

PROGRAM & ABSTRACTS

12th Annual Symposium on Graduate Research and Scholarly Projects



April 29, 2016
Rhatigan Student Center

Barbara Chaparro, GRASP Chair





2016 GRASP SYMPOSIUM

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12th Annual Symposium

Agenda

8:30am – 9:00am	Registration & Poster set-up
9:00am – 9:10am	Opening Remarks: Dr. Dennis Livesay and Dr. Kerry Wilks
9:10am – 9:40am	Keynote Speaker: Professor Rhonda Lewis
9:40am – 9:45am	Shocker Innovation Corps Announcement
9:45am – 10:00am	Break
10:00am – 12:00pm	Poster Session 1 (Beggs Ballroom 1 & 2)
12:00am – 12:30pm	Lunch (provided for all participants)
12:30pm – 2:30pm	Poster Session 2 (Beggs Ballroom 1 & 2)
3:30pm – 4:00pm	Final Remarks and Awards – Dr. Bardo & Dr. Vizzini

Poster Presentations (RSC, Beggs Ballroom 1 & 2)

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12:30pm – 2:30pm	Judging for session 2 posters

Oral Presentations (RSC, Room 265)

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1:35pm – 1:50pm	Break
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GRASP KEYNOTE

Stay Focused on Your Dream!

Rhonda K. Lewis, Ph.D., MPH

*Professor and Chair, Psychology Department
Fairmount College of Liberal Arts and Sciences*

During graduate school it is easy to get side tracked from the main focus on why you are there. You are here to complete your education and to enter the workforce with an advanced degree with a greater level of expertise and specialization. As a graduate student take advantage of all of the research opportunities that are available to you in your department and in the community. Graduate students have the unique experience of having colleagues for life. However it is easy to start comparing yourself to what others are doing. Be clear about what your dreams and aspirations are and stick to them. As I went off to graduate school my parents wanted me to go to medical school. I wanted to be a professor one day. Other people told me to take time off between undergraduate and graduate school. I wanted to go straight through. You have to do what works best for you. I decided to stay focused on my dream and complete my Ph.D. you can accomplish your dream too.

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ABSTRACTS

12th Annual Symposium on Graduate Research and Scholarly Projects



Biologically-Guided Radiotherapy Treatment Planning Optimization

Ali Adibi

Faculty: Ehsan Salari

Department of Industrial and Manufacturing Engineering, Wichita State University

According to the American Cancer Society, each year around 1.6 million new cancer cases are diagnosed in the United States. More than half of all cancer patients are treated using radiotherapy. The goal of radiotherapy is to deliver sufficient radiation dose to the tumor region while sparing the surrounding healthy tissues to the largest extent possible. To achieve this goal, mathematical optimization techniques have been traditionally used to sequentially find the optimal settings of the radiation beams as well as the number and content of treatment sessions for each individual cancer patient. Using a biological dose response model, this research integrates the two stages into a single optimization problem in order to investigate the potential therapeutic gain obtained by changing the beam settings over the course of the treatment. The proposed approach is applied to a phantom cancer case to test its computational performance and to quantify the therapeutic gain.

Biokinetics of Leg Assisted Human Rolling

Rahul Agrawal and Mahdi Hassan

Faculty: Nils A. Hakansson, PhD

Department of Industrial and Manufacturing Engineering, College of Engineering

Rolling is a critical activity of daily living. It serves to increase comfort and prevent ischemic-associated injuries to the tissues, i.e., pressure sores. Individuals with Duchenne muscular dystrophy (DMD), an inherited disorder that causes muscle atrophy, lose leg strength and ultimately their ability to roll. The objective of this study was to compare rolling kinematics with and without leg push-off to understand the influence of the legs on rolling. Kinematic data was collected from 12 subjects as they rolled from the supine to side-lying position with and without leg push-off. The kinematic data were used to calculate shoulder and pelvis angles and peak angular velocities. Significant differences were observed in the shoulder peak angular velocities and times required to complete the roll. Pushing with the leg alters the kinematics of rolling, yielding higher peak shoulder angular velocities and longer roll times.

Effectiveness of Cross Taping as A Therapy for Delayed Muscle Soreness

Alla Alfrisany

Faculty: Jeremy Patterson, PhD

Department of Human Performance Studies, College of Education

Decrease muscle soreness by medical tape is supported by the literature. The purpose of this study was to assess the efficacy of the cross tapes in muscle soreness. Subjects: Twenty normal subjects ranging in age from 18 to 55 with no history of previous skin allergy and do not have any upper body injuries participated. Methods: Subjects will perform the lowering phase of a bicep curl exercise using a dumbbell consisting of 3 sets 25 repetition, followed 90 seconds rest between each set. A grid shaped adhesive, a little larger than a stamp, called a cross tapes will be applied in the bicep of the dominant hand and the other hand as control for one week. The range of motion and pain for both arms will be measured before and after applied the tape. Results: The study findings show that there was statically significant difference between the ROM and the pain (pre, post) when the procedury is carried out over a period of two consecutive weeks (1 day per week) with large effect size (0.2) and strong power (0.96). However; there were no significant differences between the two groups (right, left arms) with medium effect size (0.1) and weak power (0.33). Discussion & Conclusion: Therefore, this study suggest that CT may reduce DOMS, however more research is needed. Future studies should include a larger number of subjects, more diverse cohort, an exercise that applies a greater intensity, and expands the time of research. CT is an advisable method to decrease DOMS and improved functional performance.

Fabrication and Characterization of Carbonized Polyacrylonitrile Nanofibers for Composite Aircraft and Wind Turbine Manufacturing

Ibrahim M. Alarifi, Abdulaziz Alharbi, and Anoop Goud Potagani

Faculty: Ramazan Asmatulu, PhD

Department of Mechanical Engineering, College of Engineering

This study reports the fabrication, and characterization of carbonized polyacrylonitrile (PAN) nanofibers for improved surface conductivity of the composites. The PAN nanofibers produced through electrospinning process were stabilized in air at 270°C for one hour and then carbonized at 850°C in inert atmosphere (argon) for another hour. The carbonized nanofibers were placed on the surface of carbon fiber pre-preg composites as a top layer prior to the vacuum oven curing process. Surface morphology and microstructural analysis of the specimen were investigated using field emission scanning electron microscope (FESEM) after sputter coating with 10 nm of gold. Energy dispersive X-ray spectroscopy (EDX) was also carried out to determine the surface elemental distribution of the carbonized PAN nanofibers. The EDX results manifested the abundance of carbon content on the nanofiber surface along with small quantities of impurities. Thermomechanical analysis (TMA) exhibited the glass transition region in pre-preg nanocomposites and the significant dependence of coefficient of thermal expansion in the fiber directions. The dimensional changes in carbon fibers were observed due to the various temperature changes during the processing. This study provides the preliminary results of the carbonized nanofibers for future composite aircraft and wind turbine applications.

Highly Hydrophilic Electrospun Polyacrylonitrile Polyvinylpyrrolidone Nanofibers Incorporated with Gentamicin as Filter Mediums for Drinking and Wastewater Treatments

Abdulaziz Alharbi, and Ibrahim Alarifi

Faculty: Ramazan Asmatulu, PhD

Department of Mechanical Engineering, College of Engineering

Polyacrylonitrile (PAN) was dissolved in dimethylformamide with different weight percentages of poly(vinylpyrrolidone) (PVP), and then gentamicin sulfate powder was added to the solution prior to the electrospinning process. Gentamicin was added mainly to remove bacteria and some viruses, while PVP was added to make the surface of membrane hydrophilic to enhance the filtration efficiency. Two water samples were chosen for filtration processes, including the dam water and city wastewater. The filtered dam water samples showed great reductions in total coliforms, E.coli, turbidity, and silica (SiO₂) particles. The filtered wastewater samples also showed huge reductions in total coliforms, E.coli, turbidity, total suspended solids, chemical oxygen demand, and biochemical oxygen demand. The morphology, dimensions and surface contaminations of the nanofibers were observed by scanning electron microscope and optical microscopy studies. Both SEM and microscopic images on the nanomembranes before and after filtrations indicated that the electrospun PAN nanofibers have superior water filtration performance.

Comparing Predictable and Unpredictable Instability in Dual-Task Balance Training

Cathy Anderson

Faculty: Jeremy Patterson, PhD

Department of Human Performance Studies, College of Education

Balance training (BT) is a vital component of many exercise programs, but actual prescriptions for exercise frequency, intensity, time and type have yet to be defined. This study compared one BT session on two balance platforms: a predictably unstable tilt board (roll movement), and an unpredictably unstable shake board (roll, pitch, and yaw movements), to see if a relationship exists between the type of platform used and measurable balance improvement. A concurrent task was added to increase cognitive complexity. Methods: Twenty healthy young adults were randomly assigned to stand on the tilt board or the shake board while performing Bal-A-Vis-X ball-bouncing exercises. Each subject's balance (overall stability, anteroposterior stability, mediolateral stability) was measured before and after BT using a Biodex Balance System SD. Results: On average, each platform group showed balance improvement. The evidence failed to support the hypothesis of a significant or meaningful difference between the platforms.

Relationship Between the Six Aims of Quality in Trauma Care

Lucy Aragon and Alok Dand

Faculty: Laila Cure, PhD

Department of Industrial and Manufacturing Engineering, College of Engineering

The Institute of Medicine (IOM) reported in 2001 that the health care system in the US fails to consistently deliver high-quality medical care. The IOM proposed six aims to be used by healthcare organizations in tracking and controlling their quality: effectiveness, efficiency, safety, timeliness, patient centeredness and equitability. Nevertheless, these quality aims are seldom considered simultaneously in research and performance improvement efforts. This research proposes a multivariate analysis approach to evaluate trauma care performance over time. Trauma quality metrics related to each aim were identified through a literature review and quantified over a six-year period using data from the Michigan Trauma Quality Improvement Program. Correlation analysis was used to investigate the relationships between quality aims. Multivariate clustering was used to identify consistently high and low-performing trauma centers. Policy-makers can use the proposed analysis approach to develop incentives for healthcare quality improvement.

Understanding Place in the Realm of Community Health: Wichita's Northeast Community

Amanda Assaf

Department of Anthropology, Fairmount College of Liberal Arts and Sciences

Place is an important factor in shaping the health of a population. To identify the potential reasons for health disparities in a particular population, one must recognize the web of social and historical relationships in which a community is embedded that shapes current community health outcomes. This paper reports on research that illuminates the felt needs of a community adjacent to Wichita State University, in Wichita, Kansas. In-depth interviews focused on health needs in the Northeast Community of Wichita were used to gain a deep understanding of health in this particular community. In addition, participant observation, surveys, and GIS mapping of demographics in the Central Northeast was utilized to gain a comprehensive understanding of needs. This study highlights the significance of analyzing historical, political, and social relationships of a community in conjunction with quantitative data, to understand public health outcomes.

Adsorption Thermal Diode Using Nonequilibrium Molecular Dynamics Simulation

Tadeh Avanesian

Faculty: Gisuk Hwang, PhD

Department of Mechanical Engineering, College of Engineering

The development of thermal diodes (heat transfer preferentially in one direction) is of great interest for advanced thermal and energy applications. However, their performance is limited due to the poor thermal rectification and slow transient behavior. In this study, a fast and efficient thermal diode mechanism is demonstrated using a gas-filled, heterogeneous nanogap with asymmetric surface interactions in Knudsen regime. Non-equilibrium molecular dynamics simulation is employed to create the temperature gradient over the nanogap size of $L_z = 20$ nm with $\Delta T = 20$ K ($80 < T < 130$ K) and different gas-solid interaction ratios, i.e. $\varepsilon_2/\varepsilon_1 = 0.5$, and 0.75 . The maximum degree of rectification ($R_{\max} \sim 8$) is found at $T = 80$ K, resulting from the significant contrast of the adsorption-controlled thermal accommodation coefficient (TAC). The results provide insights into the design of advanced thermal management systems including thermal switches/computers.

Characterizing Modified Peptides by High-Resolution FAIMS Followed by Electron Transfer Dissociation

Matthew Baird¹ and Xueqin Pang,²

Faculty: Alexandre A. Shvartsburg¹ and Lingjun Li²

¹*Department of Chemistry, Fairmount Collage of Liberal Arts and Sciences,* ²*Department of Chemistry, School of Pharmacy, University of Wisconsin*

Full characterization of proteins in living organisms, which is crucial to understanding biomedical processes, remains a stupendous analytical challenge. That especially holds for post-translational modifications, which influence the protein structure and thus function. The localization variants (isomers with identical PTMs on different residues) that commonly co-exist in vivo are particularly problematic. While electron transfer dissociation (ETD) has greatly advanced PTM analyses, only two variants in a mixture are detectable. Here we present a novel approach to resolve and identify variants: field asymmetric waveform ion mobility spectrometry (FAIMS) coupled to ETD. We implemented that on a Thermo LTQ XL ion trap mass spectrometer employing a custom high-definition FAIMS system using helium/nitrogen gas buffers. The resulting broad variant separations allow analyses of complex variant mixtures for small and medium-sized peptides. The method is demonstrated for the phosphopeptides from the tau-protein relevant to Alzheimer's and the D- and L- stereoisomers of neuropeptides.

