reached a maximum of 35 points, on a scale of 0 (nothing) to 100 (a lot). While perhaps it is encouraging that the two subgroups felt that they knew similar amounts and that they felt that the curriculum topics were taught equally well, indicating no mismatch in teaching effectiveness, it is discouraging that the amount that they knew regarding LGBT-related curriculum topics was so low. Participants were also asked to rate the coverage of LGBT content, on the whole, using a symmetric five-level Likert scale ranging from “very poor” to “very good.” Across all responses, the mean response was between “poor” and “fair.” This supports the previous research question’s results and suggests that work should be done to improve either the coverage of LGBT curricular content, or the perception of the coverage. Future research could focus on developing tools to better assess curricular effectiveness, to help determine the difference between these two directions. Medical schools must integrate LGBT curricular content effectively in order to train physicians who will provide equal care to this minority.

Presenting Author: Kassem Faraj
Assessing Potential Disparities in Outcomes Between Geriatric Surgical Patients Living in the Community and Those Living in Skilled Nursing Facilities

The geriatric population often uses nursing homes. Geriatric individuals admitted from nursing homes for surgical procedures have been shown to experience more complicated hospital courses. Some may rely on skilled nursing facilities (SNFs), which are certified by Medicare to provide continuous medical care. Because admissions from nursing homes have been associated with worse outcomes, patients from SNFs may be at a disadvantage when presenting to the hospital, compared to those from the community. Due to the high frequency of small bowel obstruction (SBO) in the elderly, this diagnosis would be ideal to assess the potential disparity between these two populations. A retrospective chart review including all patients older than 65 years admitted to Beaumont Health will be analyzed to identify SBO-related diagnoses. Their

charts will then be reviewed to characterize hospital courses. The study will aim for 1000 patients. Hospital courses will be assessed by comparing outcomes such as 30-day mortality, intensive care unit lengths of stay, the need for feeding tube placement, urgent surgical need, prolonged ventilation, cardiac complications, acute kidney injury, deep vein thrombosis, pneumonia, recovery of bowel function, and urinary tract infections. The results will be analyzed by using a chi-squared test. The information obtained from this study will help make physicians aware of patients at risk for worse outcomes at presentation due to their admission source. The potential actions that can subsequently be taken include evaluating the deficiencies in these facilities, as well as being cognizant to more carefully evaluate these patients during their hospital stay.

Presenting Author: Lauren Quinn
The Experiences of Homeless Individuals Utilizing the Emergency Department: A Qualitative Study

This is a qualitative study determining the factors associated with homeless over use of the Emergency Department (ED). While overuse of the ED by homeless individuals has received some attention in the literature, particularly with respect to the associated costs, little work has been done to elaborate the narratives of homeless ED users themselves. The project explores the nature of ED use and its associated factors from the perspective of homeless patients themselves, where chronically homeless individuals were interviewed in depth about their experiences with health care, particularly in the ED. The data is revealing that there is a lack of an adaptive approach when treating the homeless in an acute setting. Within a one month period after being admitted to the hospital, over 70% of homeless patients re-visited the emergency center. Results suggest that the “treat and street” mindset of the ED when providing care for the homeless may be a contributing factor in overuse of the ED, increases in hospital expenses, increases in chronic morbidities and addictions. Findings suggest that the cycle of overuse of the ED by the homeless needs to be confronted with effective ways to increase long-term improvement after ED discharge. Among our participants, improved quality of life for the homeless appears to be associated with intervention from medical staff in the ED by connecting the homeless with options for improving their health when leaving the hospital such as a respite center or rehabilitation facility. A unique discharge plan needs to be established for homeless patients that is part of hospital protocol. This action would ultimately decrease readmission rates and increase homeless health.

