PROGRAM & ABSTRACTS

6th Annual Symposium on Graduate Research and Scholarly Projects

April 23, 2010
Eugene Hughes Metropolitan Complex

Mara Alagic, GRASP Chair
2010 GRASP SYMPOSIUM

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# 6th Annual Symposium

**Graduate Research and Scholarly Projects—GRASP**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>8:00 – 8:30</td>
<td>Registration</td>
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<tr>
<td>8:30 – 8:45</td>
<td>Opening Remarks&lt;br&gt;Dr. Gary L. Miller,&lt;br&gt;Provost &amp; Vice President for Academic Affairs and Research</td>
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<td><strong>Keynote Address</strong>&lt;br&gt;Niall Shanks, PhD&lt;br&gt;Curtis D. Gridley Distinguished Professor of History and Philosophy of Science</td>
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<td>8:45 – 9:15</td>
<td>Good Scientific Methodology Underlies Ethical Research and Professional Practice&lt;br&gt;What ethical dilemmas graduate students face during their studies and later in their professional lives?</td>
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<tr>
<td>9:15 – 9:30</td>
<td>Refreshments and Poster Viewing in Gymnasium</td>
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<tr>
<td>9:30 – 10:30</td>
<td>Session 1 - Room 185</td>
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<tr>
<td>10:30 – 10:45</td>
<td>Break/ Viewing Posters in Gymnasium</td>
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<tr>
<td>10:45 – 11:55</td>
<td>Session 2 - Room 185</td>
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<tr>
<td>11:55 – 1:00</td>
<td>Lunch Break/ Viewing Posters in Gymnasium</td>
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<tr>
<td>1:00 – 2:20</td>
<td>Session 3 - Room 185</td>
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<tr>
<td>2:20 – 2:30</td>
<td>Break/ Viewing Posters in Gymnasium</td>
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<td>2:30 – 3:30</td>
<td>Session 4 - Room 185</td>
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<td>3:30 – 4:15</td>
<td>Break/ Viewing Posters in Gymnasium</td>
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<td>4:15 Room 132</td>
<td>Closing Remarks&lt;br&gt;President Donald L. Beggs&lt;br&gt;GRASP Awards</td>
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<td>Ranjith Kumar Krishnamurthi*</td>
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<td>Lisa Lutz</td>
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<td>Andres Reyes Gaige</td>
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<td>Stacy Tiemeyer</td>
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<td>Katherine Waller</td>
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<td>Brian W. Westhoff</td>
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<td>Michele D. White</td>
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<td>GP72</td>
<td>Elizabeth Winterbone</td>
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<td>GP73</td>
<td>Bangwei Zhang</td>
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</tbody>
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ABSTRACTS:
ORAL PRESENTATIONS

6th Annual Symposium on Graduate Research and Scholarly Projects
Using 3D Modeling to Enable Students with Quadriplegia

Phillip Baumer*
Faculty: Barry Baggett
School of Art & Design

Section 504 of the American Rehabilitation Act of 1973 states, no qualified handicapped person shall, on the basis of handicap, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity which receives or benefits from Federal financial assistance. The Foundations curriculum within the School of Art & Design at Wichita State University offers structured courses that introduce students to principles and theories in visual thinking. How do instructors enable a student with quadriplegia to fulfill the requirements of a 3-dimensional design foundation course that also emphasizes learning to handle equipment and tools properly in order to realize their designs? The approach was for the student to use a 3D modeling software as a way to design and construct concepts relating to the assignments in virtual space. It was equally essential that the instructor be familiar with the concept of teaching with the modeling software. While the learning curve for designing with 3D modeling software can be steep; there are a few programs that offer intuitive tools to speed up the process of taking an idea to full visualization. 3D modeling can prove very effective for visually conveying the students’ ideas in accomplishing the assignments and provides persons with quadriplegia a powerful tool for achieving design independence.

Fatigue Life Estimation of Notched Aluminum Sheet Specimens Subjected to Periodic Tensile Overloads

Floyd Caiado*
Faculty: K. S. Raju
Department of Aerospace Engineering

The objective of this study was to determine the applicability of an approach to predict the number of cycles of fatigue loading of a structure to failure. In the present investigation, notched structural elements were subjected to constant amplitude loading with a maximum stress of 15ksi and mean stress of 6ksi along with periodic tensile overloads of 20ksi. The fatigue lives of the specimens were determined experimentally. Miner’s rule was used to estimate the cycles to failure, and a second analytical approach, that incorporated the notch residual stress caused by the first overload in the Miner’s rule, was used to estimate the number of cycles of load to failure. The predicted fatigue life using the second approach agreed with the experimentally determined fatigue life better than that of the first approach.
Ecological Perspectives of Latino/Hispanic Families in a Rural School Community

Larry Callis*, Natalie Grant*, Doug Siemens*, Lance Stout*
Faculty: Jo Bennett
Department of Educational Leadership

Immigration waves from Mexico, Central and Latin America have changed demographic landscapes and in some communities, native Spanish speaking people are the majority (Lee and Bean, 2004; Louis, 2003; Reyes, Paredes Scribner, & Scribner, 1999). In schools across the U.S., growing numbers of students need not only English language resources but also cultural supports from their public schools (Reyes, Paredes, & Scribner, 1999; Valenzuela, 1999). Communities and schools have been impacted by this changing ecology and the need for understanding populations, families and individuals, and creating processes for teaching and learning that promotes success for every student has emerged. This study seeks to understand the worlds that the Hispanic/Latino families negotiate each day as they move through the interconnected and various ecologies of their existence: family systems, cultural norms, communities, and school. Through qualitative methodology, researchers gathered oral narratives from families in a rural Midwestern community to understand how Latino/Hispanic parents support their children in schools and define their relationship to their children’s education. The intention was to understand their perspective in order to propose adaptations in school practices that more closely match the experiences students know from their home environment.