Gastroduodenal Artery Aneurysm: A Case Report

Jessica Baughman and Patricia White

Faculty: Kayla Keuter, PA-C

Department of Physician Assistant, College of Health Professions

Gastroduodenal artery (GDA) aneurysms are rare but highly fatal. There are only 74 cases reported in English and Japanese literature in 55 years. GDA aneurysms have a mortality rate of 40% if the artery ruptures, and 30-50% of all GDA aneurysms rupture.

GDA aneurysms have a broad presentation of symptoms and due to their high mortality rate, it is important that medical providers consider GDA aneurysm as a differential diagnosis.

Our case report of a 52 year old male whose ruptured GDA was successfully identified and treated discusses the rarity and severity of a GDA aneurysm, as well as the importance of recognizing signs, symptoms and associated conditions in order to avoid a fatal outcome.

Exploration of the Inhibitory Effects of Manuka Honey on the Growth of *Staphylococcus aureus* in an *in vivo* Animal Model

Authors: Fawn V. Beckman, Lauren J. Johnson, J. David McDonald

Faculty: J. David McDonald

Department of Biological Sciences, Fairmount College of Liberal Arts and Sciences

Chronic overuse of antibiotics has led to an age where some microorganisms are no longer susceptible to any known antibiotic. Of particular concern to clinicians is one type of antibiotic resistant bacteria that contributes to the majority of hospital acquired surgical site infections: methicillin-resistant *Staphylococcus aureus*. One promising substance that has been shown to inhibit the growth of *S. aureus in vitro* is manuka honey (MH); however, not much is known about the role MH may play in the inhibition of initial wound infection in a living organism. To explore this aspect we plan to use an established epicutaneous mouse model of infection which involves pretreating mice with MH and then challenging them with *S. aureus*. Results will be interpreted via superficial appearance to track wound progression, histology to assess tissue damage, and RT-q-PCR to compare expression levels of inflammatory cytokines and bacterial virulence factors between groups.

Error Correction Coding Meets Cyber-Physical Systems

Ali Behfarnia

Faculty: Ali Eslami, PhD

Department of Electrical Engineering, College of Engineering

Coupling cyber and physical systems gives rise to numerous engineering challenges and opportunities. An important challenge is the contagion of failure from one system to another, which can lead to large-scale cascading failures. On the other hand, self-healing ability emerges as a valuable opportunity where the overlay cyber network can cure failures in the underlying physical network. To capture both self-healing and contagion, we introduce a factor graph representation of inter-dependent cyber-physical systems, in which factor nodes represent various network functionalities and the edges capture the interactions across different layers. We extend the message-passing algorithm used in low-density parity-check codes to the proposed representation. Through applying the Bayesian rule, we obtain an approximation formula for a given network to investigate the reaction of the network to initial disruption. Our analysis provides simple yet critical guidelines for considering network parameters to achieve resiliency against cascading failures.

Cervical Auscultation, Acoustic Parameters and Measuring the Normal Adult Swallow: A Literature Review

Andrew Bernhard

Faculty: Julie Scherz, PhD

Department of Communication Science and Disorders, College of Health Professions

Researchers are investigating the use of Cervical Auscultation (CA) with signal processing technology to electronically record acoustic signals, which characterize a normal adult swallow. The purpose is to find a non-invasive, accessible, inexpensive and time saving method to evaluate patients at-risk for dysphagia. Identifying a consistent and reliable acoustic signal in a normal adult swallow is paramount to establishing a standardized acoustic measurement to compare against a dysphagic swallow's acoustic signature. Currently, the lack of agreement between researchers' methodology and terminology to measure and define a normal adult swallow prohibits establishing a normative data set to use for differential diagnosis purposes. After reviewing the literature, research suggests the cricopharyngeus muscle produces the most consistent and strongest acoustic signal compared to other sound components in the pharyngeal segment. Further studies on the acoustic signal associated with the cricopharyngeus muscle need to be conducted in the future to confirm preliminary results.

Developing a qPCR Assay to Quantify Disease Severity in Medicago Truncatula Due to Macrophomina Phaseolina Infection

Prajwal Bhandari

Faculty: Bin Shuai, PhD

Department of Biological Sciences, College of Liberal Arts and Sciences

Having host range over 500 crop species, the soil borne necrotrophic fungus *Macrophomina phaseolina*, is one of the catastrophic factors in current agricultural sector. It infects plant during stressful environmental conditions such as hot and dry weather, resulting in alteration of plant growth, yield, and seed quality. In order to establish proper disease control system and develop disease resistant cultivars, we have established a pathosystem in the model plant, *Medicago truncatula* to study the molecular interactions between the host and the pathogen. In this study, we proposed to establish an unbiased quantitative assay using quantitative PCR (qPCR), which is more objective than other previously used approaches such as, scoring system based on percentage of necrosis and chlorosis seen on aerial part of plants or colony count approach. qPCR can quantitate the amount of fungal and plant DNA during infection over time, which are then used to understand disease progression by comparing amount of DNA from two different sources. This assay also facilitates disease diagnosis/assessment in the field.

A Novel Approach to Program Assessment

Erica Bocchi, Nathan Lee, and Teal Sander

Faculty: Dr. LaDonna Hale and Dr. Amy Drassen Ham

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Effective academic program review and quality improvement initiatives begin with a robust, systematic evaluation process. Integrating qualitative and quantitative data in program evaluation can yield insights that neither approach would produce on its own. Most programs rely on surveys and anecdotal feedback to steer improvement initiatives. Such feedback tends to require fewer resources; however, a well-conducted, structured focus group can uncover deeper insights into desired topics from a targeted audience. This descriptive project provides instruction for planning and conducting a focus group, analyzing data, and interpreting findings for program review and accreditation. We compare and contrast data obtained from a survey (n=70) and focus group (n=8) of health care providers and hospital administrators who supervise second-year physician assistant students during clinical practice experiences to demonstrate the rich feedback obtained when using both evaluation methods.

Clinical Management of Food Allergies in Pediatrics

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There are over 171 identified food allergens and it is estimated that 8% of children have a food allergy. The purpose of our clinical review is to provide a concise and accessible guide to the diagnosis and management of pediatric food allergies for primary care providers. It is important for clinicians to understand the pathophysiology, epidemiology, diagnostic process, and available therapy so that they can formulate an appropriate treatment plan for their patients. This clinical review article was based upon meta-analyses and expert guidelines as well as primary studies accessed through electronic databases including MEDLINE, CINAHL, and Cochrane Library. The prevalence of food allergies is increasing in the United States and often the presentation of symptoms can be vague and difficult to diagnose. Our article provides patient and provider education as well as emergency actions plans, which are imperative to reducing the emotional and economic burden of this disease.

Separation of Diverse Lipid Isomers by FAIMS in Conjunction with Mass Spectrometry

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The specificity, sensitivity, and versatility of mass spectrometry (MS) have made it the dominant analytical tool. However, typical biological and environmental samples are complex enough to require prior separations, especially to disentangle the ubiquitous isomers. The unique specificity of novel field asymmetric waveform ion mobility spectrometry (FAIMS) approach and its substantial orthogonality to MS make it attractive for isomer separations. The recently developed high-definition FAIMS enables previously impossible resolution of peptide and lipid isomers and even isotopomers. Here we broadly explore FAIMS separations of lipid isomers, focusing on the common glycerides and phospholipids. Analyses were performed using a custom planar FAIMS system coupled to the Thermo LTQ ion trap MS platform. We distinguished ~70% of isomers for protonated or ammoniated lipids generated by electrospray ionization, including all four major isomer types (stereo-numbering, chain-length, cis/trans, and double bond position). Further isomers were separated for metal-cationized (in particular, argentinated) lipids.

Conceptual Investigation of a Hybrid Electric Regional Airliner

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This project re-imagines and investigates an 80-100 passenger aircraft as a hybrid electric airplane powered by distributed electric propulsion (DEP). The BAE 146 was used as a baseline for this study, featuring a blown wing with several electric motors distributed along the wingspan, resulting in higher lift than with conventional wings for a given airspeed. The inspiration for this project was derived mainly from NASA's LEAPTech (Leading Edge Asynchronous Lift Technology) Program, currently in the testing phase. The airplane's mission phases were analyzed first, and then with the addition of electric motors, and the results were compared. The idea of this project is to illustrate the potential of electric powered airplanes, and their advantages in reducing takeoff & landing distances, as well as kinetic energy compared with conventional airplanes, which will improve safety. Additionally, significant reductions in emissions will result, particularly at and near airports.

A Directory Based Hybrid Cache Update Strategy to Reduce Memory Latency of Shared Memory Multiprocessors

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Multiple cores with a shared memory on a single-chip provide an excellent architecture to achieve fast computation. However, shared memory multiprocessors with typical write update and write invalidate strategies suffer due to the fact that the number of cores is normally less than 16, bandwidth is often wasted, and memory latency becomes very high. This paper presents a directory based hybrid cache update strategy for shared memory multiprocessors with large number of cores to help reduce memory latency. The proposed directory scheme continuously checks for requests from cores, satisfies the requests according to the priority, starving cases, and updates the directory accordingly. We simulate a 32-core system using pure write update (PWU), pure write invalidates (PWI), and the proposed hybrid strategies. Preliminary experimental results show that the proposed strategy decreases memory latency by 24% when compared with the PWI strategy. The proposed strategy is as good as the PWU strategy.

Veterans and Mindfulness: The Impact of a Peer-Led Community-Based Initiative

Dan Clifford

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Veterans that are reintegrating to civilian life and potentially transitioning from clinical services for mental health are in a critical phase that can be further complicated with a post-traumatic stress disorder (PTSD) diagnosis. Recent paradigm shifts in therapy have suggested that mindfulness-based interventions can have a positive impact on both PTSD symptoms and stress levels, making this type of approach advantageous to the veteran population. Additionally, this approach is also thought to be impactful for emergency medical service providers due to both chronic stress and potential daily exposure to traumatic events. This study utilizes a phenomenological approach to understand both veterans' reintegration experience and impact of a community-based mindfulness intervention for veterans and EMS providers in the community. Results have indicated that the intervention which is led by trained veteran facilitators can help participants both reintegrate into their communities and lead to a reduction with both stress and PTSD symptoms.

Legislative Compensation: An Econometric Analysis

Clinton D. Coen

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In this econometric project I look at legislative compensation across the fifty states to see if market theories hold; market theory would suggest that higher legislative pay would yield better performance. My hypothesis is that market theories will hold, the states with higher compensation rates will see better results.

I use ordinary least squares regression: some of my dependent variables include GDP per capita, unemployment, graduation rates, and more.

The results, as a whole are inconclusive, because it cannot be determined if increased legislative compensation results in increased legislative performance. While the results are inconclusive there are some valuable results of the analysis. A large portion of the variables display a positive relationship: some of these positive correlations are more desirable than others.

Exploring the Advantages and Barriers in the Use of Video Modeling Through Different Age Groups

Kimberly Cole

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Video modeling is a program that has been used with students with Autism and intellectual disabilities to teach them how to do a variety of tasks. It has been found to be an effective strategy, but it is not being implemented in the local area. This study reviewed current literature containing empirical research where video modeling was used in order to determine why that might be. Studies were broken down into three age ranges: preschool to elementary, middle school to high school, and adults. The advantages and barriers of video modeling were explored in each age group. The study found that even though barriers were evident across age groups, studies continue to show the advantages of video modeling for students with ASD and ID should outweigh those barriers.

Study of Soy-Protein-Isolate and Its Nanocomposites for Electrical Energy

McCord Cox

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Soy protein has been a renewable natural resource for bio-plastics, in the face of environmental concerns relating to production, application and disposal of petro-polymers. The proteins are known for their multilevel structures with complex asymmetry which suggests the possible spontaneous dielectric polarization in protein materials. It is believed that this structural asymmetry can be tuned via proper denaturation and modification of proteins. Thus, the protein materials are ideal candidates for new generation of dielectric films for capacitor applications. In this research, soy protein isolate, a high protein content soy product, has been investigated for the proposed green dielectric films. Via various denaturation and modification processes (i.e. temperature, pH, surfactants, etc.) applied to SPI, the relationships between structures and dielectric properties of SPI have been studied. Meanwhile, in order to improve dielectric performances of resulting SPI films, boron nitride nanomaterial has been incorporated to enhance the energy density.

Miracles in the classroom: how to engage all levels of readers using multi-modal literacy.

Presented by Kelly Connelly

Advisor: Dr. Mara Alagic

Department of Education, College of Curriculum and Instruction

Students hate reading. Studies show that students report a decline in reading for enjoyment starting in 6th grade, by the time students reach high school they spend less than an hour on average reading for enjoyment. Through research, combined with data collected in my classroom, graphic novels have proven to be a way to reengage students who have grown to dislike reading. Graphic novels are classified as multi-modal literature, which is literature that goes beyond just words. Multi-modal literature can actively engage all levels of readers while also meeting 21st century literacy needs. When students are more engaged, it increases their comprehension, enjoyment, and interest in the subject. Graphic novels help struggling readers learn to love reading and help challenge advanced readers in new ways.