Presenting Author: Lola Adekanmbi
Survival Outcome of Elderly Patients with Acute Myeloid Leukemia

INTRODUCTION: Acute Myeloid Leukemia (AML) has been considered a medical emergency in which immediate initiation of therapy is thought to be crucial to minimizing morbidity and mortality. Physicians must weigh the risks associated with giving immediate intensive therapy to patients with poor prognostic characteristics, such as advanced age and adverse cytogenetics. This assessment of AML survival in the elderly population at Beaumont Hospital will help determine trends in treatment outcomes to define optimal treatment plans and generate new evidence that can guide future management. METHODS: Approximately 70-80 elderly patients with confirmed diagnosis of AML will be identified from the tumor registry and/or oncology data services at Beaumont. With age being a major prognostic factor in AML, the patients will be categorized into the “youngest old” (65-74), the “older old” (75-85) and the “oldest old” (85+). Overall survival after AML diagnosis will be evaluated in terms of the percentage of patients alive each month after the AML diagnosis and the median number of months after the AML diagnosis that the patients survived. Characteristics and outcomes among the subset of patients who received chemotherapy will be evaluated, and study measures will be assessed by length of survival. ANTICIPATED RESULTS: It is expected that the overall relative survival among elderly patients with AML that have treated at William Beaumont will

have increased over a fifteen-year period (2000-2015). We also expect to see that the median survival decreased with each successive age group. Among patients who received treatment, we anticipate that chemotherapy for leukemia improves overall survival in older acute myeloid leukemia patients compared to other approaches. **CONCLUSION:** Through this study, we hope to gain a better insight into the poor prognosis associated with the elderly AML population and provide more accurate risk assessment, which may ultimately permit a more refined treatment approach for elderly AML patients.

Presenting Author: Annette G. Skowronska
Optimal Design of a Microgrid with Vehicle to Grid Capability

Most engineering systems are repairable. Their components can be repaired or renewed, if system failure occurs, to put the system back into service. The reliability theory of repairable systems is vastly different from that of non-repairable systems. The optimal solution for design and maintain repairable systems includes the initial design, the system maintenance throughout the planning horizon, and the protocol to operate the system. In this work, we extend this idea by incorporating flexibility and demonstrate the approach using a smart charging electric microgrid architecture with Vehicle to Grid (V2G). The flexibility is realized by allowing the architecture to change with time. Our approach “learns” the working characteristics of the microgrid. We use actual load and supply data over a short time to quantify the load and supply random processes and also establish the correlation between them. The quantified processes are then used to generate load and supply realizations over the long planning horizon. We show how this can reduce the computational effort when simulating microgrids for the entire planning horizon without impeding on their design under various operating scenarios considering uncertainty.

Presenting Author: Benjamin Nold
Development of an Immersive First Person View System for an Unmanned Vehicle

In this project, an electromechanical gimbal mount for a First Person View (FPV) system is simulated via image processing performed on a wide-angle image. Using a FPV system on an Unmanned Vehicle (UV) provides many benefits to the UV's operator, including the ability to see the surrounding area from the perspective of the UV and the ability to operate the UV out of a direct line of sight. FPV systems consist of a video camera, a wireless video transceiver set and a screen to view the video. Traditional FPV systems commonly mount the camera on an electromechanical gimbal to permit independent orientation of the camera in relation to the UV's orientation. The system developed in this simulates an electromechanical gimbal in software by performing image processing on ultra-wide angle video images. The developed system attaches a wide-angle video camera directly onto a UV and wirelessly transmits the video to the base station. A desktop computer at the base station was used to perform image processing on the video to simulate an electromechanical gimbal and to display the image on a Virtual Reality (VR) headset. The orientation of the pilot's head was tracked by the VR headset and was used to control the orientation of the software gimbal. The operation of the system has been successfully demonstrated.

Presenting Author: Ketan Raghavendra Kulkarni
Cache Usage in Multi-Core Processors

Modern microcontrollers operate at high frequencies, which make them considerably faster than the speed at which data can be fetched from the main memory. Hence, the use of caches has become crucial to achieve improved performance. In order to use cache in a microcontroller, it is necessary to first understand the basic terminologies associated, such as cache hit, cache miss, cache line, and cache write-back. Many microcontrollers now have separate caches for program and for data. It is also necessary to understand the difference in their working to make intelligent decisions regarding selectively enabling them for different sections of the main memory. The cache mapping mechanisms such as direct mapping, fully associative and set associative should also be understood to understand the best one suitable for a certain application. Cache use becomes even more important in case of multi-core processors to achieve optimal performance. Each core of the processor has its own cache. Also, it is quite possible that all the cores have a read/write access to the same shared data memory space. This leads to the problem of Cache Incoherence, in which the data is inconsistent between the different caches and the main memory. This is a very serious issue that can make the overall application unstable. There are many hardware cache coherency protocols to address this issue. But due to the cost involved, they are not implemented in many real-time embedded multi-core processors. Hence, it is necessary to achieve Cache Coherency using software. This poster describes one of such protocols: Write-Through-Invalidate Protocol to get around the Cache Incoherence problem. The Infineon Aurix is used as the target processor for this work. The Aurix is a popular 32-bit multi-core micro-controller that is widely used in the automotive industry. It has 3 cores with 3 separate data and program cache. The poster explains the cache implementation on the Aurix and provides recommendations to achieve optimal performance.