Analysis of Differential Glycosylation Patterns of Human FSH

Carrie Chambers*, Bin Shuai, George Bousfield
Department of Biological Sciences

Follicle stimulating hormone (FSH) is a glycoprotein hormone with two subunits, α and β, and is required for gamete development. Our data suggest that estrogen is responsible for inhibiting the glycosylation of FSHβ in reproductive-age women, thus producing a di-glycosylated FSH with higher biological activity than the tetra-glycosylated form. The difference in glycosylation of two subunits is suspected to be due to activity of different oligosaccharyltransferase(OST) isoforms. OSTs are responsible for the first step in N-glycosylation. Factors including signal peptide hydrophobicity of α and β maybe contribute to selective usage of OST, and hence modulate N-glycosylation. Therefore our hypothesis is that N-glycosylation of FSH subunits is regulated by the differential interactions between OST isoforms and the signal peptides of each subunit, and the differential interaction is modulated by hormones such as estrogen. To test our hypothesis, we have genetically engineered chimeric hFSH subunits by swapping the signal peptide sequences of α and β. Constructs with the chimeric sequences were introduced into immortalized gonadotrope cell lines. FSH glycoforms expressed in the cell lines will be examined using Western Blot, RIA, and immunoaffinity chromatography. If our hypothesis is correct, then we would expect to detect unglycosylated α subunit in the transfected cell lines. The cell lines will be treated with estrogen and differences in FSH subunit glycosylation will be examined.
Rhetoric, Identity, and the Obama Racial Phenomenon: Exploring Obama’s title as the “First Black President”

Krystal S. Cole*
Faculty: Deborah Ballard-Reisch
Elliott School of Communication

In 2008, a nearly 200 year U.S. historical precedent was overturned when Barack Obama was named the “first Black president.” Although Obama is of mixed heritage, he adopted an almost singularly Black identity and has long been characterized by the media as Black. This study is concerned with the role that society and Obama’s acceptance of the title play in identifying and portraying him as the “first Black president.” This study compares Barack Obama’s self-portrayal in his book, Dreams from my Father, to mainstream and Black media portrayals of his race. Furthermore, it researches the existence of a racially stratified society by dividing racial constructs and determining the driving force behind the rhetoric of race.

Experimental Investigation of Progressive Crushing and Load Rate Effects of Wedge Type Crush Initiators of Laminated GFRP

Sana Fazal Elyas*, K.Y.Tan
Faculty: Suresh Keshavanarayana
Department of Aerospace Engineering

The results of an experimental investigation of the crush behavior, failure modes and rate sensitivity of axially compressed flat specimen made from Newport Nb 321/7781 composite prepreg are presented in this paper. Single bevel type trigger mechanisms were used to initiate the progressive failure mechanism. Quasi-static tests and dynamic tests were conducted at load rates ranging from $10^{-3}$ in/s to 10 in/s. The influence of 45° bevel angle, stacking sequence and failure modes were analyzed, to examine the brittle failure mechanisms related to crash energy absorption during compression of the flat plate specimens. Results indicate that energy absorption is highly influenced by the trigger bevel angle, load rate and stacking sequence. The peak load decreased with an increase in load rate and the failure modes varied with the stacking sequence.
A Study of External Stakeholders’ Perspectives of a Midwestern Community College

Mark Watkins, Heather Eubank, Shelia Rathbun, Maram Jaradat, Mohammad Mustafa, Janis Stucky,
Facutly: Sharon Goodvin and Linda Bakken

Department of Educational Leadership

A Midwestern community college hired a new president in 2003. Since then, community college personnel endeavor to improve institutional effectiveness, program quality, and perceived stakeholder value. The president expressed a concern that the institution's progress remains relevant to the needs of the stakeholders. This study was designed to ascertain data from external stakeholders of the community college regarding their current perceived value of the community college, what value it could bring in the future, and suggestions about moving from the present to the future. The qualitative study participants included high school seniors to obtain the views of prospective community college students, high school counselors who advise high school seniors, and sponsoring community members who pay property taxes in support of the community college. Surveys, interviews, focus groups, and documentation were utilized to collect the data. The findings from the data are presented in this study to be used by community college officials to incorporate into their strategic plans.