Do Wearable Devices Bring Distraction Closer to the Driver? Comparing Smartphones and Google Glass

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Distracted driving increases driving errors (e.g., deviation from lane-keeping, inconsistent speed, delayed response-time) and chance crashes. Increased availability and usage of hand-held and wearable devices have exacerbated these consequences. Thirty-four drivers (21 female; ages 18-43) participated in a simulated driving task while receiving and verbally responding to text messages from both a head-down smartphone display and head-up display via Google Glass, to evaluate driving performance and time to engage in the distracting task. Driving performance was analyzed in a 3X2 repeated-measures ANOVA with driving task (drive-only, drive-smartphone, drive-Glass) and driving difficulty (easy, hard) as factors. Time to engage was investigated in a 2x2 repeated-measures ANOVA with device and driving difficulty as factors. Drivers had more variable speed, deviation of the steering wheel, and deviation from lane position while texting, and responded to messages quicker on Google Glass, however they spent more time to send.

What Words Have to Say and the Benefits of Text Analysis in Adolescents

Johnna Crawford and Francis Connor

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In 2015 Researchers used text analysis software to examine the writings of six school shooters. Ultimately, the shooters' texts scored higher in the dimensions of Revenge, Narcissism, and Humiliation. In the past, the computer program LIWC (Linguistic Inquiry and Word Count) has examined speeches, Facebook posts, and songs for various studies. This project examines written texts of 12 students, ages of 10-18, to demonstrate the variations that LIWC can identify in language. We combined recent studies with present day problems to explore future benefits of implementing text analysis in education for greater individual awareness. Text analysis in subjects under the age of 18 is necessary to aide parents, educators and students by highlighting learning styles and personality traits. Often overlooked Anxiety or high functioning Autism could be identified through writing exercises that undergo screenings for human awareness, while also acting as a healthy, natural form of expression and coping.

The Effects of Auditory, Tactile, and Visual Cues On Lower Extremity Running Mechanics.

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This study examined the effects of cueing (or different types of sensory prompts) on knee kinematics while running to evaluate strategies for facilitating optimal kinematics in novice and recreational runners. Dartfish Express was used to analyze knee flexion angles at initial contact and midstance of 31 healthy, female and male runners during treadmill running at constant, self-selected speeds. We hypothesized that specific auditory, tactile, and visual cueing techniques would optimize running kinematics. Using a one-way ANOVA, a visual cue to run with minimal vertical excursion produced significant increases in knee angles at initial contact. Additionally, both the visual and auditory (“run softly”) cues significantly decreased knee flexion angles at midstance. The varying mechanical changes following different types of cues suggest that cues should be specific to the type of change desired in runners’ knee kinematics.

Kansas Population Forecast by Age Cohort Survival Method

Matthew Darrah

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Using new data, this paper proposes a method to predict the populations of Kansas counties. The project forecasts the population of all 105 counties of Kansas using an age-cohort survival projection method. The age cohorts are composed of 19 age categories and classified by sex. Each cohort is simulated forward every five years until the year 2064. The projections are driven by variables such as birth, death, and migration rates pulled primarily from the Census Bureau and Kansas Information for Communities. The birth and death rates have been forecasted for the next fifty years using trend analysis of region-specific data. Over the next fifty years, the Kansas population is forecasted to grow slowly. This growth appears to be driven by declining birth rates and slowing death rates for the older population. These trends are strongest in rural communities which face decreasing population while urban populations continue to grow.

A Year of Pediatric Prevention

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Faculty: Michelle Wallace, MPAS, PA-C and Gina Berg, PhD
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Unintentional injury remains the leading cause of death in children under 18 years of age in the United States. From 2003 to 2013, 93,941 unintentional deaths occurred in the pediatric population, not including the additional morbidity in survivors. This project aims to educate parents and providers about the most common unintentional pediatric injuries by composing a list of evidence-based strategies to reduce injury and mortality. After reviewing the National Vitals Statistic System from the CDC website, a list of common pediatric unintentional injuries was compiled. This list was narrowed to encompass 12 topics based on their burden of injury, cost to society, and feasibility of recommended actions. Each of these topics was studied further to produce evidence-based strategies for prevention. The clinical review article will be converted into a safety-themed calendar for parents and healthcare providers that raises awareness and provides information to prevent 12 common unintentional injuries in children.

Comparison of Wii Balance Board Scores in Ballet Dancers and Non-Ballet Dancers

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At any given time, 30% of adults suffer from some type of balance dysfunction. Multiple studies suggest that dance has helped participants improve on balance, functional mobility tasks, and compliance when compared to other exercise programs. The purpose of our study was to identify if a significant difference in balance ability exists between ballet dancers and non-ballet dancers, implying ballet training could be used in treating patients with balance problems. Thirty participants were tested using the Wii balance board to collect data for center of balance, single leg balance, yoga tree pose, and the table tilt game. The participants were asked to complete two trials; one with their eyes open and one with their eyes closed. No significant difference between the Wii balance board scores in ballet dancers and controls were observed. Further research is encouraged to isolate and identify balance abilities in ballet dancers.

A Support Vector Machine Approach to Identification of Proteins Relevant to Learning in a Mouse Model of Down Syndrome

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The drug memantine has been shown to improve learning ability in a Down Syndrome model of mice (Ts65Dn) exposed to Context Fear Conditioning (CFC), an existing technique for measuring the learning ability of normal mice which does not typically produce results in Ts65Dn mice. This work seeks to increase the understanding of how memantine affects the learning ability of Ts65Dn mice at the protein level by analyzing the expression of 77 proteins obtained from the brains of normal and Ts65Dn mice, with and without memantine and with and without exposure to CFC. Support Vector Machines are used for pairwise classification of the groups of mice based on protein expression. Feature selection is then used to choose the proteins whose levels appear to be significant for each classification. The majority of classifiers outperform previous analysis methods in terms of prediction accuracy, producing a reliable subset of proteins for further biological study.

Acuity-Based Nurse-Staffing Strategies for Inpatient Settings Using a Stochastic Modeling Approach

Parisa Eimanzadeh

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The Health Resources and Services Administration (HRSA) projects a deficit of 36 percent of registered nurses nationwide by 2020. The national nurse shortage along with rising patient acuity levels have led to an increase in nurse workload, causing nurse workforce to experience high levels of burnout. There is growing concern that nurse burnout could adversely impact the quality of care provided. To address this concern, there are recommended nurse-to-patient ratios for different types of inpatient settings. However, patients in a hospital unit may have different acuity levels based on the severity of care needed. This may impact the staffing needs of the unit potentially rendering a fixed nurse-to-patient ratio ineffective. Using a finite-source queueing model, we develop a stochastic framework to determine nurse staffing strategies that minimize staffing costs while ensuring timely delivery of nursing care in an inpatient unit with heterogeneity in patient acuity and nursing skills.

“Dead on Arrival”: Why Marijuana Decriminalization in the Air Capital Never Took Off

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This study is a thematic analysis of the events leading up to the marijuana decriminalization vote of April 2015 in Wichita, Kansas. Newspaper articles appearing in *The Wichita Eagle* were purposively sampled for their relevance to the subject matter. The lack of existing literature on marijuana decriminalization necessitated a ground-up coding and analysis scheme, which allowed for themes to emanate from the data itself rather than be imposed upon it. For instance, the code “city/state conflict” was developed after repeatedly finding instances of conflict between the state’s legislature and Wichita’s city council. Findings show that while Wichita’s city council is generally in favor of allowing citizens to vote on the ordinance they received strong opposition from state officials. The council ultimately placed the decriminalization measure on the ballot, which was accepted by a majority vote but has not been legally realized because of its contradiction with state law.

How Effective are the Supports for Students with Learning Disabilities

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When students with Learning Disabilities (LD) are placed in an inclusion class they, along with the teachers, face many challenges. Providing support for these students can be complicated and confusing. The purpose of this research study was to examine the effectiveness of special education supports and services for students with LD that are in an inclusive classroom. Data was collected from quantitative, qualitative and observational studies that implemented inclusion at the middle school level. The study found that different implementation strategies effected student performance and attitudes about inclusion. Additional findings from research indicate that inclusion is effective in providing support when implemented correctly and with intentional planning. While most research that was examined showed positive effects for student performance, other research suggests that there is little to no difference in academic achievement. The results of this study can be used to implement effective support strategies in an inclusive classroom.

Keywords: inclusion, effective, support, middle school, special education, collaboration, learning disabilities, academic performance, mild, moderate

Effects of Core Endurance Training on Athletic Performance Indicators in College-Aged Individuals

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Core training has recently been a popular topic in strength and conditioning and rehabilitation research. This is due to the role core musculature plays in the prevention and rehabilitation of injuries, as well as the execution of sport-specific skills. The purpose of this study was to identify the relationship between core endurance training and performance on the T-Test for agility and the 12-minute Cooper's Test for endurance. A sample of convenience was taken from healthy men and women aged 18-30 who participate in "medium activity", as defined by the CDC. Baseline testing was administered for the T-Test and Cooper's Test, followed by a 6-week core endurance exercise program for the experimental group. Follow-up results demonstrated a non-significant improvement in both the T-test and Cooper's Test in the experimental group, and in the T-test for the control group. The control group, however, demonstrated decreased performance in the Cooper's Test.

Documentation Workflow in a Pediatric Emergency Department

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The pediatric emergency department (ED) is a complex environment where physicians perform multiple tasks under intense time pressure and are interrupted more often than in any other hospital department. Documentation is one task that consumes a majority of physicians' time. Despite the important implications of documentation for diagnosis, communication, and billing, we know very little about the role of documentation within physician workflow.

Using a quasi-ethnographic approach to observe and record documentation and interruptions in real time, researchers followed 11 pediatric ED physicians for a total of 23 8-hour shifts. A systems-approach analysis was used to examine the factors that most strongly shape performance including communication, tasks, technology, organization, and environment. Possible barriers to documentation within workflow were also discovered and recommendations were given. This research sheds light on workflow in technology-driven environments and the impact of workload and interruptions on physician documentation.

Effects of Carbon Nanotubes Functionalization and Geometrical Configurations on Mechanical Properties of Polymeric Nanocomposites

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Carbon nanotubes (CNTs) are among the most interesting nanostructures that exist in various geometrical configurations and size. They have demonstrated superior properties such as mechanical, thermal, and electrical which make them an ideal candidate for application as reinforcements in structural composite materials. CNTs can be functionalized by employing different chemical and physical techniques in order to improve their dispersion and adhesion to the polymers. There are different factors that can affect the quality of the final product like weight percentages, dispersion technique, curing process, processing method, nanomaterials shape and size. The main objective of this research is to investigate the effects of CNTs' functionalization, loading weight percentages, and geometrical configurations. Test samples were fabricated and then tested according to the American Society for Testing and Materials. Test results are analyzed and then discussed. In addition, Scanning electron and optical microscopy was performed to examine the fractured surfaces.

Keywords: Nanomaterials, Polymeric Nanocomposites, Carbon Nanotubes, Mechanical Properties, Thermal Properties, Functionalization, Characterization.

Using MobyMax: A Study of the Validity of Student Assessment and Progress Monitoring with MobyMax

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MobyMax is a computer-based assessment and learning program. It provides a system for educators to assess which grade level students are currently performing at. The concern is that educators may not use the MobyMax program correctly, and then may use the data gathered to identify students for special education services. In order to explore this potential problem, two questions were explored: (1) does MobyMax provide valid baseline data, and (2) should MobyMax be used for progress monitoring? A review of literature was done to look for research conducted on MobyMax and the methods that MobyMax employs to assess students. Additional research was conducted which examined the program in action. The results indicated that while MobyMax was developed using research-based methods there is insignificant data to indicate that the use of MobyMax for instruction and assessment is supported by research, particularly without further training educators on using the program effectively.

The Effect of Victoria's Secret's Advertising on Couples' Communication Dynamics

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Advertising is designed to draw attention and pique interest in a product or service. This study is an exploration of the impact of sexualized advertising on male/female interactions, specifically, couples noticing the window posters outside of a Victoria's Secret retail store in Wichita, Kansas. 19 couples were observed walking by the posters during a two-hour period. Detailed notes about the couples' reactions to the images were recorded and condensed into themes. Three themes emerged from the observation: Breaks in conversation, changes in non-verbal and verbal communication, and distraction from one another. Almost all of the couples stopped talking while walking by the images, and resumed conversation after passing by them. Many had quick verbal and non-verbal responses, and many became distracted from one another. It became clear that the closeness and interpersonal dynamics of the couples, as one of them (or both) noticed the images, momentarily changed.

That's What She Pinned: Gender Stereotypes and Pinterest

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Pinterest is a social networking website launched in 2010, which reached 48.7 million users by 2013. Previous studies have found that boards created by users consist of resources for everything from everyday interests to major life events. Considering the majority of Pinterest users are female, it is not surprising that the content or resources collected reflect gender ideals. To assess the specific ways Pinterest users might support or challenge traditional gender roles, this qualitative content analysis analyzes the boards and pins of ten Pinterest users (five women and five men). The boards were coded as typically female oriented, typically male oriented, or gender neutral based on specific pins within the board. The analysis yielded three primary findings. First, the majority of boards pertained to gender-neutral topics. Second, both men and women had boards that were gender specific. Finally, gendered boards tended to support gender role stereotypes.