Presenting Author: Waseem Sadeh
Development of a Fork-Join Dynamic Scheduling Middle-Layer for Automotive Powertrain Control Software

Automotive multicore microcontrollers are rapidly making their way into the automotive industry. Efficient utilization of multicore microcontrollers could handle the increased complexity of the powertrain control software, reduce their execution time and power consumption, as well as make them more reliable. This paper presents the preliminary status of our ongoing research on evaluating the approach of dynamic scheduling for automotive powertrain control software on multicore chips. We have adopted the Cilk approach (MIT 1994) to develop a pure ANSI C Fork-Join dynamic scheduling runtime middle-layer with a work-stealing scheduler targeted for automotive multicore embedded systems. This middle-layer can be running on top of any AUTOSAR compliant multicore RTOS. It could be used to design new software as well as to help migrating legacy powertrain software into multicore embedded systems. We recently have successfully integrated our runtime layer into parts of legacy Ford powertrain software at Ford Motor Company. We have used the 3-core AURIX TC27x Infineon multicore microcontroller chip and the ETAS RTA-OS multicore RTOS. For testing purposes, we have forked 2 periodic tasks in Ford legacy powertrain software. Our preliminary evaluation showed that this runtime layer scales well to the available cores, and it abstracts away the details involved in load balancing and inter-core communications from programmers. The preliminary results showed 2.4x speedup factor on the execution time of the two forked periodic tasks and overall reduction on tasks' maximum response times (25.1% average) for all periodic tasks with the same or less priority than the two forked tasks. The maximum response times for the 2 forked have reduced by 28.5% and 34.2 % respectively. This presentation outlines our preliminary design and results of this ongoing work on evaluating the dynamic scheduler for powertrain control software on multicore chips.

Presenting Author: Wedad Alawad

Co-presenter: Awatef Balobaid

Forensic Enabled Security as a Service (FESaaS) - a readiness model for cloud vendors and cloud forensic investigator

One of the main reasons as to why forensic in cloud is highly challenging is due to the fact that cloud computing is still new to the forensic investigators. This makes it harder for the investigators to know all the effects and threats to be addressed. Apart from cloud being new, the fact that it is a virtualized computing makes it even harder to determine the right time to perform the digital forensic investigation. Using the forensic readiness model makes it easier to perform the investigation before the occurrence of a threat. Since the cloud forensic investigation is a newer concept, it is common for organizations to lack the model. This will however change once more understanding and research is done on cloud computing. Earlier methods of investigations provided the investigator total power over the artifacts being investigated. This was mainly due to the fact that the data being assessed was physically available and could easily be found. This is not the case in cloud computing. The main difference being the nature of cloud computing. As mentioned earlier cloud computing is completely virtual and the distribution of data is totally different. If the earlier methods of forensic investigations are used it could be challenging for the investigator to get the relevant evidence. The main reason lying on the type of service model used by the providers. There are few readiness models proposed by the researchers. However, we are the only researchers who proposed a forensic readiness model that combines the Security as a Service and the Forensic as a Service in one model; the proposed readiness model will work as a Forensic Enabled Security as a Service. Moreover, the study will focus on the forensic process flow model. A forensic investigator needs to address different methods or areas in order to find the relevant digital evidence. The investigator must deal with the acquisition, storage and detection of data used. A security deployed cloud model logs all the incident data and also stores the artifacts. The outcome of this project will be a new Forensic Enabled Security as a Service model (FESaaS) for cloud services. That will contribute in the field of cloud digital forensic and will help the forensic investigator to investigate any incident in short time.

Presenting Author: Oltion Mesi

Co-presenters: Abdelrahman Hassane, Hamid Soltanian-Zadeh, Ph.D.