Kansas Physician Assistants’ Attitudes/Beliefs and Current Practices Regarding Implementation of Fall Prevention Strategies in Older Adults

Shelton J. Fraser*

Faculty: LaDonna S. Hale

Department of Physician Assistant

Falls among older adults are a significant economic and social healthcare issue. Evidence-based fall prevention guidelines exist but are not implemented in daily practice. Purpose: Evaluate attitudes/beliefs and current practices of Kansas physician assistants (PAs) regarding fall assessment and prevention strategies in older adults and barriers/facilitators to integrating strategies into daily practice. Methods: A 67-item, non-validated survey was mailed to all 760 Kansas PAs in 2009. Results: Findings show that 100% of PAs felt fall prevention was important and 95% thought falls were preventable. Although > 90% felt a professional responsibility to implement fall prevention strategies; 50% or less actually did so routinely. Conclusions: PAs believe fall prevention is important but do not routinely implement strategies due to time, staffing, and feeling ill-prepared.
Assessment of Bone Mineral Density in Forearms of Collegiate Ten-Pin Bowlers

Ashley R. Fryman*, Bryce M. Winklepleck, Ashley M. Hervey
Faculty: Jeremy A. Patterson
Department of Human Performance Studies

Physical activities involving high impact weight bearing forces are osteogenic to bone health. This is the first study assessing the effects of ten-pin bowling at an elite collegiate level on BMD of the bowling arm compared to the non-bowling arm. Purpose: To assess the BMD of the bowling arm and forearm compared to the non-bowling arm and forearm of collegiate bowlers. Methods: Dual Energy X-ray Absorptiometry Unit (Hologic QDR 4500W Elite) was used to assess BMD of bilateral arms and forearms of 25 (N=13 males, N=12 females) collegiate ten-pin bowlers (20.72 ± 1.46 yrs). Results: Forearm scans showed significantly greater (p<0.05) BMD in the bowling arm (0.635 ± 0.05 g·cm\(^{-2}\)) compared to the non-bowling arm (0.618 ± 0.06 g·cm\(^{-2}\)) of both male and female bowlers. However, when separated by gender, the females bowling arm showed a significantly greater difference between arms (4.06 ± 3.11% difference, p<0.05) and compared to the males (1.48 ± 2.62% difference, p<0.05). Total-body scans were also assessed and similar results were observed in the bowling arm compared to the non-bowling arms of males (3.81 ± 5.19%, p<0.05) and females (4.15 ± 2.54%, p<0.05). Conclusion: The bowling arm of elite level collegiate ten-pin bowlers demonstrates the increased response of BMD in the bowling arm and forearm when compared to the non-bowling arm.

Environmental Sustainability: Metrics and Definitions

Farnaz Ghazi Nezami*
Department of Industrial and Manufacturing Engineering

Corporate sustainability as a newly defined concept is based on five main pillars of environment, business excellence, innovation, governance and human contributions. Among these pillars, environment is an important one since it has a wide common area with other pillars. In this paper, environmental sustainability as an important challenge to achieve a sustainability program in any corporation is discussed. This paper develops some important metrics to assess the environmental sustainability program of any given corporation. Moreover, as there are some overlaps among environment and other pillars of sustainability, these similarities and overlaps will be discussed. Finally, the application of introduced metrics in top five Fortune companies will be illustrated in this project to accredit the practicality of the introduced metrics.
Synthesis of Highly Ordered Titanium Dioxide Nanotubes: Impact of Process Parameters

Shifath Ikram Khan *
Faculty: Ramazan Asmatulu
Department of Mechanical Engineering

Highly ordered arrays of Titanium dioxide nanotubes were synthesized from Titanium foil using the electrochemical anodization process in an etching solution consisting of Ammonium Flouride (NH$_4$F) and Ethylene Glycol. TiO$_2$ nanotubes have shown great potential in applications such as the new generation solar cells called the Dye Sensitized Solar Cells (DSSC). We examined the possibility of fabricating nanotubes of different lengths by varying the anodization parameters. The lengths and diameters of the synthesized TiO$_2$ were found to be governed by two main process parameters, current density and etching solution composition. The etching process was carried out in two different configurations. First, 55 volts DC was used to drive the etching process. The anodic current in this case was found to be between 0.07 to 0.01 amperes. Secondly, 55 volts DC with 5 volts AC was employed to carry out the etching process. The average anodic current was found to be higher in the second case. The recorded anodic current was between 0.1 to 0.01 amperes. The characterization of the synthesized TiO$_2$ was carried out using the Atomic Force Microscope (AFM).

Empowering Settings in Nicaragua: Hearing Some of the Voices of Nicaraguan Youth

Chris Michael Kirk*
Faculty: Rhonda K. Lewis-Moss
Department of Psychology

With one of the highest poverty rates in the Western Hemisphere and a remarkably young population, Nicaragua is a nation in which the challenges of the future lie in the hands of its youth. The empowerment of these young people is a vital asset in the development of future educational and economic success. The role of empowering settings in the development of individual empowerment is well-documented, and the characteristics of these settings have been described throughout the literature. Most of this research, however, has been centered in Western, developed nations. The purpose of this qualitative study was to gather information from the viewpoint of youth about their aspirations and the settings in which they interact. A total of 29 youth were interviewed. Participants identified three key community settings and several resource assets and deficits which contribute to the empowerment potential of these settings. These themes are compared to existing models of empowering settings and adolescent empowerment programs in order to explore their effectiveness in an international context. Limitations and suggestions for future research and intervention will be discussed.
The Preparation of Charged Anion Receptors to Bind Anionic Components of Bacterial Membranes