Bathroom Manifesto

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On April 29, 2015 a pair of shoes representing a person of the opposite gender along with stories and explanatory posters were placed in bathroom stalls in over sixty restrooms on campus.

Purpose: Raise awareness of the flaws of gendered restrooms. Create a dialog among masses and be easily reproducible.

Methods: Installation of shoes, stories and posters finished by 8:00 a.m. Facebook page and email accompanied posters and served as potential engagement and database. Photos were taken throughout the day. E-mails to faculty encouraged class dialog.

Results: Classroom discussions occurred. Encouraging notes handwritten by students found in restrooms. Most shoes disappeared by 5:00 p.m. KWCH ran a story and posted on Facebook. 135 comments appeared in support and opposition.

Conclusion: Education and dialogue occurred not only at Wichita State University, but throughout the city. While WSU generally showed support, ultimately no changes have been made.

Coming Out in Black and White: A Thematic Analysis of Coming Out Stories on YouTube

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For members of the LGBT community, coming-out is a pivotal moment in their lives. Expressing to their family their sexual orientation is an experience that could change their lives forever. Members of this community must also navigate other intersections, such as race and ethnicity to assess how these communities will perceive their sexuality. The social media platform YouTube has given LGBT youth the ability to come-out in a creative and safe way. This project's aim is to determine the similarities and differences between queer communities of color and queer white communities when coming out through YouTube videos. Through a thematic analysis of 16 videos, using codes developed from Cass's Homosexual Identity Development Model, results showed that Black and White LGBT YouTubers, aged 18 to 25, developed acceptance of their sexuality in similar ways, and that racial identity did not play a role in the coming out process.

The Effect of Vitamins, Minerals and Herbs on Cognitive Function and Dementia

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Introduction: Dementia affects over 5 million Americans and 35 million people worldwide. This clinical review looked at whether there is an association between the intake of vitamins, minerals, and herbs, and cognitive function and the onset of dementia. Methods: A search of Medline, Cochrane Library, and the National Center for Complementary and Integrative Health revealed 18 articles related to nutrition, cognitive decline, and the onset of dementia. Findings: Daily consumption of at least three servings of vegetables that contain antioxidants, such as vitamins B, C and E, are effective in delaying the decline of cognitive function. Individuals who adhere to the Mediterranean diet, which emphasizes fruits, vegetables, whole grains, legumes and nuts, have a slower progression toward the onset of dementia. Conclusion: Dementia is a progressive disease that can be delayed by adequate intake of specific nutrients, which are most beneficial when acquired through whole foods rather than dietary supplements.

Inclusion and Students with High Incident Disabilities

Lora Hopper

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This study compares stakeholders' perception to attributes within the working model of today's general and special education system, seeking answers to what may be affecting successful experiences for all involved. Inclusive education benefits students with and without disabilities, and is required by law. Some teachers seem resistant to students with exceptionalities in their general education classrooms. Something is missing that is not supporting the initiative for inclusion. Patterns of best practices, obstacles, and other solutions will be sought out. This method of research is based on a literature review of qualitative, quantitative, and mixed-method articles and media. Common themes were established through coding and comparing to determine obstacles, issues, and solutions in real-world applications. Analysis of these patterns resulted in conclusions around the complexities involving policy, training, teacher relationships, community values, instructional strategies, student individual needs, the way we use and collect data, and other obstacles to inclusion were drawn.

Efficiently and Economically Upgrading Abundant Natural Gas Into Clean Liquid Fuel Under Ambient Conditions

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In US, the production of natural gas is projected to increase by 21% and 50% in 2020 and 2035, respectively, mainly thanks to the recent explosive growth of shale gas exploration. The great abundance and low cost of natural gas offer a unique opportunity for upgrading natural gas to convenient and value-added liquid fuels. Traditionally, methane can be upgraded via thermal process under high pressure (> 300 MPa) at high temperatures (> 600 °C). In this project, a novel electrochemical process is designed to upgrade methane to methanol under ambient pressure/temperature. Such a designed electrochemical process is based on hydroxyl radical as a powerful activating agent in aqueous system. In addition, the intrinsic flexibility of electrochemical process also allows for seamless integration of renewable electricity as clean and inexpensive energy input. The project may provide an alternative approach to efficiently and economically utilize abundant natural gas nationally and internationally.

The Relationship of Experiential Avoidance and Value Importance with Related Behavioral Choices

Jia Hui Chaw

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The goal of acceptance and commitment therapy is to enhance psychological flexibility or the ability to make behavioral adjustments to live a life congruent with personal values. One barrier to psychological flexibility is experiential avoidance (EA) or the unwillingness to remain in contact with unwanted thoughts, emotions, memories, bodily sensations, and the contexts in which they occur. This project examines at both macro and microlevels of analyses how EA and the importance of values in life domains contribute to related behavioral choices. For the microanalysis, the Value-Congruent Behavior Scale (VCBS) was developed to assess scenario-specific, value-consistent actions. While the interaction between levels of EA and the importance of values predicted value-consistent behavior at a macrolevel of analysis, similar findings were obscured by social desirability at a microlevel. The implications of the findings for further study of the contributions of EA and values to related behavior and clinical practice are discussed.

International link of Stock Markets: New Evidence of U.S. Impacts on Vietnam

Phuong Huynh

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Vietnam has drawn attention of the world to its fast growing economy in recent years. Its stock market, established in July 2000, is the main target of domestic and international investment. Vietnam's policy in embracing globalization has also subjected its economy to the impact of other countries, especially the U.S. This research investigated how stock prices and volatility in Vietnam are affected by such external factors as the exchange rate and the performance of US stock markets. Using a Capital Asset Pricing Model (CAPM), this research showed that stock price indices in the two countries indeed have a long-term and stable relationship with a clear causality going from the U.S. to Vietnam. Surprisingly, after augmenting the traditional theory with the exchange-rate volatility and applying a newly developed time-series econometric technique, Vietnamese stock market has been proved to be also affected by the foreign exchange market.

Exploration of The Effects of Allicin on the Growth of Staphylococcus Aureus in an In-Vivo Animal Model

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The antimicrobial properties of allicin require further investigation in order to evaluate this garlic-derived chemical as an anti-infective agent against Staphylococcus aureus wound infection. There is an important ongoing clinical problem with wound infection by this pathogen along with the fact that antibiotics continue to lose their effectiveness against strains. This motivated us to explore alternative methods to deal with this common clinical problem and allicin quickly emerged as an agent worthy of testing in a standardized wound infection model. Using a mouse model, we followed wound progression in the presence of different levels of allicin applied at the wound site, and compared that to controls. We followed the progression of this infection in a number of ways: visually, semi-quantitatively, and by histologic staining and microscopic analysis of wound tissue. These forms of analysis showed that, when used as stated, allicin is not effective on its own for wound control.

Converting Long Chain Carbons of Biomass Into Short Chain Crude Oil for CO₂ Mitigations

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There is a limited supply of fossil fuels so they are unsustainable as a source of energy and during combustion CO₂ is produced which is considered a leading contributor of greenhouse gas. In order to address greenhouse gas production a carbon neutral form of fossil fuel can be produced from bio-waste products. The conversion process is hydrothermal liquefaction (HTL) which converts long chain carbon (organic) material into crude oil (shorter chain carbon) and purified water which is contained in the organic material. The purified water, a byproduct of the HTL process, is needed since clean water is becoming difficult to obtain. The current HTL process is a batch type process. Conversion from a batch process into a continuous process requires research and development to determine mixing ratios, heating time, and flow rates to optimize it as a continuous process for minimal heat input. This is the focus of this current research.

Exploration of Isotopomer Separations by High-Resolution Differential Ion Mobility Spectrometry (FAIMS)

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With all the power of modern mass spectrometry (MS) that made it a dominant analytical approach, characterizing complex and particularly isomeric mixtures requires prior separations. Ion mobility spectrometry (IMS) is a competitor to chromatography and electrophoresis, providing faster and often more specific results. In particular, differential IMS (FAIMS) is highly orthogonal to MS and thus capable of fine isomeric resolution. Previously, FAIMS has distinguished isotopomers of single amino acids differing in the heavy atom position. Here we extend such isotopomer separations to larger species – the protonated synthetic di- and tri-alanines with one labeled residue. Small isotopic shifts are accurately quantified employing the unlabeled analogs as internal calibrants. The effect is measured as a function of dispersion field and buffer gas composition, especially in the He/N₂ and He/CO₂ mixtures that broadly improve FAIMS performance. Full separation of dialanine isotopomers and partial resolution of trialanine isotopomers have been achieved under optimum conditions.

Maximum Inner Product Search Using Memory Efficient Randomized Partition Trees

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Finding the maximum inner product is a well-known problem and it has been used in many applications such as recommender systems. It is also known that this problem can be converted to a nearest neighbor problem using various transformations. Local sensitivity hashing (LSH) is the most used algorithm for this purpose, but it has some disadvantages (e.g. many parameters should be fixed initially and there is no optimal way to fix them). In this paper we use an existing method called Random projection tree (RPT) and also propose two space efficient versions of it at nearly no additional cost. Moreover, we prove what the best transformation for RPT is. Finally, we test our method on many real world datasets such as Movielens and Netflix. The results connote that with the same amount of computations (even less), RPT have higher accuracy than LSH.

Design and Manufacture of Quick-Change End-Caps for a Chemical Vapor Deposition System for Synthesis of Carbon Nanotubes

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To synthesize carbon nanotubes in a chemical vapor deposition reactor, a sealed environment is necessary for high-temperature decomposition of a carbon source in the vapor phase. The current furnace utilizes a large quartz tube for which custom end-caps must be fabricated to operate the system. They have been designed to fit parameters such as size, temperature, and sealing quality. The end-caps will be easily installable, providing a vacuum-tight seal with chemically resistant O-rings. Stainless steel is the material of choice, as it exhibits good strength, corrosion resistance, and is suited for operation in elevated temperatures. Stock size and material waste was considered to minimize weight, reduce cost, and expedite machining. These features have been optimized to provide a compromise of feasibility and functionality. With its unique, effective, and scalable design, the assembly will function in the current setup, and could be modified and adopted in other high-temperature materials processing systems.

What are the Effects of Cochlear Implants (CI) on Students with Deaf and Hard of Hearing (DHH) Disabilities within an Educational Classroom?

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Students with deaf and hard of hearing (DHH) disabilities struggle to hear their classmates, teachers, parents, and the world surrounding them. Some of these students use hearing devices to aid their hearing capabilities. One of the more popular devices is the Cochlear Implant or CI. Many outside of the DHH environment think that students with CIs are able to hear sufficiently with CIs; however, this is not always the case. How do CIs affect a student with a DHH disability in the classroom? What strategies assist a student with a CI? Students with CIs can benefit from several accommodations, strategies, and socialization in classrooms. Both qualitative and quantitative research used in this literature review showed that well-lit classrooms with preferential seating benefited these students. Studies with strategies such as fingerspelling, chaining, and Visual Phonics showed an increase in students' comprehension of vocabulary words and use of spoken English language.

Validation of a Single Question Health Literacy Screening Tool for Older Adults

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Introduction: Health Literacy is the capacity to obtain, process and understand basic health information. Older adults have the lowest health literacy rates. The purpose of this study was to assess health literacy rates of older adults and to validate a single question screening tool.

Methods: Participants included a convenience sample from the state of Kansas. Respondents were age 65 or older and English speaking. Participants completed the 36-item Short Test of Functional Health Literacy Assessment (STOFHLA) and a single item screening (SIS) for health literacy, “How confident are you filling out medical forms by yourself?” Results of STOFHLA and SIS were compared using nonparametric statistics. **Results & Conclusion:** Of the 64 participants, 94% had adequate scores on the STOFHLA, while 64% self-reported confidence in filling out medical forms ($P=0.006$, $X^2=7.606$, $df(1)$). This result suggests that the health literacy screening tools need to be further validated for use in older adults.

Myopalladin's Role in Cardiac Muscle Function and Disease

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Decades of research have provided fundamental insight into the human heart's structure and function. Yet, most cardiac malformations remain a mystery as scientists and clinicians continue to examine how inherited mutations and aging affect the normal biological functions of proteins associated with cardiac dysfunction. Recently, mutations in the muscle protein myopalladin have been linked to cardiomyopathy. Myopalladin and palladin belong to a family of closely related proteins that have essential, but uncharacterized roles in organizing the actin cytoskeleton. Our recent work has shown that palladin binds directly to actin and increases both the rate of actin polymerization and the stability of actin filaments. A number of mutations in myopalladin are located within the analogous actin-binding region, which suggests that a disruption in actin regulation may occur in cardiomyopathy. Thus, we hypothesized that myopalladin also binds directly to actin and increases both the rate of actin polymerization and the stability of actin filaments.