Evaluation of Microgravity Effects on Spine and Supporting Muscles using Magnet Resonance Imaging

INTRODUCTION: Astronauts are exposed to microgravity environments during their space objectives, making their bodies susceptible to significant physiological and anatomical changes. The goals of the proposed research is to accurately quantify the effects of a microgravity environment on the spine and supporting muscles using imaging modalities such as magnet resonance imaging (MRI). Space travel may one day find a place as standard transportation so it's imperative that we understand the changes experienced by the human body as a result of microgravity. **METHODS:** Disc heights and volumes of supporting spine muscles will be collected from 7 astronauts. Multiple scans were taken of each astronaut pre and post space flight and disc heights from discs T12-S1 were quantitatively compared across pre and post scans in each corresponding astronaut using T1 MRI imaging. Volumes of the erector spinae, quadratus lumborum, and psoas major muscle in pre and post scans will be compared in each corresponding astronaut using T1 MRI imaging. Statistical analysis will be conducted using

multivariate analysis of variance (MANOVA) in order to determine if a microgravity environment had any statistically significant effect on disc space and/or supporting spinal muscles. **RESULTS (or Anticipated Results):** Previous studies conducted by NASA indicate that there is no statistical difference in disc space between pre and post space flight. However, pre and post flight differences in muscle volume did indicate a statistically significant decrease in volume across muscle groups. We expect to get similar results and use them in conjunction with NASA's results to draw conclusions about the effects of microgravity on disc spaces and supporting spinal muscles. **CONCLUSION:** A decrease in volume size in supporting spinal muscles may indicate that a microgravity environment induces muscular atrophy. The expansion of intervertebral discs may also initiate catabolic events within the disc and lead to disc herniation. These two factors are likely to be the etiology for back pain experienced by astronauts as a result of space flight.

Presenting Author: Rayhaan Akram

Co-presenters: Jason Adam Wasserman, Justin Brox

What factors influence change in glycated hemoglobin over time in an underserved population?

Introduction/Objective: Diabetes-related mortality is higher in minority populations as is the occurrence of diabetes complications. Safety net health care institutions aim to reduce these risks but are presented with various challenges. In this study, we examine factors that influence change in glycated hemoglobin among patients at a free clinic. We hypothesize that education, socioeconomic status as a child, social capital and frequency of visits to the GB clinic will be associated with a decrease in glycated hemoglobin even when controlling for diet, BMI, and initial A1C. In addition, we hypothesize that employment is associated with longer time to glycemic control when controlling for other factors. **Methods:** Data was obtained via medical records and prospective surveys of diabetic patients who fulfilled the inclusion criteria seen at the Gary Bernstein Community Health Clinic during the study period (i.e. control variables included in predictive models of time to glycemic control to examine the effects of key hypothesized factors). Data were analyzed to obtain sum change of glycated hemoglobin over clinic visits to test the hypotheses. Bivariate correlations and analysis of variance (ANOVA) informed a multivariate regression model that best predicted time to glycemic control using the variables at our disposal. **Results (or Anticipated Results):** 13 of 15 participants showed a negative HbA1c change over time ($M = -1.83$, $SD = 2.621$). On bivariate correlation, employment ($N = 14$; $M = 0.714$; $SD = 0.469$) is positively correlated with sum HbA1c change ($N = 14$; $M = -1.94$; $SD = 2.685$; $r = 0.798$; $p < 0.001$; $r^2 = 0.637$). All other variables tested were not statistically significant. Nonetheless, the R^2 for the model was 0.866, likely owing to the small sample size, but also indicating high strength among that particular sample. **Conclusion:** The results did not confirm our hypotheses except that employment is associated with increase in HbA1c over time and thus longer time to glycemic control. Despite the small sample size, these results suggest that FQHCs and other safety-net institutions should emphasize glycemic control with the working poor whose work related activity may interfere with a range of behaviors related to glycemic control. Further studies exploring unique barriers to health care for this population should be conducted.