Manjula B. Koralegedara*
Faculty: Dennis H. Burns
Department of Chemistry

A receptor able to selectively bind a phosphatidylglycerol (PPG) head group is an attractive synthetic target as a modular component of an antimicrobial therapeutic. The major challenge to the preparation of such receptors, able to exclusively recognize this bacterial membrane component, is to create a binding motif that will complex a phosphorus anion, along with hydroxyl functionality, strongly and selectively in an aqueous environment. Herein we report the synthesis and binding studies of a family of charged hydrogen bonding receptors, with phosphate anion and with PPG anion monitored with proton NMR spectroscopy and Isothermal Calorimetry (ITC) to reveal the best fit with the anionic phosphate head group of the PPG.

Improving Adolescent Health Promotion

Kathleen A. Kottas*
Faculty: Betty Smith-Campbell, Karen Hayes
Department of Nursing

Adolescent patients often do not seek regular, preventive healthcare visits because they are essentially healthy. This makes it difficult to promote preventive healthcare with this population. New interventions that can increase adolescent health promotion must be identified. This project sought to determine if use of a prompting tool improved coverage of health promotion topics with adolescent patients. The design was an intervention study using a pre and post chart review of adolescent patients seen in a rural family practice clinic. The intervention was a health promotion prompting tool, which included six key topic areas: alcohol/drug use; injury/violence; tobacco use; nutrition; physical activity and sexual risk behaviors. The final sample included 40 charts audited prior to and after the intervention. The mean age of the sample population was 17 years of age and over 50% were female. A t-test at 95% C.I., was used to determine significant difference between pre and post prompting tool results. There was a significant improvement in documented discussion of Alcohol/Drug use topics (10% to 25%); Tobacco use (10% to 33%) and Nutrition (8% to 35%). Discussion of physical activity actually declined (48% to 38%). Overall mean coverage of all topics improved 9.2%. The results of this project found that the prompting tool can improve coverage of health promotion and disease prevention topics.
A Fornberg-like Method for the Numerical Conformal Mapping of Bounded Multiply Connected Domains

Everett Kropf*
Faculty: Thomas DeLillo
Department of Mathematics and Statistics

A new Fornberg-like method is presented for computing conformal maps from the interior of the unit disk with \( m > 1 \) circular holes to the interior of a smooth closed curve with \( m \) holes bounded by smooth curves. The method is a Newton-like method for computing the boundary correspondences and the conformal moduli (centers and radii of the circles). The inner linear systems are derived from conditions for analytic extension of functions defined on the circles to the interior domain. These systems are \( N \)-point trigonometric discretizations of the identity plus a compact operator and are solved efficiently with the conjugate gradient method at a cost of \( O(N^2) \) per step.

Data Redistribution Problem in Data Intensive Sensor Networks

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We tackle the data redistribution problem in data intensive sensor networks, which concerns how to redistribute the large volume of sensory data into the sensor networks wherein sensor nodes have limited storage space and battery energy. The goal of the problem is to minimize the energy consumption incurred by data redistribution, while fully utilizing the storage capacity in the DISNs. We first show that this problem is equivalent to the balanced assignment problem, which can be solved by the well-known Hungarian algorithm. However, there are two limitations of this approach. First, the Hungarian algorithm gives \( O(Nm) \) time complexity where \( N \) is the total number of sensor nodes in the network and \( m \) is the average storage capacity of each node. Second, Hungarian algorithm is a centralized algorithm, which cannot be easily implemented in a distributed manner. In our work, we design a fully distributed, highly scalable, and efficient data distributed mechanism, which is also adaptable to network dynamics such as dynamic data generating and node failure. Using our own simulator (written in C language) we show that our distributed algorithm outperforms the existing data redistribution techniques in sensor networks in terms of energy consumption for data redistribution.
Does the Use of Interest Rate Swaps Matter?

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Department of Economics

This project analyzes the effectiveness of employing interest rate swaps to weather U.S. monetary announcement effects. First, this paper shows that assets prices react to the surprising component of the federal funds rate changes rather than the raw interest fluctuations. Having identified fixed and floating rate payers, the following research employed the two-stage regression analysis. I first generate the magnitudes of individual company’s and industry’s reactions to the monetary announcements. The subsequent magnitudes are stored as dependent variable observations for the second stage cross-sectional analysis. Firstly, this study presents the different responses to monetary shocks across various industries. Among the 56 industries classified by 2-digit standard industry code, the financial service sector reacts to the monetary shocks most aggressively, followed by durable goods industries. Additionally, this study provides the evidence that there are benefits for fixed-rate payers when the Fed tightens the money supply, but the expected adverse effects on floating-rate payers are not observed. Finally, the paper explains the sensitivities of the stock returns using companies’ balance sheet information in conjunction with their positions in interest rate swaps contracts.