Quality of Communication between Persons with Aphasia and Their Primary-Care Physician from Caregiver and Patient Perspectives

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Introduction: Communication between healthcare providers and persons with communication disorders has been shown to be problematic and to negatively impact the patient's autonomy and health outcomes. The purpose of this study was to identify the quality of communication between persons with aphasia (PWA) and their primary-care physician. To gain a broader understanding of this interaction, the communication was examined from the perspective of both the caregiver/spouse and the patient. Methods/Results: Clients from the Aphasia Group at the Wichita State University Speech-Language-Hearing Center were given a modified Communication Assessment Tool (CAT) designed to provide insight into the quality of communication between patients and physicians. Another modified version of the CAT was given to the client's spouse/caregiver to obtain their perspective on the communication. Results are discussed with respect to discrepancies between the perspectives of caregivers/spouses and PWA, as well as specific strengths and weaknesses of the communication interaction.

Survey of Breastfeeding Curriculum in Physician Assistant Education

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The benefits of breastfeeding are well documented. In 2011, the Surgeon General's Call to Action specifically identified physician assistants (PAs) and their role in supporting breastfeeding. However, breastfeeding is not included on the National Commission on Certification of Physician Assistants (NCCPA) exam blueprint that serves as a guide for PA program curriculums. There is a discrepancy between the Surgeon General's expectation and what is required in PA curriculum. We conducted a cross sectional survey asking PA educators about their breastfeeding curriculum. Results identified a variety of teaching methods and topics included in PA breastfeeding curriculum as well as barriers, including the omission on the NCCPA blueprint. Additionally, 79 percent of programs were unaware of the Call to Action. The results support the need for a change in the NCCPA blueprint and a consistent teaching method so that PAs are able to meet the needs of breastfeeding mothers and infants.

Community, Clarity, and the Closet: Bisexuals' Strategies for Resisting Marginalization

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Bisexual individuals face a marginalization unique among sexual minorities. While they encounter heterosexism as do all LGBTQ community members, they also face biphobia, erasure, and a host of stereotypes specifically aimed at their unique orientation. In this pilot study, I ask what strategies bisexuals use to combat, resist, and minimize the marginalization they face. I use a thematic analysis approach to analyze data gathered from online sources, including blog entries from three bisexual bloggers and multiple threads from three discussion forums addressing bisexual concerns. I also include one interview. The findings reveal a variety of strategies used by bisexuals to respond to their oppression. While some find empowerment by visibly identifying as bisexual, others avert prejudice by staying in the closet. For many bisexuals, finding a community of support is an important tactic. Others combat harmful myths by refuting stereotypes and creating clarity around what it means to be bisexual.

Effective Inclusion Strategies for Students with Mild to Moderate Cognitive Disabilities

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Federal mandate requires that students with disabilities be educated in their least restrictive environment. Researchers have concluded that these students do just as well or better in inclusive settings compared to those that are in self-contained or resource rooms. Appropriate inclusive instruction and practices can enhance learning of students with mild to moderate intellectual disabilities. The benefits of inclusive environments can be endless, but the main push for this type of education is to provide a wide range of students with a variety of academic, social, and behavioral abilities. To best educate students with disabilities, teachers need strategies to effectually engage, teach, and provide accommodations inside of the least restrictive environment. This research is being conducted to determine effective strategies that are utilized in inclusive classrooms. The results reveal that with the implementation of the purposed strategies, students with disabilities can be successful in the general education classroom.

A Semantic Knowledge Engine Using Automated Knowledge Extraction from World Wide Web

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It becomes extremely difficult for the existing search engines (such as Google) to crawl, index, rank, and manage huge amount of data and locate information while answering questions. Semantic web technology (such as Google Knowledge Graph) is emerging into the answer engine market in order to transform the unstructured data into more structured useful information. However, the existing engines suffer due to the fact that curators and volunteers feed these systems manually. In this project, we aim to transform the unstructured data into more useful data using an automation technique. We implement the proposed system in 11 different categories including universities. Based on a survey among 50 university students, we receive excellent satisfactory results as the proposed engine answers more effectively. In an average, the proposed engine helps save 25% search time and 25% energy consumption for each 100 searches when compared with the existing search engines.

Effect of The Receptor CMG2 On Stability Changes in Domain IV of Anthrax Toxin Protective Antigen in Comparison to the Full-Length Protein

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The anthrax protective antigen is an 83 kDa protein secreted by *Bacillus anthracis*, and is required for entry of the edema factor and lethal factor, that leads to Anthrax. PA bound to Capillary Morphogenesis Receptor (CMG2) in the host initiates the pathogenesis. Domain 4 has been shown to be important not just in binding to the host cellular receptor, but also in providing protective immunity against anthrax intoxication. The presence of many antigenic epitopes make domain 4 a better candidate vaccine but its usage in vaccine formulations may be compromised due to the thermal stability and its inability to exist in its native state in physiological conditions. An increase in stability of domain 4 may be significant in terms of the development of a better anthrax vaccine. Herein, we use biophysical methods to investigate the stability of isolated Domain IV when bound to CMG2. The implications of our data with respect to anthrax pathogenesis will be discussed.

Retrofit Winglets for Wind Turbines

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Wind energy has demonstrated its potential as a renewable energy source. Much research has been devoted to technologies that improve wind turbine efficiency, winglets being among them. Blade tip vortices increase induced drag and affect wind turbine lift generated. This affects power generated and efficiency of turbines. In aircraft, winglets have proven to reduce induced drag. However, winglets tend to increase aircraft bending moments, requiring structural reinforcement and making winglets an expensive proposition. The primary objective of this study is to design a retrofit winglet for a baseline Wind Turbine, and determine economic feasibility. Traditional methods to determine power output of a wind turbine, such as the Blade Element Momentum theory, are insufficient to model a wind turbine with winglets. A Vortex Lattice Method for rotor applications has been developed. Economic feasibility is a key issue in the wind industry today. Accordingly, a cost function that compares design, manufacture and labor costs against increment in power has been developed. These tools, along with researched winglet design philosophy, will be used to determine a beneficial winglet configuration. Lightweight material and careful configuration design will minimize root bending moments, thus mitigating a need for structural reinforcement of the blade. The net result will be a retrofit winglet configuration that, with minimum installation cost, provides improved performance and economic benefit.

A Comparative Study of Time and Energy Savings Due to Near Field Communication Technology

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The popularity and demand for the Near Field Communication (NFC) applications are rapidly growing in the recent years. NFC technology helps transfer data by bringing two smart devices closer (5-10 cm). Many important applications, such as “contactless payment”, are supported by the NFC technology. Although NFC is vulnerable to numerous networking attacks including relay attack, NFC technology has many advantages (such as fast data sharing and passive communication) over other similar technologies including Bluetooth and Wi-Fi. In this work, we explore NFC, Bluetooth, and Wi-Fi technology by transferring different files. According to the preliminary experimental results, for 27 MB files, NFC technology helps reduce transfer time by 4.29% (i.e., more than 13 seconds) when compared with that due to Bluetooth technology. Moreover, NFC technology requires less energy (0.0555 watts) than the Bluetooth (0.111 watts). For a file size approximately 27 MB, NFC technology helps save 17.538 watt-second energy.

The Effects of a Circuit Based Exercise Program on Individuals with Parkinson's Disease

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The purpose of this study is to determine the effects of a circuit based exercise program on quality of life, strength, balance and fall risk on individuals with Parkinson's disease. These changes were measured by the following: TUG, BERG, functional reach, dynamometry, quality of life survey (WHO-QOL-BREF), 2-minute walk test and grip strength. The quality of life survey we chose, WHO-QOL-BREF, includes components regarding physical health, psychological, social relationships and environment. The participants completed eight weeks of a circuit training program which included gait training, balance and strength training for core, upper body and lower body. The results demonstrated statistically significant improvements in TUG, BERG, 2-minute walk, and left-handed grip strength, as well as non-significant improvements in functional reach, all other strength measures, and quality of life.

Factors for Success in Breast Cancer Screening

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One of the Healthy People 2020 initiatives within the U.S. is to increase the proportion of women who receive breast cancer screenings based on the most recent guidelines (c-17). Despite highly recognizable promotion campaigns that encourage women to obtain routine breast cancer screenings, women today face changing guidelines. Regardless of which reputable source is followed (the American Cancer Society, U.S. Preventative Services Task Force, or the American College of Obstetricians and Gynecologists), the recommended age to begin testing and timeframe to retest varies and seems to be evolving. To explore factors influencing women's adherence to recommendations for preventative screening, this study utilizes secondary data from the Center for Disease Control and Prevention's (CDC) Behavioral Risk Factor Surveillance System (BRFSS) survey among women in Midwest states. Points of diversion among women who are participating in routine breast cancer prevention based on location, accessibility, and affordability will be discussed.

Analyzing the Trade-off between Radiotherapy Treatment Quality and Efficiency

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Radiotherapy is one of the main treatment modalities for cancer in which high-energy radiation beams are used to eradicate cancer cells. One of the major issues in radiotherapy treatment planning is to find the desired balance between contradictory goals of delivering sufficient radiation dose to the tumor while sparing the surrounding healthy tissues and critical structures. In this research, a multi-criteria mathematical optimization approach is used to quantify and incorporate the trade-off information between conflicting clinical objectives into the radiotherapy treatment planning process. Furthermore, due to biological and logistical reasons, long treatment times are undesirable and may cause inconvenience to the patient. Thus, the proposed treatment planning approach also takes the trade-off between the plan quality and treatment duration into consideration. The proposed method provides clinicians with valuable information for individual cancer patients to design radiotherapy plans that yield the desired trade-off between clinical objectives and can be efficiently delivered.

A Promising MATLAB Assisted Image Segmentation for Detecting Breast Cancer

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Breast cancer is the most common cancer among American women; about 1 in 8 (12%) women in the U.S. will develop invasive breast cancer during their lifetime; and more dangerously, breast cancer is the second leading cause of cancer death in women. Mammography, an imaging technique, is used in most breast cancer detection method. A typical mammogram has poor contrast; as a result, doctors often overlook microcalcifications while using mammograms. Therefore, mammograms easily lead to wrong diagnosis. In this study, we introduce an image processing technique using MATLAB to segment mammograms. The proposed technique has potential to accurately encircle the suspicious regions in mammograms, because the suspicious regions are converted into equivalent 8-bit digital values to analysis. Mammograms from the University of South Carolina breast repository are used in this study. Preliminary experimental results show that the proposed method segments suspicious regions with more than 99% accuracy.

Investigating Interactive Features of Online Instruction: Meta-Analysis with Qualitative Probing

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Online classes are a mode of education that is rapidly gaining popularity due to its flexibility in terms of both time and place for studying. According to Allen and Seaman (2013), 32% of the students take one or more of online courses during their studies. The trend appears to continue with slight variations. This presentation provides meta-analysis of research literature related to implementation of online programs. It includes qualitative probing within an innovative graduate program related to use of different features of BlackBoard™ Learning Management Systems like discussion board, Collaborate and Instant Messenger as well as the forms of feedback and student-instructor and student-student interactions. Findings illustrate the need for additional support/training about using the existing tools prior to taking disciplines-based online courses. Furthermore, results illustrate various levels of tensions, categorized based on use of different multimedia modes for student – instructor interactions as well as delivery of lectures and resources.

Biomass as a renewable energy for providing drinking water using pellet fluidized bed

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As like as energy consumption, there is an increasing need for potable water and depletion of water resources are even more challenging than anticipated decrease in fossil fuel resources. Some water resources have unacceptable levels of contaminants and hardness and can be retreated to provide drinking water that is safe and within acceptable contamination levels. In this study, biomass is used to produce biogas and boiling water in a pellet fluidized bed to serve the needs of small communities. By using pellets and boiling water in fluidized bed, the hardness of water and microbiological contaminants can be removed effectively. It is shown that using this simple structure, the drinking water demand of the region can be partially met by using a free and abundant source of biomass in the region. Moreover, it minimizes the health problems due to both water contaminants and biomass residues in the area.

Comparative Studies on Water Self-Diffusivity Confined in Graphene Nanogap: Molecular Dynamics Simulation

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Water behaviour in presence of graphene is studied in various studies and surface interaction between water and graphene is of high interest. However, confined water behaviour due to different potentials still is not completely clear. In this study, SPC/E and TIP3P water models have been confined between two fixed layers of graphene nanogaps with size of $L_z = 0.8$ to 4 nm at STP conditions. Using Molecular dynamic simulation, self-water diffusivity is calculated by the mean squared displacement approach for both lateral and vertical direction water diffusivities. It is found that the water self-diffusivity in the confined region is lower than that of the bulk water, and it decreases as the gap size decreases and the surface energy increases. No significant effect of the equilibrium distance between the water and graphene on the water self-diffusivity is found. The in-plane water self-diffusivity is very larger than that of the out-of-plane.