Presenting Author: Tania Kohal
Efficacy of Outreach on Individuals Based on Prior HIV Testing and Counseling in Seeking Further Preventative Information

Introduction: Advances in pharmacological therapy have changed the narrative of individuals diagnosed with HIV, prolonging quality and length of life, however, prevention remains key in preventing transmission. Our project aims to assess how individuals obtain HIV information and testing services in the hope to better inform how resources for prevention can be effectively allocated. Methods: Our study involved designing a flyer to be placed in two clinics, Affirmations and American Indian Health Family Services (AIFHS) in a general information area and a testing area. The flyers contained different web addresses directing individuals to the same web module. This web module contained information about HIV and a survey querying prior testing, risk assessment, and demographic factors. A link was provided from the web module to a website where testing resources were available. We designed a method of tracking web traffic to ascertain the initiative individuals were taking in seeking further information. A focus group was done to evaluate how individuals obtain HIV information for which a qualitative analysis was done. Results: Individuals do not readily engage in paper-media based information sources, and are more likely to seek out web-based information on their own, or respond to directed intervention by peers, physicians, etc. Conclusion: Our study indicates that resources may be better directed towards web-based information sources and that a directed approach involving healthcare providers, peers, etc. is most effective in encouraging prevention-seeking behaviors.

Presenting Author: Ali Alqazzaz
Co-presenter: Abdulrahman Alzahrani
Web Application Security Tools Analysis

Real-world websites are complex systems that exchange and integrate data with other systems and store and process data in many different places. In other words, they consist of different numbers of components and technologies, including web browser and client-side tools (such as JavaScript and Flash) and web server and server-side application development tools. However, web application security deals with different software bugs in the attempt to get the application to do something bad. In most of the cases, software is developed with the focus on functionality and future needs. Businesses are able to maintain a competitive advantage by providing easier usage. Testing plans are based on making sure the program does what it is supposed to when given good information. The bad news is that there is a number of people out there that are testing your web application as well, but with a different attempt. They check your web server to see if it is vulnerable to unpatched flaws. As a result, strong security for web applications is critical to the success of your online presence. Security importance has grown massively, especially among web applications. Dealing with web application or website security issues requires deep insight and planning, not only because of the many tools that are available but also because of the industry immaturity. So, finding the proper tools requires deep understanding and several steps, including analyzing the development environment, business needs, and the web applications' complexity. This paper studies the underline of web applications to understand web application vulnerabilities. A very high percentage of web applications deployed on the Internet are exposed to security problems. According to the Web Application Security Consortium, about 49% of the web applications that have been reviewed contain vulnerabilities of high-risk level. In addition, this paper analyses the existing tools that have been used to scan for the most widespread vulnerabilities in web

applications, which are: Fingerprinting, Insufficient Transport Layer Protection, Information Leakage, Cross-Site Scripting, SQL Injection, and HTTP Splitting. Finally, this paper evaluates those tools due to security vulnerabilities.

Presenting Author: Anusha Gundam
Role of Big Data Analytic's in the Agriculture Industry

Agriculture and food processing industries are major contributors to the global economy, both in the developed and developing countries. Agriculture not only provides food and raw materials but also employment opportunities to a very large portion of the population. Overall, the agriculture and food industries account for 6% of GDP, comprising 15 million businesses and 46 million jobs. The United Nation has predicted that the global population will reach approximately 9.2 billion by 2050; with many countries lacking enough arable land to cultivate and produce enough food feed its population at current productivity levels. So being able to meet the world demand for food while preserving natural resources for future production, adapting to weather changes, and meeting the standards for quality and food safety, represent great challenges to be overcome. Big data analytic's can play a major role in improving the efficiency and increasing the output of farming activities by collecting and analyzing data about the various factors that impact the yields of different crops. Big data analytic's techniques can be used to manage optimize and predict crop yields by analyzing past data and current conditions and facilitate precision farming. This requires adequate capacity in terms of computer storage and processing power to deal with large amount of data. The objective of this paper is to investigate how “Big data analytic's” tools and techniques can be effectively used in the agriculture industry to boost production. Data collected from soil samples can be analyzed to enable farmers to estimate the potential yield of their farm land; allow efficient and strategic use of fertilizers and pesticides; increase awareness of climate changes, etc. This will allow farmers to determine the best course of action. This knowledge will fetch the best return and maximize agriculture production. This paper will also discuss the different sources of big data in precision agriculture and develop a big data framework that will assist in precision farming. Making decisions at the farm is not easy because information may be missing or there may be too much information to process. The main contribution of this paper is to provide big data framework and some precision agriculture technologies to track yields, monitor field conditions, and manage inputs at very precise levels and offering the potentials to increase the productivity and profitability.