Crucial Edge Detection in Sensor Systems
Under Energy Constraints

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Although the wireless sensor nodes available today may be equipped with rechargeable batteries, the minimal energy capacity and low recharge rates hinder the sensor's lifetime and achievable performance. Sensor loses energy predominantly because of the redundant transmissions of sensed data. To avoid this, a sensor is modeled to transmit only the changes sensed in the event occurrence process, referred to as Transitions or Crucial Edges. For the proposed sensor model, we have developed a near-optimal decision-making policy. The policy, designed for a single rechargeable sensor, addresses the question “how long should the sensor sleep, and how long to stay active?”
Pediatric Adverse Drug Event Occurrence in a Community Hospital

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Hospitalized children are at greater risk for adverse drug events (ADEs) due to varying size, development and lack of pediatric specific dosing. The project determined ADE rate for 40 randomly selected pediatric hospitalized inpatients utilizing the Pediatric-Focused Trigger Tool in a retrospective review. 171 triggers revealed 10 unique ADEs involving 8 patients, including ICU, general unit, and ER. Mean ADE rates were 25/100, 47.84/1000 days and 28.01/1000 medication doses, 50% preventable. Constipation and oversedation were common. Opiates and benzodiazepines/anti-epilepsy medications were associated with ADEs. Thirty percent required initial or prolonged hospitalization. ADE rates in a community hospital were higher than the rates reported for children’s hospitals. This rate will serve as a benchmark as new safety measures are implemented.

Data Replication in Data Intensive Scientific Applications with Performance Guarantee

Dharma Teja Nukarapu
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Department of Electrical Engineering and Computer Science

Data replication is well adopted in data intensive scientific applications to reduce the data file transfer time and the bandwidth consumption. However, the problem of data replication in Data Grids, an enabling technology for data intensive applications, is proved to be NP-hard and even non-approximable. Previous research in this field is either theoretical investigation without practical consideration, or heuristics-based with little or no theoretical robustness. We propose a data replication algorithm, which not only has provable theoretical performance guarantee, but also can be implemented in a distributed and practical manner. We design a centralized replication algorithm, which reduces the total data file access delay at least half of that obtained from the optimal solution. Our centralized replication technique can be easily implemented in a distributed manner, which can be adopted in a distributed environment such as the Data Grid. Through extensive simulations, using our own simulator, we show that our centralized replication algorithm performs comparably to the optimal algorithm under different network parameters.
Determining if Factors Affecting NHL Attendance Are Equal Across Geographical Regions

John Provenzano
Faculty: Jenchi Cheng
Department of Economics

This paper estimates a nightly demand model for National Hockey League attendance for five teams from different divisions. The magnitudes of the coefficients are compared for each team to determine if factors that influence attendance affect each team the same. All variables except games played in October were found to be statistically different between at least two teams. Games played between division opponents and previous season success had the largest regional variation while “calendar” variables (weekend and games played in March and April) have the lowest regional differences. The analysis shows that a general attendance model of the NHL is inaccurate and can cause misleading interpretations for purposes of marketing and profit maximization.

The Effects of Hamstring Stretching on Vertical Jump in Healthy Young Adults

Jamie Stewart, Maria Shields, Donya Goman, Karson Craig*
Faculty: Barbara Smith
Department of Physical Therapy

In physical therapy, a large portion of the patient population consists of non-athletic individuals. Therefore the purpose of the study was to achieve a better understanding about the use of a stretching program prior to activities that non-athletes perform that require power, such as vertical jump. Twenty-seven non-athletic individuals were measured for hamstring flexibility, performed a vertical jump, and were divided into control and a treatment groups. The treatment group was assigned a 6 week stretching program while the control group was instructed to continue their normal activities. A pre and post sit and reach measurement was taken to evaluate hamstring length. A pre and post vertical jump measurements were obtained for all participants. A mixed design ANOVA will be used to evaluate whether stretching causes changes in vertical jump. A correlation coefficient will be used to determine a relationship between change in hamstring length and change for vertical jump height. It is anticipated that there will be no significant difference between the control and the treatment groups in power output measured by vertical jump.
Biomimetic Solar Cells

Navaneetha K. Subbaiyan
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Department of Chemistry

Eco friendly energy resources are becoming important due to the predicted oil depletion and soared CO\textsubscript{2} emission. Of available alternatives, solar energy finds special attention due to its vast availability and has enormous power of 1000 watts per square meter. Various mechanisms have been carefully employed to harness the solar power including photovoltaic, inorganic/organic dye sensitized or bulk heterojunction solar devices. Some of these devices utilized donor-acceptor supramolecular systems designed mimicking natural photosynthesis. Self-assembly of energy donor and acceptor is an important criterion for harvesting sunlight efficiently.

Here, we demonstrate an elegant method of self-assembly to modify TiO\textsubscript{2} surface using coordinating ligands followed by immobilization of variety of sensitizers and dyads. In this method, in addition of testing the photoelectrochemical behavior of different zinc tetrapyroles, it also allowed us to introduce fairly complex structures involving more than one donor entities. Of all macrocycles studied, zinc porphyrin-ferrocene dyad markedly improved the current-voltage performance of the photoelectrochemical cell due to an electron transfer-hole migration mechanism. Incident photon-to-current efficiency values up to 37\%, highest values ever reported for this type of electrodes was obtained for the electrode modified with the dyad, highlighting the importance of photocells built based on biomimetic principles for efficient harvesting of solar energy.