Enhanced Critical Heat Flux in Pool Boiling using Canopy-Capillary Evaporator Wick

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A liquid-vapor phase change in pool-boiling offers an efficient cooling mechanism, but a main challenge is the limited Critical Heat Flux (CHF), resulting from the hydrodynamic instabilities near the evaporator. To enhance this limit, the micro/nanoscale surface wetting/structural modifications have been employed, but the enhancement is only factor of 3 compared to that of the plain surface. In this study, a capillary-canopy wick with the monolayer wick is employed to separate vapor-liquid phases to assist the liquid coolant supply to the evaporator, aiming at further CHF enhancement with a minimal thermal resistance. The particle size, heights and distance of the liquid-artery wick effects are also examined using sintered-copper particles/mesh. Experimental results show a significant CHF enhancement with a reduced thermal resistance. This novel wick design provides a deep insight into an optimal design in order to improve CHF and minimize the thermal resistance for advanced thermal management systems.

Effects of Modulation on Friction During Deformation Processing

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Friction causes tool wear and increases redundant work during the deformation processing of metals and alloys. A technique involving the application of a controlled vibration on the tool or the work material has been found successful in machining operations. As a step towards the application of modulation to these other processes, a setup for the evaluation of frictional phenomena in indentation and compression between flats is developed. The setup is used to apply a controlled vibration (modulation) of low frequency on the work material during wedge indentation. The effects of this modulation on friction are observed indirectly through force measurements and characterization of microstructural flow patterns. It is found that the modulation enhances lubricant penetration into the tool-work material interface, thereby reducing the severity of the friction arising from the indentation action. The findings will inform the design of modulation systems applicable to a range of deformation processes.

A Combination of Classical and Multi-Modal Approaches to Teaching Human Anatomy

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The model for teaching human anatomy through traditional lecture and lab must be re-examined. Cadaver lab maintenance is costly and although medical knowledge grows exponentially, allotted lecture time is declining. A paradigm shift toward flipped-classroom approaches, computer generated 3D models, and online lecture and resources seek to resolve these issues and improve efficiency. A thorough literature review was conducted to identify evidence-based multi-modal teaching approaches specifically with anatomy courses including cadaver dissection, 3D models, and other technology. This poster describes the pros and cons of each of these modalities and also describes one university's successful approach to teaching anatomy with multi-modal methods including a flipped-classroom hybrid model.

WISE Socket: A Smart Electrical Socket

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Department of Industrial and Manufacturing Engineering

Costly solutions have been invented to resolve the issues of increasing electricity consumption and dead zones. Control of a device has also been a concern as temperature readings and security are important needs in every home or office. A solution is presented in order to meet with the needs of professionals in different organizations. An electrical socket is used as a medium to achieve the elimination of dead zones, monitor electrical usage, read temperature, and provide security and control of its functions. The system is made by attaching a microcontroller board to a socket with Wi-Fi extending capabilities, making each socket a hub for wireless connection. A central server gathers data from each socket and organizes them on a table, which can be accessed from a website and a mobile app.

Depictions of Parental Incarceration in Children's Literature

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Often called “unintended victims of the war on crime,”¹ 1.5 million children have at least one incarcerated parent and 22% are younger than 52. Accessible literature for these children to relate to, which would also increase other children's understanding, could decrease their reported stigmatization³. This qualitative pilot study includes thematic analysis of 10 published children's books about parental incarceration. 4 books contain male children, 4 female children, and 2 were gender neutral. Of incarcerated parents portrayed, 3 were mothers, 6 were fathers, and in 1 book both parents were incarcerated. In the books, caregivers were mothers (3), an aunt (1), grandmother (2), both grandparents (1), or not mentioned (3). In 9 books, there is contact with the parent via phone calls, letters, or visitation. Overall, the most prevalent themes were emotional issues, life changes, and confusion about emotions or the situation. Future studies should examine accessibility of these resources.

Transitioning to Independent Living: Hopes, Dreams, and Possible Selves

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This study will examine the hopes, fears, goals, and possible selves of older adults as they transition into a continuous care retirement community as independent living residents. There has been little research regarding the effect of a life transition on a person's self-concept, hopes, and fears, and so it is the focus of this exploratory project. Twenty residents will participate in a one-hour personal interview about their possible selves, interests, activities, attitudes toward aging, health, perception of time, and reasons for moving. Analyses will address the number of hoped-for and feared possible selves as well as the domains of the possible selves (health, social relationships, life events, etc.). Of interest will be whether having an "expanded" or a "limited" sense of time left will be related to having achievement, maintenance, or prevention goals. Preliminary results will be presented.

A Dynamic Heads-Up Air Traffic Locator & Collision Advisory Display Using Google Glass

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A heads-up display designed to assist pilots in the rapid location and identification of air traffic is developed and evaluated on Google Glass. The display is conceived as a proposed addition to a Traffic Collision Avoidance System, and the research seeks to determine if the presence of the assistive technology yields faster response times in detecting surrounding air traffic. The display features a dynamically updating three-dimensional arrow that continuously guides the pilot's eye towards oncoming traffic, and updates its orientation based on the relative head motion of the pilot, the motion of the pilot's aircraft, and the location of the oncoming traffic. Testing and simulation runs are conducted to gauge response times of pilots and non-pilots, in an effort to determine if the display leads to faster response times in visually acquiring oncoming traffic. Results show a significant improvement using the display, with reductions of over 60% in response times.

A Line-by-Line Data Accountability Framework to Enhance Security of Cloud

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Cloud technology provides the convenience of access to data from anywhere in a time- and cost-effective manner. Due to the recent security breaches, users' fear of losing control of their own data has increased. Data-security is a significant barrier to the wide adoption of Cloud services. In this paper, we introduce a highly decentralized information accountability framework to keep track of the actual usage of the user data in the Cloud. In particular, a line-centered approach is proposed to enable enclosing logging mechanism with user data and policies. A line to line security of file authentication using the Rivest-Shamir-Adleman (RSA) and message digest 5 (MD5) algorithms are used to create a dynamic and a secure Cloud environment. In case of any attempts to access data by an unauthorized person, the framework triggers an authentication error message and automates logging details to the data owner.

Enhancing the Energy Efficiency of Capacitors by Using Polyethylene Oxide/Soy Protein Isolate

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The energy efficiency of the Polyethylene oxide (PEO)/soy protein isolated (SPI) membrane was studied. The different PEO/SPI ratios (10wt% SPI, 30wt% SPI, and 50wt% SPI) are successfully made by denaturing the SPI at a high temperature (60°C) to compare with the pure PEO membrane in case of energy efficiency. Moreover, the effect of the polyethylene oxide molecular weight was studied by using two different molecular weights (1,000,000 and 100,000g/mol.). The Current-Voltage and Hysteresis tests were measured to study the electrical behavior of membranes. Additionally, an LCR meter was used to measure the capacitance of the membranes. We conclude that the presence of the SPI in PEO/SPI membranes contributes to a dramatic increase and there is an optimum amount for the PEO/SPI ratio. In addition, the PEO low molecular weight has better performance than high molecular weight PEO. Likely this is due to a better interaction between polymeric chains and protein molecules in lower molecular weight PEO.

Keywords: Energy efficiency; Polyethylene oxide (PEO); Soy protein isolated (SPI); Denaturation; Hysteresis

Telepractice for Speech-Language Services with School-Aged Children: An Efficacy Study

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Telepractice has the potential to extend speech-language pathology services to remote and underserved populations; however, current evidence on the efficacy of telepractice for speech-language services is limited. The purpose of this investigation was to determine the efficacy of speech-language telepractice service delivery compared to traditional, face-to-face intervention. A retrospective analysis compared reported standardized scores for children 6-9 years of age, served via telepractice with those served in face-to-face school settings. Each child received 4-9 months of intervention for disordered “speech sound production”. Analysis revealed no significant difference in improvement scores between the face-to-face group (4% improvement, $p=.739$, 95% CI[.82-1.33]) and the telepractice group after adjusting for age, length of service, and initial score. Each additional month of service was associated with approximately a 4%, $p<.016$, 95% CI[1.01-1.07]improvement. For school-aged children presenting with disorders of speech sound production, telepractice is a viable mode of service delivery.

Urinary Incontinence and Pelvic Floor Strengthening Education in Collegiate Dancers

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The purpose of this pilot study was to test the efficacy of an educational exercise program for treatment of stress urinary incontinence (SUI). Participants completed a pre-survey to determine the presence and severity of SUI and quality of life. The researchers examined subjects' ability to perform a Kegel, educated on how to perform the exercise correctly, and prescribed a daily home exercise program. The participants were re-tested, re-educated, and completed a post-survey at four and eight weeks. Over an 8-week period subjects that were able to perform an isolated contraction increased from 14% to 71%. The number of subjects who reported SUI decreased from 71% to 29%. The study found that there was a decrease in frequency of SUI at both 4 and 8 week follow-ups. These results may lead to future research and the development of a preventative exercise program to provide to young females.

Cognitive Defusion versus Cognitive Restructuring: An Analogue Examination of Potential Moderating Variables

Eric Richardson

Faculty: Robert Zettle, PhD

Department of Psychology, College of Liberal Arts and Sciences

The impact of negative self-referential thoughts on psychological problems has long been targeted in cognitive behavioral therapy (CBT) through cognitive restructuring. Recently, acceptance and mindfulness-based approaches within CBT have suggested cognitive defusion as an alternative strategy. The primary purpose of this analogue study was to compare the effects of brief cognitive restructuring and cognitive defusion protocols in reducing the believability and discomfort of targeted negative self-referential thoughts among college students. Its secondary purpose was to investigate whether levels of dysfunctional attitude endorsement and cognitive fusion differentially moderate the impact of the two interventions. While both protocols significantly reduced believability and discomfort to an equivalent degree, moderating effects were noted only for reducing emotional discomfort via cognitive defusion. The impact of this intervention was greatest for participants who endorsed less dysfunctional attitudes. The limitations and clinical implications of this study are discussed.

Medical Barriers and Interventions and the Poverty Cycle – A Case Study

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Department of Physician Assistant, College of Health Professions

Patients in poverty face a variety of barriers in health care. The current research aims at cost reduction for the health system, while this case study focuses on cost reduction for individuals, via primary care interventions. Seven participants, identified through the Salvation Army, were interviewed regarding their health issues, practices and costs. A questionnaire, approved by WSU IRB, was utilized. The clients' responses were compared in an attempt to identify common barriers and potential interventions. Two clients were selected for case presentations. The role of a primary care provider to reduce personal health care expenses was not consistently apparent in the clients interviewed. Some clients had a tendency to seek a specialist's care rather than establishing primary care, while others valued primary care as a unifying element for their varied health needs.

Evaluation of Distributed Generator Impacts on Distribution System with Optimal-Performance Index

Koushik Sarkar

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The increasing penetration rate of Distributed Generators (DG) on power distribution system makes it more complex and more stressed. Injected power from DG affects the power flow, nodal voltage, real and reactive power loss, harmonic contents. The impact factors due to fault current and fault voltage will also affect the protection measurements taken in the distribution system while the DG is integrated with existing power system. The above-said factors when combined increase the complexity of optimal placement of DGs. Optimal location of DG is very critical in order to obtain the maximum benefits to the system. This paper proposes Optimal Performance Index (OPI) which evaluates the technical issues related to Distributed Generators (DG). The DGs with different sizes are placed in IEEE 13-feeder system and the OPI is calculated for each configuration. The tool used for the simulation is MATLAB/SIMULINK.

Effects of Soil Heterogeneity on the Richness and Spatial Structure of an Assembling Prairie Plant Community

Olivia S. Schouten

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Department of Biological Sciences, College of Liberal Arts and Sciences

In ecological communities, plant species are often non-randomly distributed, with individuals of species occurring in aggregated spatial arrangements. This non-random spatial structure can develop as plants interact with the environment or compete with other plants for space and resources. These interactions are hypothesized to contribute to species coexistence and maintenance of diversity, although their relative importance is not clear. To test the importance of soil heterogeneity on plant diversity and community structure, soil heterogeneity was manipulated using the variation in the vertical soil profile to create heterogeneous and homogeneous plots and then seeded with native prairie species. Spatial analysis was used to determine whether species show differences in spatial structure between soil treatments after five years. Results indicate that, at least for some species, plant spatial structure can be driven both by soil heterogeneity and by the plants themselves even in relatively homogeneous soils.

Understanding Genetic Testing In Primary Care

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As genetic tests are expanding, primary care providers have an increasing need to integrate tests into their practice. The purpose of this project is to offer an evidence-based clinical review, regarding types of genetic tests and their application in primary care. Practical information on the utilization of karyotype, microarray, polymerase chain reaction, fluorescence in situ hybridization, and whole exome sequencing were searched. Karyotype and microarray can be used when considering pediatric disorders. PCR is most useful for infectious processes, while FISH has a niche with malignancies. Finally, WES is best used when other diagnostic avenues have been inconclusive or unrevealed disorders. The article was submitted for publication at JAAPA to provide a needed resource in appropriately utilizing genetic testing in primary care.