Presenting Author: Avinash Pudota
Present and Future trends of XBRL reports

This article discusses developments in the industry on using XBRL to file financial reports since its inception in early 2000's and its current and future manifestations. In the middle of an information revolution spurred by the Internet, the process of consolidating business information for financial reports or analysis is still largely based on the same manual procedures that have been in place for 25 years. XBRL filings have come up a long way to reduce manual processes and redundancy in reporting and analysis. Many papers are published on XBRL and how it has improved the financial reports and efficiency. There are also some key areas it could improve, such as providing security from information abuse and use of extensible taxonomies in instance document. The objective of this study is to explore various procedures in which organizations file XBRL reports in their respective financial markets in the world and review the adoption rate of XBRL in various geographies across the world. XBRL in Asia is mainly driven by need to improve transparency in reporting and China extends it for Mutual Fund reporting, IPO approvals, Data mining applications to detect

financial fraud whereas Europe has developed an array of government wide and cross-border applications that can share consistently structured XBRL data. XBRL is used to improve banking, municipalities, water board across Europe by leveraging its efficient data gathering and automated analysis. However, there is a significant lag in developing of software applications that regulators, investors, accounting agencies, statisticians and reporting agencies can use to analyze reports effectively according to local markets. XBRL data is also used by market regulators for supervisory purpose in most of the aforementioned financial markets. Key markets considered in this study are Asia, Europe and the Americas and inputs from major financial regulators in these regions are taken into account. This approach can determine the future course of action for economies which are new to adopting XBRL in financial markets such as South Africa, Russia and India.

Presenting Author: Brittany Elia

How Human Resource Management Can Best Support Employees with Autism

Adults with Autism Spectrum Disorder (ASD) are commonplace in our society. Most of the existing research focuses on causes and treatment as it pertains to early diagnosis in young children. Very little is known regarding how to support postsecondary success. (Hendricks, 2010). A recent national study conducted in the United States found that among youth with Autism Spectrum Disorders, 34.7% had attended college and 55.1% had held paid employment during their first six years out of high school (Shattuck, Narendorf, Cooper, Sterzing, Wagner and Taylor, 2012). These individuals are often able to achieve educational goals, but not secure and maintain employment. The disconnect may lie in our understanding of key employment practices used to recruit and manage employees; these are often within the human resource management function. This project provides the social and research background on the issue. First, the existing and relevant literature will be reviewed. Second, the public policy supporting individuals with disabilities will be described (i.e. Americans with Disabilities Act and Workforce Innovation and Opportunity Act). Third, recommendations for both human resource practitioners and researchers will be outlined to best support adults with ASD in the workplace. These recommendations will focus on the following functional areas of human resource management: recruitment, retention and performance management, total rewards, training, development and health and safety.

Presenting Author: Meredith Emery Deneweth

Conventional versus Realistic Constraint Modeling for Optimal Warehouse Locations

The decreasing number of truck drivers reduced the available truck capacity in the United States. The baby boomer workforce is aging into retirement with no replacement. Due to changes in 2013 to the United States Federal Government Hours of Service regulations, the daily hours a truck driver is allowed to work has severely lessened, which lead to additional constraint and transportation costs. In order to choose where to place their next warehouse or distribution center (DC), companies need to consider the availability of trucks and someone to drive them with available service hours. Positive attributes such as low taxes, highway access, and local workforce would not create a successful warehouse if carriers are unavailable to move the product to and from the location. There are multiple theories, algorithms and methods to choosing the best warehouse location such as the Gravity Location Model. The inadequacy in the existing theory does not account for new constraints in the supply chain industry. Conventional modeling is assessed and compared to the proposed Optimal Route Location Model. New factors, calculation methodology and performance measures are created in the Optimal Route Location Model to determine the ideal warehouse placement in the United States.

Presenting Author: Anna Wysocki

Co-presenters: Lisa Welling, Benedict Jones, Lisa DeBruine, David Perrett, Anthony Little

Diurnal variation in women's face preferences

Natural cycling women have an increased preference for masculine faces, voices, and smells near ovulation. This increasing preference for masculinity is associated with an increase in testosterone, which is highest near ovulation, which is highest near ovulation. Additionally, testosterone levels fluctuate throughout the day,, with higher levels in the morning than in in the evening. Consequently, we hypothesize that there will be a fluctuation in preference for masculinity dependent on time of day with women reporting a higher preference for masculinity in the morning when testosterone is higher than in the evening when it is relatively lower than in the evening when it is relatively lower. For the present research, a within-subjects design was used for Study 1, and a between-subjects design was used for Study 2. Both studies found an increase in preference for masculinity in the morning in comparison with the evening for women who reported not using contraceptives. The same relationship was not found for women who reported using hormonal contraceptives. The results of this study suggests that, in addition to preferences for masculinity fluctuating around the fertility cycle, it may also fluctuate diurnally. A limitation of the current work, however, is that we did not measure testosterone directly, which future scholars should address.