Customer Service in Financial, Communications and Professional Service Companies in Nigeria: Impressions of Lagos Industry Executives

Chigozirim Utah
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Elliott School of Communication

Nigeria, notorious for its overdependence on oil, is the eighth largest oil producer in the world, and the largest in Africa, generating over 2 million barrels of crude a day. Yet, instead of transforming the country into one of the most prosperous in the continent, Nigeria's abundant natural resources have enriched a small minority while the vast majority remains impoverished. Violence and instability in the oil-rich Niger-Delta region coupled with the capriciousness of oil prices have stimulated the nation's quest for economic diversification. Service sector growth is particularly promising. Increased privatization, foreign investment and globalization have served to stimulate growth in service companies, especially in telecommunications, financial and professional services. This study seeks to explore the role and definition of customer service in service companies located in Lagos, (the commercial hub of Nigeria), and how customer service practices are evolving and contributing to the development of the service sector. Interviews with service sector executives will be analyzed through thematic analysis to draw out insights into the emergent customer service culture in Lagos.
ABSTRACTS:
POSTER PRESENTATIONS

6th Annual Symposium on Graduate Research and Scholarly Projects
Review on Heat Affected Zone (HAZ) in Laser Machining

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Laser machining being a non-contact process possesses several advantages such as no tool wear or damage and no contact force induced problems. Laser cutting involves thermal process and it does not depend on the strength and hardness of the work piece, thus making it ideal for cutting non-homogeneous material. In this research work several papers related to the heat affected zone (HAZ) of laser machining of CFRP and GFRP are reviewed. It was found that laser parameters such as specific laser energy, laser power, repetition rate, work piece temperature determine the extent of HAZ. In CFRP HAZ in perpendicular laser grooving is much higher than that in parallel grooving. Presence of nitrogen jet decreases the work piece temperature leading to lower HAZ. Observations of the HAZ area of CFRP material revealed fiber swelling of 50 or 60% and fibers near the top are seen to curl up. In case GFRP charred black material called shell and melted glass fibers are observed in the HAZ. It is also observed that the extent of HAZ affect the static tensile and bending strengths of CFRP. Tensile strength reduces linearly as HAZ increases. A comparison of laser cutting on CFRP using three types of laser is also presented here. Nd:YAG laser cutting on CFRP at optimized parameters produce least HAZ and highest bending strength.

Translating Vortex Pairs with Prescribed Profiles

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Department of Mathematics

We generate translating vortex pairs with smooth or more arbitrary profiles that reflect modern vortex pairs being generated using prescribed domains of vorticity. Instead of prescribing the domain, we fix the area of the vorticity and iteratively generate the vortex by prescribing the profile function defining the vorticity, which as a side effect produces a domain of vorticity dependent on the profile function and area. A large class of previously developed and new translating vortex pairs is developed for almost arbitrary vortex profiles using this methodology. This is further enhanced to produce solutions for flows on a rotating sphere.
Accelerometer-determined Relationship between Physical Activity & Functional Fitness in Older Adults

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Physical activity is critically important for older adults to delay the onset of functional limitations, maintain independence, and improve quality of life. As the aging population grows and the effects of physical inactivity proliferate in the United States, determining the amount and intensity of physical activity necessary to maintain functional ability is significant. Therefore, the purpose of this cross-sectional project was to elucidate the relationship between physical activity and functional fitness in a sample of older adults. An additional aim was to examine current recommendations with respect to physical activity and health. Given the nature of this study and the large number of subjects required to create a useful database, 100 female subjects were recruited from local community centers, senior centers, retirement communities, and other senior-based programs. When logistically possible, data collection was conducted at the site of recruitment (i.e. community center); alternatively data collection occurred on the WSU campus. Assessments included basic measures of demographics, height, weight, and body mass index. Daily physical activity was monitored for 2 weeks by a Lifecorder PLUS accelerometer. Accelerometer variables analyzed were: a) footsteps and b) intensity of physical movement ranging from 0 (low intensity) to 9 (high intensity). Functional fitness measures included chair stand, arm curl, chair sit and reach, back scratch, 8’ up and go, and 12-minute walk. Time required to administer assessments was approximately 1 hour/20 subjects. Data were screened for outliers, and assumptions of normality and homoscedasticity. Analysis consisted of both parametric and non-parametric statistics and included descriptive, frequencies, correlations, t-tests, and one-way analysis of variance.
Perceptions of U.S. Physicians Regarding the Entry-level Doctoral Degree in Physician Assistant Education: A Comparison Study with Physician Assistants (PA) and PA Faculty

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Many health care professions have implemented the entry-level clinical doctorate, but the PA profession has not done so to date. Prior to this study, only PAs and PA faculty have been extensively surveyed about their perceptions of the Doctorate of Physician Assistant (DPA). The purpose of this study was to compare the perceptions of practicing PAs and PA faculty with physicians regarding an entry level DPA degree, utilizing the same survey. Methodology: This cross-sectional study surveyed representative samples of PAs, PA faculty, and physicians in the U.S. regarding their perceptions of the DPA. The results were analyzed using descriptive and chi-square statistics. Results: Overall, physician responses were less congruent with PA and PA faculty responses. For example, PAs (79.1%), PA Faculty (95.1%) and physicians (56.2%) agreed that the master’s degree was sufficient for PA practice. A larger percentage of PAs and PA faculty disagreed with the statements: the DPA should be the entry level degree (PA=82.8%; PA Faculty=89.8%; Physician=55.9%) and DPA was necessary to deliver the highest standard of care (PA=83.1%; PA Faculty=95.1%; Physician=56.5%). Conclusion: This study illustrates the perceptions of those in and around the PA profession, in particular, PAs and PA faculty who were not supportive of the DPA. However, the results raise some questions about the perceptions of physicians. If the move to the DPA is considered in the future, information and data from this study may be beneficial.