Non-Linear Finite Element Approach to Analysis of Fiberglass Reinforced Honeycomb Core under In-Plane Loadings

H.Shahverdi, A. Kothare

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This paper presents a numerical investigation on the mechanical response of fiberglass reinforced honeycomb core subjected to in-plane loadings. Here, a finite element model implemented with the MSC.MARC program is presented to simulate the honeycomb cell wall and node adhesive layer. In this research, the effective mechanical properties of a hexagonal cell core are determined as a homogenized material using a numerical method which is based on a non-linear finite element analysis of a representative unit cell. In particular, the geometry of the simplest repeating unit of the core as well as the appropriate loading and boundary conditions that must be applied is presented. In conclusion, the in plane elastic properties of honeycomb core are evaluated by analytical methods and correlated with experimental results. Moreover, from non-linear analysis, it is found that node adhesive layer has a significant effect on the mechanical properties of honeycomb which has not been considered so far in any studies.

Traumatic Aortic Dissection with Confounding Factors - A Case Study

Darby Riley and Blake Shinn

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This project describes a single case report of a 58-year-old male with Stanford type B traumatic aortic dissection with aneurysmal expansion of the descending aorta. A study of the risk vs. benefits of surgical treatment of a Stanford type B aortic dissection, subtrochanteric femur fracture, and burst fracture of the lumbar spine have been reviewed. In contrast to the 72% of patients with Stanford type A dissection who are considered to have a medical emergency and treated surgically, only 20% of patients with a type B dissection undergo surgery. These recommendations do not appear to be as concise, when the dissection is considered to be complicated. The significance of this case demonstrates that there is minimal medical benefit in early treatment of the aortic dissection. Current literature suggests there is benefit in early surgical repair of a subtrochanteric femur fracture and lumbar burst fracture.

Effectiveness of Lumbar Manipulation and Iliotibial Band Exercise versus Iliotibial Band Stretching and Iliotibial Band Exercise on Iliotibial Band Tightness

Matt Dobratz, Katie Klausmeyer, Luke Kriley, Jeremy Luthi, Korey Ramsey, and Stephanie Shogren

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The study's purpose was to examine the effectiveness of lumbar manipulation with iliotibial band (ITB) strengthening exercises v. standard ITB stretching and strengthening exercises for reducing ITB tightness. The participants included 32 physical therapy students aged 18-40, who were randomly assigned to one of three groups. Group 1 was assigned ITB strengthening exercises with lumbar manipulation at the level of L5/S1 1x/wk for 8-weeks. Group 2 was assigned ITB strengthening exercises and ITB stretching 1x/day for 8-weeks. Group 3 served as the control. Results of a mixed-model design two-way ANOVA revealed no significant differences between groups, but it should be noted that the manipulation group had the largest within subject effect (significance 0.158, $p < 0.05$), followed respectively by the stretching and control groups (significance 0.206, $p < 0.05$, significance 0.771, $p < 0.05$). This suggests that both manipulation and stretching interventions with concomitant hip strengthening may be beneficial for a patient presenting with ITB tightness.

The Attitudes and Reading Behaviors of Parents

Julia Siwierka

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Nationwide, 32% of fourth grade students read at or below the “basic” level (NCES, 2013), and students who cannot read at proficient levels by the third grade are four times more likely to drop out of school later (Hernandez, 2012). In Kansas, there are drastic disparities in reading proficiency by socioeconomics and race (Kids Count, n.d.). Using the Social Cognitive theory, this study sought to uncover parents’ personal attitudes and reading behaviors, which can influence their children’s. Additionally, this study wanted to ask what barriers prevent parents from encouraging their children’s reading. A mix of quantitative (collected through a survey) and qualitative data (focus groups with parents of K-3 students— “lost years” in the research) were used. Results indicate that overall, parents have favorable attitudes towards reading, but there are disparities in parent behaviors. Parents also mentioned changes in curriculum as being a major barrier to their own reading involvement.

Considering Point-of-Care Electronic Medical Resources in Lieu of Traditional Textbooks for Medical Education

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Department of Physician Assistant, College of Health Professions

Within just 26 months, physician assistant students are transformed from relatively medically naive learners into licensed healthcare providers with a high level of autonomy. Didactic education traditionally relies on medical textbooks to fill knowledge gaps and clarify/deepen comprehension. However, clinicians rarely use textbooks to practice medicine. Instead, they use point-of-care electronic resources, drug information, and medical applications (eg, UpToDate, Clinical Pharmacology). Thus, PA students are also expected to demonstrate strong information literacy skills and proficiency with these resources during clinical rotations and as clinicians. Information literacy skills (the ability to recognize when information is needed and to identify, locate and effectively use information) require time and mentoring. Thus, PA students must rapidly gain knowledge and information literacy skills simultaneously. This article explores the use of POC resources in lieu of textbooks during didactic training to bridge the gap between classroom and clinical setting. (Published: Journal of Physician Assistant Education, 2015.)

Parametric Study of Interface Friction to Model Metal-Coated Rapid Prototyped Structures using Finite Elements Techniques

Adrian Soler Luna

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The use of additive manufacturing, also known as 3D-printing, is rapidly increasing in the aerospace industry due to its ability to produce high quality parts with short delivery time and reduced cost. Metallization of plastic additively manufactured parts has been shown to increase the material strength by adding a thin layer of Nickel to the plastic surface. A finite element model of a cylindrical 3D-printed plastic made of Nylon-12 and externally coated with a Nickel layer (0.002in) was compared with a specimen of the same geometry and coating thickness under a compression load applied to failure. A finite element parametric study of the friction of the contact interface between the plastic surface and the metallic layer will show that FEM software could model the tested specimen and predict the yield load. Differences in tensile and compression yield strength of Nylon-12 favored the use of Mohr-Coulomb yield criteria in this study.

Qualitative Data Analysis and Presentation in an Exclusively Digital Environment

Lindsey Stillwell

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Technology continues to advance research fields, especially in qualitative data analysis. Digital storytelling, a form of qualitative research, offers researchers an opportunity to visually share their data in a way that is easy to consume by the general public and resonates with the viewing audience. This is an introduction to an innovative method to analyze videotaped interviews that potentially reduces the influence of researcher bias and meaning lost through traditional transcription and coding methods. Researchers utilizing this method will abandon transcription and perform coding within the digital environment. Coding in the digital environment thereby retains context, body language, and non-verbal cues of the interviewee. Potential impacts include greater contextual understanding, stronger meaning making, and research reporting with less bias.

Psychometrics of the Pursuit of Happiness

Jeffrey Swails

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Department of Psychology, College of Liberal Arts and Sciences

The pursuit of happiness is firmly established in American culture with explicit mention in historical documents (i.e. Declaration of Independence). Therefore, it is of little surprise that thousands of self-help books and pieces of personal wisdom offer routes to happiness. However, psychological research over the past three decades on the effectiveness of controlling emotions suggests pursuing happiness and other positive hedonic states may have a downside. More fully investigating this possibility has been limited in part by the lack of a scale to assess individual differences in the pursuit of and overattachment to happiness. The purpose of this project was to develop a psychometrically sound scale to measure people's attempts to pursue and prolong positive affective states as a means of conducting further research in this area.

A Framework for Pediatrics Clinic No-Show Prediction using Elastic Net and Bayesian Belief Network

Kazim Topuz

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No-Shows not only creates additional cost for healthcare facilities but also affect the quality of care for the patients. This study predicts the no-show probability of the patient with using demographic, social and appointment as well as appointment attendance information. We develop a hybrid probabilistic prediction framework based on statistics and Bayesian network. We utilized Elastic Net for selection of the variables and state of art structural learning algorithm for building the Bayesian Belief Network (BBN). We validate our study with ten years of local pediatrics clinic data. The results indicate that the proposed BBN framework achieves a comparable prediction method to the best approaches in the literature. More importantly, our method provides novel information on the interrelations among the predictors and the conditional probability of predicting no-shows. The output of the model can be implemented to the appointment scheduling system for robust overbooking strategy.

Mobile Text Input On A Smartwatch QWERTY Keyboard

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As smartwatches continue to grow in popularity the demand for a smartwatch with efficient texting capabilities continues to increase. Conventional opinion states texting on a smartwatch is too difficult and inefficient due to the limited screen size. However, recent research done in our lab shows smartwatch users can achieve typing speeds of up to 30 AdjWPM using a trace-based typing method and 26 AdjWPM using a tap-based typing method while seated at a desk. These speeds are comparable, if not better, than typing speeds achieved on smartphones using the same input methods. In addition, these speeds are better than any other keyboard for small screen devices listed in the literature. Given the mobile nature of smartwatch usage, a second study was conducted to examine typing speeds using the same techniques while walking and standing. Results from both studies will be discussed along with smartwatch design implications.

Functionalized Graphene & Hexagonal Boron Nitride Nanocoatings for Protection of Transparent Plastics

Thu Van Tran,¹ and Aybala Usta,¹

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¹ *Department of Mechanical Engineering, College of Engineering,* ² *Department of Electrical Engineering and Computer Science, College of Engineering*

Nanocoating is the result of a coating application of nanomaterials to build a consistent network of molecules in a coating or paint to protect surfaces of various materials. Boron nitride (h-BN) is in 2D form with excellent thermal and chemical stability. Graphene is an allotrope of carbon in the 2D form and a hexagonal lattice with extraordinary physical and chemical properties. By adding functionalized Graphene or h-BNs into paints or coatings, they will absorb the harmful UV part of sunlight, prevent coating degradation, and the impact of the environmental factors on the coatings to enhance longevity and durability. In this study, graphene & h-BNs were modified with [3- (2-Aminoethylamino) propyl] trimethoxysilane and uniformly added into the polyurethane paint with different amounts to increase hardness, water resistance, and decrease UV degradation of substrates. The samples were characterized by using Fourier Transform Infrared Spectroscopy (FTIR), UV Vis, Scanning Electron Microscope (SEM), water contact angle, and Differential Scanning Calorimetry (DSC).

Palladin Regulates Cancer Metastasis Via Actin Cytoskeletal Remodeling

Ravi Vattepu

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The migration of both normal and cancer cells is a complex process that involves dramatic remodeling of the actin cytoskeleton. Currently 90% of cancer deaths result from metastasis, the migration of cells into the bloodstream, and there are currently no therapeutic agents that directly target this step of cancer progression. Actin-cytoskeleton dynamics are regulated by a large number of actin binding proteins (ABPs), and some of these proteins are specifically upregulated during metastasis. One such protein is palladin, which binds directly to actin as well as many other ABPs and has been shown to play an active role in the organization of cellular actin networks. Our hypothesis is that increased amounts of palladin result in altered actin dynamics that promote metastasis of cancer cells. Our recent research results show that palladin has direct role in actin polymerization and alters the structures of resulting actin filaments.

Heat Transfer Analysis through Branched Structure Microchannel Heat Exchanger

Pavan Vellore Kumaraswamy

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Heat Exchanger is a key component in cooling systems. The introduction of microchannel heat exchangers has revolutionized the cooling technology which lead to miniaturization of devices to a great extent. Due to their compactness they are mainly used in electronic cooling; in recent times their application is extended to medical field for heating blood and cooling for scanning equipment. Microchannel heat exchangers have high heat transfer coefficient due to small channel size, however this causes high pressure drop. Experimental studies have shown that thermal efficiency of branched structure is comparatively higher than that of parallel microchannel. Present study focuses on heat transfer analysis carried of single phase gas flow through branched microchannel for size ranging from 20 μm to few hundred μm , also at different branch angles to determine the optimum design parameters. The analysis is carried out using computational software like OpenFOAM.

Assistance to Immune System by Genetically Engineered Bacteria: Molecular Communication.

Vemula Chandana

Faculty: Hyuck M. Kwon, PhD

Department of Electrical Engineering and Computer Science, College of Engineering

Molecular communication (MC) is a communication between bio transmitters (that emit molecules carrying information) and bio receivers. The use of such a communication method also involving genetically engineered bacteria and immune cells results in the development of a curative methodology dealt in the paper. A Bacterium is engineered by bacteria plasmid splicing– a new gene insertion technique. Here, plasmid is separated from the bacterium and immune cell gene is inserted into it. This engineered plasmid is placed back into the bacterium and it is kept in the culture to multiply. These genetically engineered bacteria upon being injected into the blood stream starts functioning as immune cells developed artificially. Thereby, assist the immune cells of the organism. In cases where the immune system activity is lost, altered or weakened these genetically engineered bacteria developed will assist the immune cells of the organism and also cure the effected immune cells.

Predicting Viscoelastic Behavior of Fabric Composites Using Finite Element Based Micromechanics Model

Anand Vijay Karuppiah, Kevontrez Jones, Abhiruchika Sriyathne

Faculty: Suresh Keshavanarayana, PhD

Department of Aerospace Engineering, College of Engineering

Advanced textile composites have become widespread in many aerospace structural applications due to their unique ability of conforming to complex structural curvatures while maintaining their desirable properties. Besides all of its advantages, their long term application is restricted by its time dependent viscoelastic behavior, in which the state of stress decays as a function of time. In an attempt to predict this macro-level stress relaxation behavior, micromechanics model of 8-harness (8HS) woven fabric is assembled to capture the effects of the individual constituents and their microstructure. The model is developed from the microscopic images of composite cross-sections using the subcell modeling approach and idealized to contain a linearly viscoelastic matrix and orthogonally interlaced unidirectional composite tows. Periodic boundary conditions are applied to recreate the Representative Volume Element of woven fabric lamina. From the comparison, it was observed that the numerical results of 8HS model are in good agreement with experimental results. This finite element analysis based on the fruitful combination of mechanics of material and microstructure not only estimates the viscoelastic response of woven composite, but also predicts the state of stress and its variation in the adjacent tows and matrix regions.