Presenting Author: Justin Mogilski

Co-presenter: Lisa Welling

The Relative Importance of Sexual Dimorphism, Fluctuating Asymmetry, and Color Cues to Health During Evaluation of Potential Partners' Facial Photographs: A Conjoint Analysis Study.

Sexual dimorphism, symmetry, and coloration in human faces putatively signal information relevant to mate selection and reproduction. Although the independent contributions of these characteristics to judgments of attractiveness are well established, fewer studies have examined whether individuals prioritize certain features over others. Here, participants (N = 542, 315 female) ranked six sets of facial photographs (3 male, 3 female) by their preference to start long- and short-term romantic relationships with each person depicted. Composite-based digital transformations were applied such that each image set contained 11 different versions of the same identity. Each photograph within each image set possessed a unique combination of three traits: sexual dimorphism, symmetry, and color cues to health. Using conjoint analysis to evaluate participants' ranking decisions, we found that participants prioritized cues to sexual dimorphism over symmetry and color cues to health. Sexual dimorphism was also found to be relatively more important for the evaluation of male faces than for female faces, whereas symmetry and color cues to health were relatively more important for the evaluation of female faces than for male faces. Symmetry and color cues to health were more important for long-term versus short-term evaluations for female faces, but not male faces. Analyses of utility estimates reveal that our data is consistent with research showing that preferences for facial masculinity and femininity in male and female faces vary according to relationship context. These findings are interpreted within the context of previous work examining the influence of these facial attributes in romantic partner perception.

Presenting Author: Nicole L. Jarrett

Co-presenter: Jillian Hunsanger

Mindfulness As A Mediator Of The Relationship Between Emotional Reactivity and Resilience

Introduction: Due to their interconnection, mindfulness and emotion regulation have been conceptually integrated via the catchphrase “mindful emotion regulation” (Chambers et al., 2009). Recent research also indicates that mindfulness training significantly modifies level of resilience (Johnson et al., 2014). However, impacts of emotion and mindfulness on resilience are unclear. Specifically, the direct relationship between emotion reactivity and resilience has not been investigated. This current study examined the role of mindfulness as a form of emotion regulation in the association between the emotion regulation facet of emotion reactivity and overall resiliency. Method: Data were collected from a sample of 347 national Amazon MTurk workers. Mindfulness was measured with the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). Emotion reactivity was assessed with the Emotion Reactivity Scale (ERS; Nock et al., 2008). Resilience was evaluated with the 25-item Connor-Davidson Resilience Scale (CD-RISC-25; Connor & Davidson, 2003). Results: After controlling for facets of mindfulness, the ERS subscales of sensitivity ($\beta = -.127$, $t(302) = -1.107$, $p = .269$), arousal ($\beta = -.065$, $t(302) = -.651$, $p = .516$), and persistence ($\beta = -.099$, $t(302) = -1.179$, $p = .239$) were all insignificant, suggesting that mindfulness alone mediates the relationship between emotional reactivity and resilience. The mindfulness facet of observing ($\beta = .111$, $t(302) = 1.954$, $p = .052$) approached significance. Facets of describing ($\beta = .156$, $t(302) = 2.975$, $p = .003$) and non-reacting ($\beta = .349$, $t(302) = 6.168$, $p < .001$) were significant mediators; facets of acting with awareness and non-judging were insignificant. Discussion: The results reveal a compelling relationship among emotion reactivity, mindfulness, and resilience. Resilience is composed of psychological health preservation, improvement, and recovery processes (Davydov et al., 2010). High emotion reactivity contributes to the commencement and perpetuation of behavioral problems and psychopathological issues (Nock et al., 2008), which potentially negatively impacts resilience. Mindfulness functions to improve emotional dysregulation by increasing attentional awareness, reducing knee-jerk reactions to subjective emotional experiences (Hill & Updegraff, 2011), which in turn may augment personal resilience. The findings of this study pinpoint the mindfulness facets of describing and non-reacting as especially influential in the relationship between emotion reactivity and extent of resilience.