Comparative Binding Studies with a Tetraurea Picket Porphyrin Receptor Using $^1$H NMR and Isothermal Titration Calorimetry

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The determination of anion binding constants using $^1$H NMR and Isothermal Titration Calorimetric (ITC) reveals the occurrence of several specific and unspecific binding steps. In general, ITC reports on all specific and unspecific binding processes of the whole system, whereas a typical NMR probe details the thermodynamic properties associated with the binding of the anion to the receptor. For example, the ($\alpha, \alpha, \alpha, \alpha$)-5,10,15,20-tetrakis (2-(4-fluorophenylurea)phenyl) porphyrin binds strongly ($K(M^{-1})>10^4$) to chloride anion, and close to 2-3 orders of magnitude less to acetate anion, in DMSO-$d_6$ as revealed by $^1$H NMR titration studies. However, acetate anion showed stronger binding than chloride anion when ITC analyses were done. Thus, the binding studies’ results vary with the use of instrumental method. Other significant differences observed in the behavior of anion binding with the porphyrin receptor when using the two probes will also be addressed in this report.
Testing homogeneity of a parameter matrix with some rows constrained by synchronized order restrictions

Arijit Banerjee  
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Department of Mathematics and Statistics

A multivariate linear regression model $Y \sim N(\beta M', \Sigma)$ is considered where some of the rows in the coefficient matrix $\beta$ are constrained by synchronized order restrictions. A test scheme is derived for the homogeneity of the coefficient matrix using the likelihood-ratio test procedure under the assumption that the coefficient matrix $\Sigma$ is known. When $\Sigma$ is unknown, a new ad-hoc test statistic $T_H(Y)$ is proposed by replacing the covariance matrix with its estimator, where $H$ is a non-empty subset of the row-index space $\{1,2,\ldots,p\}$. The properties of $T_H(Y)$ are studied using a transformation without assuming the randomness of $Y$. A theorem is stated on the distribution of $T_H(Y)$ which eventually helps us to estimate $p$-values using the Monte-Carlo method by simulation.

Contextual Characteristics of Physical Activity in Children with Intellectual Disability Through Accelerometry and Time Diaries, Weekday vs. Weekend MVPA

Kenny Barry*, Matt Hagenmaier, Brian Miller, Victoria Smith  
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Department of Physical Therapy

Health-enhancing physical activity (i.e. moderate-to-vigorous physical activity, MVPA) during childhood is vital for optimal development and lowers incidence of obesity and related co-morbidities. Youth with intellectual disabilities (ID) are suggested to be less active than peers, and no measure of intensity levels and time spent in the MVPA range has been made outside of school. Telephone time diaries (TTD), in conjunction with accelerometers, would provide these levels and time of all daily PA (physical activity). The purpose of this study was to determine the feasibility of monitoring the contextual characteristics (CC) of PA of youth with ID over a 7-day period using TTD. Three children with mild ID participated in this study. Objective PA was gathered using the ActiGraph GT1M accelerometer, and subjective PA with TTD. Descriptive statistical analyses were conducted which broke down PA time spent in different intensity levels (e.g., sedentary→vigorous), in various settings. The data collected showed that mean weekend MVPA > weekdays MVPA. CCs of PA were determined using accelerometers and TTD over a 7-day period. The TTD were found to be a feasible method of monitoring the CC of PA of children with ID.
The Effect of Hippotherapy on Children with Developmental Delay

Abby Belcher*, Kelli Methvin, Amy Wiebe
Faculty: Candy Bahner
Department of Physical Therapy

The purpose of this study was to determine the effect(s) hippotherapy has on children diagnosed with developmental delay as measured by the Pediatric Evaluation of Disability Inventory (PEDI). Although researchers have shown the benefits of hippotherapy on functional abilities of children with cerebral palsy, these benefits cannot be generalized to children diagnosed with developmental delay. It was hypothesized that hippotherapy would improve functional abilities in children with developmental delay. Subjects included three children ages two to six years with a diagnosis of developmental delay who were enrolled in a 10-week hippotherapy session at Prairie Meadows Therapeutic Riding Center. The results were analyzed descriptively due to the small sample size and a floor effect shown by the participants. As hypothesized, the children made some increases in their functional abilities. However, the sample population of children whose functional abilities vary daily displayed inconsistent results, and therefore the outcomes did not show significant overall improvement.