Strength and Endurance of the Rotator Cuff: Normal Subjects Versus Those with Shoulder Pain

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This study aimed to develop a method for testing endurance of the shoulder external rotator (ER) muscles and to see if differences exist between shoulder strength and endurance between those with and without shoulder pain. 45 subjects were tested and their maximum ER strength was recorded via hand held dynamometer. Dumbbells representing 25% of the maximum ER strength were used for the endurance test, and time holding an isometric contraction was recorded. Maximum strength and endurance values between groups were then compared. The results show there is no significant difference in ER strength between participants with and without shoulder pain. However, a statistically significant difference in ER endurance between the painful/dominant shoulders of the experimental group, and the non-painful/dominant shoulders of the control group was found.

Developing a Quantitative Risk Assessment Model for a Non-Profit Mentorship Program in Wichita, Kansas

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One of the most serious challenges facing any social service, non-profit organization is ensuring that the appropriate services are being matched with the individuals who most need these services. Previous research has found that the risk-profile of a youth entering a mentorship program is of particular concern to both the quality of the mentoring relationship and the outcomes of the program for the youth. Using data taken from 427 past youth in a mentoring program, this project investigates the effect of various risk factors on both the outcomes and the quality of that youth's mentoring relationship. Initial analyses indicate that three risk factors matter, but only to individual outcomes. School/work problems and antisocial behaviors are related to multiple outcomes, although generally only when zero-order relations are considered. The key risk factor in this analysis are family/marital issues, which was associated with lower perceptions of academic confidence, lower grades, and lower levels of parental support.

Comparison of Speech Intelligibility of Patients with Huntington's Disease Between Familiar and Unfamiliar Listeners

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Familiar listeners may overestimate the intelligibility of speakers with dysarthria. The purpose of this study is to compare speech intelligibility for patients with Huntington's Disease between an experienced neurologist evaluator using the Universal Huntington's Disease Rating Scale (UHDRS), and unfamiliar listeners using the Assessment of Intelligibility of Dysarthric Speech protocol (AIDS). 15 patients were audio recorded speaking 10 words and 5 phrases from the AIDS protocol. Unfamiliar listeners were instructed to write each word/phrase on a record form, as they were able to understand them. Each response was scored for accuracy (i.e., complete word or words/sentence). Participants with a UHDRS rating of 0 (normal speech) ranged between 81-93% intelligibility, those with a UHDRS of 1 (unclear, no need to repeat) 49-93%, those with a UHDRS of 2 (must repeat to be understood) 66-77%, and one participant with a UHDRS of 3 (mostly incomprehensible) scored 37% intelligibility by unfamiliar listeners.

Construction Industrial Multivariate Statistical Analysis based on real estate market in USA

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This project mainly focus on how the land market value, in terms of GDP, CPI, construction cost index and unemployment rate, inflation rate, population and purchasing manage index, enables a relationship with the real estate market and investment. We also apply the 34 years' national data for statistical multivariate analysis. Besides, we explore the qualitative and quantitative relationship among these economic variables at risk scenarios. We obtain how to add value to business through statistical modeling and apply skills set to real estate in a real world environment. Most importantly, we forecast the land market value and prospect the future trend of real estate market in USA. The goal in providing crucial statistical analysis of many variables in the real estate market is to enable government and investors to make informed decisions regarding real estate.

Utilizing Multiple Baseline Single Subject Design to Investigate the Impact of Neurofield Pulsed Electro Magnetic Field on Mental Health and Physiological Outcomes for an Individual with Post Traumatic Stress Disorder

Alisha Warf ¹ and Christopher Warf ²

Faculty: John Larson¹

¹ *Department of Psychology, Lewis College of Human Sciences*

This study examined the impact of Neurofield pulsed electromagnetic field technology on an individual with post-traumatic stress disorder. This individual was given a survey to assess her own anxiety before each treatment. In this single blind study, the participant was given 7 randomized baseline measures as a control. After the 7th baseline measure the participant received 14 Neurofield treatments. Approximately a month after treatment ended the participant's EEG scores were recorded and showed that Neurofield treatment had positively impacted the individual's EEG scores and her own self-report measure of her anxiety.

Food for Thought: A Qualitative Look into the Need for A Campus Food Pantry

Shelby Bowman, Ciera Dockter, Marcela Gimenez, Erik Young, Kayla Basham,
Maureen Ekundayo, Jessica Newman, Elnaz Parviz, Tyler Pennick, Chelsea Pini,
and Hannah Watkins

Faculty: Deborah Ballard-Reisch, PhD

Department of Communication Studies, College of Liberal Arts and Sciences

According to the Chronicle of Higher Education, ongoing research on campus food insecurity illustrates the seriousness of the problem and need for intervention. To assess the need for a campus food pantry at Wichita State University, researchers conducted three focus groups. Focus groups, facilitated group conversations, included ten questions assessing the need for a campus-based food pantry. Twenty-two participants, ranging in age from 17 to 40, took part in the study. Three themes emerged: nutrition, awareness of the need for a campus food pantry, and recommendations regarding the logistics of implementing a food pantry. Participants showed concern with food quality, suggesting healthy food options including fresh fruits and vegetables. All participants perceived the need for a food pantry and acknowledged the reality of food insecurity on campus. Moreover, students were concerned with establishing clear procedures for the management of the food pantry, including protecting the privacy of those who use it.

Increasing Student and Faculty Publication Through a Successful Research and Evidence-Based Practice Curricular Model in PA Education

Elena Watt and Allison Koester

Faculty: Sue Nyberg, PA-C, LaDonna Hale, PharmD
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For the physician assistant (PA) profession to continue to grow in autonomy and respect, PAs must be seen not just as medical literature consumers, but as contributors. Currently, PAs lag behind other health professions in publications. The capacity of PAs as researchers can be advanced through modeling the role of PAs in research and improving research and scientific writing skills and confidence. This poster describes a replicable model of the WSU PA Program's successful use of student research teams, faculty-driven research agendas, mentoring and statistical support, innovative and practical research avenues, and interprofessional and community collaboration to reduce workload and improve project quality, thus improving publication potential. The WSU PA Program 5-year average for student professional poster presentations is 21% and co-authored journal articles is 27%, arguably the strongest in the nation. This level of productivity and quality has been cultivated by a clinically trained faculty with limited financial resources.

World War II British Propaganda to The Home Front, Barrow-In-Furness – Weapons of Mass Destruction, Or Weapons of Mass Communication?

Hollie Weatherburn

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Some wars are fought and won with weapons of mass destruction, others with weapons of mass communication. When Britain and its Allies won WWII in 1945 there were many factors that made this possible, but what motivated an island of die-hards to stand up to the domination of Hitler? This study investigates the effectiveness of the Ministry of Information's food and conservation propaganda efforts on the small town of Barrow-in-Furness, Great Britain. Contextual analysis of posters and 20 oral interviews were conducted. Findings reflect that home front propaganda helped civilians adjust to wartime life. Propaganda led to austerity and created a sense of unity, responsibility, pride and trust, and boosted morale. Interviewees claimed the posters provided safe and helpful information that influenced how they adapted to wartime realities. Thus, Britain's success in WWII can be attributed to both its weapons of mass destruction and its weapons of mass communication.

Readmission Diagnosis, Patient Characteristics, and the Development of a Risk Assessment Tool to Decrease Stroke Readmissions

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Hospital readmission for stroke is a major concern, and identifying characteristics contributing to readmission during the patient's index admission is critically important. Prior studies lack a consistent approach in early identification and a process for preventing hospital readmissions. The purpose of this project was to identify the readmission diagnosis and characteristics of discharged stroke patients within 30 days, and subsequently develop a risk assessment tool to help prevent future readmission. Retrospective medical record review identified characteristics of readmission and index stroke admission. The most common readmission diagnoses were ischemic stroke, urinary tract infection, acute respiratory failure, and pneumonia. The characteristics of age 70-79; Caucasian; female; risk factors of hypertension, diabetes, and dyslipidemia; and frequency of complications during the index stroke contributed to a readmission in 30 days. Further evaluation of these characteristics is needed by applying the newly developed risk assessment tool to stroke patients to support the current findings.

Balance Capacity of Age Matched Male and Female Adolescents with Intellectual Disabilities

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Department of Physical Therapy, College of Health Professions

Sex specific norms for motor skills have been established to insure that normal differences in motor development between sexes are not interpreted as motor impairment. Although sex specific norms for gross motor skills of adolescents without disabilities has been reported, little research in this domain has been performed for youth with intellectual disabilities (ID). Six evaluations from The Bruininks-Oseretsky Test of Motor Proficiency (BOT-2) were used to evaluate the static and dynamic balance capacities of 123 males and 78 females with ID for age groups 12 through 17 years. A cluster analysis of 776 assessments revealed that although male mean scores tended to be higher, males scored significantly higher only in one age group (17 yrs) for one test (walking forward heel-to-toe). In addition, >50% of mean test scores were below age criteria for both sexes. Future research should include children (5-11 yrs) with ID.

Double-Branch Capillary Electrophoresis by Using Microfluidic Switch for Alternate Injections

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Capillary electrophoresis (CE) is an analytical tool which has gained great interests during the past decade. The main attractions of CE are its fast, high-throughput and highly efficient separations. However, conventional single branch CE system has faced the challenge when samples lack of appropriate internal standards. Thus, a double branch CE configuration is introduced here to solve this problem. We successfully fabricated the two branch microfluidic switch by using standard photolithography and PDMS prototyping. This two-branch switch was placed between the two sample supplies and an injection flow gate. Two samples were alternately injected and then separated by the CE system. The concentration of one sample was maintained constant as the standard while the other contained to-be-determined analyses. This method was able to compensate the effects due to potential drifting of the excitation light source, variation of light focusing, and/or fluctuation of sample injections, which was based on the assumption that the variation of experimental conditions between two successive injections was negligible. The results showed high reproducibility and stability achieved by the two-branch switch. This strategy would be especially valuable at situations when there are no appropriate internal standards for specific analyses.

Effects of Plant Protein Based Modifiers on Structures and Ferroelectric Properties of Dielectric Films

Zhuoyuan Zheng

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Department of Mechanical Engineering, College of Engineering

Plant proteins, as renewable and cost-effective natural resources, have gain increasing interests in non-food applications. In particular, with increasing environmental concerns of petro-polymers, biomass as substitution of traditional petro-polymers has become an important research area. In this study, soy protein isolate (SPI) has been studied as a functional modifier to tune ferroelectric behaviors of polymer dielectric films for advanced capacitor applications with desirable energy density and efficiency. To achieve this goal, SPI based modifiers were prepared via controlled denaturation and modification procedures. The modifiers were then applied to poly (vinylidene fluoride), a ferroelectric polymer. The ferroelectric analysis showed that the energy density and energy efficiency of resulting dielectric films can be effectively tuned by SPI based modifiers to satisfy different capacitor applications. To understand the mechanisms of these tunable properties, SEM, optical microscope, XRD and FTIR were utilized to characterize phase structures and crystal structures of the films.

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According to the Chronicle of Higher Education, ongoing research on campus food insecurity illustrates the seriousness of the problem and need for intervention. To assess the need for a campus food pantry at Wichita State University, researchers conducted three focus groups. Focus groups, facilitated group conversations, included ten questions assessing the need for a campus-based food pantry. Twenty-two participants, ranging in age from 17 to 40, took part in the study. Three themes emerged: nutrition, awareness of the need for a campus food pantry, and recommendations regarding the logistics of implementing a food pantry. Participants showed concern with food quality, suggesting healthy food options including fresh fruits and vegetables. All participants perceived the need for a food pantry and acknowledged the reality of food insecurity on campus. Moreover, students were concerned with establishing clear procedures for the management of the food pantry, including protecting the privacy of those who use it.

Synthesis, Analysis, and Characterization of Electrically Sensitive PVA Hydrogels Loaded with MTX Cancer Drugs

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The objective of the project was to achieve controlled the drug release under different applied voltages. For this purpose, polyvinyl alcohol (PVA) hydrogels loaded with methotrexate (MTX) were prepared via solution casting process, and by introducing sulfoacetic acid, structure was rendered electrically sensitive. Characterization of the hydrogel was studied by fourier transform infrared (FTIR) spectroscopy and all the expected peaks were observed from the results. Electrosensitivity behaviors was observed via bending test. Moreover, drug release study was performed on the MTX-loaded hydrogel strips placed in a sodium chloride (NaCl) solution under different voltages (0V, 5V, 10V, and 20V) using ultraviolet-visible (UV-Vis) spectrophotometer. Finally, cytotoxicity study was performed by MTT assay. The UV-Vis results confirmed that the controlled drug release could be achieved under different electrical voltages. MTT results showed the effectiveness of MTX on breast cancer cells and biocompatibility of hydrogels. It also confirmed the results obtained from UV-Vis spectroscopy.