The Effect on Channel Knowledge in Relay System

Yu Bi
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Based on [1], we will focus on a relay system which consists of a source, a destination and a relay which assists the transmission from source to destination by Amplify-and-Forward (AF) relaying protocols. To ensure that the power budget on the relay node is not violated, an amplification coefficient is applied at the relay node which can be classified by (1) Average amplification coefficient. In this case, only the second order statistics of the channel is known. (2) Instantaneous amplification coefficient. In this case, the full channel information of channel is known at the relay.

We focus on the effect of the channel knowledge at relay node in terms of ergodic channel capacity. Intuitively, the channel knowledge should bring higher data rate. However, an interesting observation we obtained is that, the instantaneous amplification coefficient does not provide higher ergodic channel capacity in AF relaying than the average one. The contribution of this work is the theoretical derivation of the channel capacity and error probability under both instantaneous and average amplification coefficients, and obtaining useful insights on the tradeoff on the data rate and the knowledge of the channel knowledge at the relay node.
Impact of Lower Extremity Muscle Fatigue on Performance of the Star Excursion Balance Test in Healthy Volunteers

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Department of Physical Therapy

Examining the effects of lower extremity muscle fatigue in regards to performance on the Star Excursion Balance Test (SEBT) is the purpose of this study. The hypothesis is that the SEBT performance will be altered following fatigued conditions. The SEBT required participants to reach in eight directions three times and the average of the reaches was recorded as distance reached. An isokinetic dynamometer fatigued three muscle groups in 32 healthy participants aged 18-30. Fatigued muscle groups included the knee extensors, hip abductors, and hip extensors. Each was fatigued in three separate experimental sessions all one week apart allowing for adequate recovery time. Prior to experimental sessions, a baseline measurement was taken. Muscle fatigue was reached when the isokinetic force output for each muscle group was below 50%. After fatigued, the SEBT and reach distances were measured. Statistical results were based on a repeated measures ANOVA. Fatigue of the knee extensors, hip abductors and extensors by at least 50% significantly affected performance negatively on the SEBT as a whole. When implementing the SEBT clinically, scores may be negatively affected if the SEBT is done following therapeutic exercise.

A Preliminary Investigation of the Speech Productions of Children with Hearing Loss

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Children with severe hearing loss (HL) generally experience considerable difficulty developing intelligible speech. Most investigators have analyzed individual sound productions (e.g., /f/ as being totally correct or incorrect) without consideration of types of errors or patterns. This study was designed to evaluate phonological deviation patterns (e.g., final consonant deletion, cluster reduction) of children with HL. Fifty object-naming word productions of 12 children between the ages of 4 and 10 years were audio recorded and also transcribed phonetically at the time of utterance. Deviations were analyzed phonologically. This poster will compare the phonological deviation patterns of children by age, degree of hearing loss, assistive listening device (e.g., cochlear implants, hearing aids), and age of speech intervention onset.
Kansas Physician Assistants’ Attitudes and Beliefs Regarding Spirituality and Religiosity in Patient Care

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Department of Physician Assistant

Objective: The relationship between religiosity and spirituality (SR) and health outcomes is well established, however attitudes and beliefs of Physician Assistants (PAs) regarding SR in patient care is not well studied. The objective was to explore PA's attitudes and beliefs regarding SR in patient care.

Methods: Surveys were mailed to all PAs who were active members of the Kansas Academy of Physician Assistants. Questions included demographics, personal SR beliefs, and attitudes about SR in patient care.

Results: Respondents (334) were mostly white (94%) and female (68%); average age was 41 and most reported having a religious affiliation (93%). Significantly more PAs who report being religious agree that should be aware of patients’ S/R (p = .01) and that it is their role to address patients’ S/R needs (p < .001) than those who don’t report being religious. Significantly more PAs who report being spiritual agree they should be aware of patients’ S/R (p=.02) and that it is their role to address patients’ S/R needs (p < .01) than those who don’t report being spiritual.

Conclusion: PA's attitudes regarding spirituality and religiosity in the patient encounter is associated with their personal spirituality and religiosity beliefs.

Factors Influencing Physician Assistant Practice Location in the United States

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Department of Physician Assistant

Currently, certain rural areas of the country suffer from inadequate access to health care providers. The purpose of this cross-sectional survey of 2,000 practicing PAs from the United States was to determine the number of PAs from rural areas who returned to a non-urban area after graduation and the factors that influenced their first practice location choice. Nearly one-half of respondents self-identified as graduating from a non-urban community high school, yet only one-third practiced in a similar community upon graduation. Many factors other than an individual’s community size prior to PA training were related to first job selection. Chi-square analyses revealed six factors of significance (p<.05) in relationship with demographic variables in determining their first job, including: benefits and incentive programs offered by employer; hours of work required per week; significant other support of location; medically underserved designation of practice site; quality of surrounding schools; and quality of life for the entire family. Existing efforts focusing on recruiting Physician Assistants will be futile if the factors influencing practice location are not taken into consideration in order to help provide the underserved areas in the US with better access to health care.
A Fuzzy Multi Objective Model for a Green Generation Expansion Problem

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In this project, a comprehensive fuzzy multi-objective model is presented for generation expansion planning problem considering uncertainty in objective functions and demand constraint. The purpose of the model is determining the optimal generation amount in existing and new generation units along with calculating the transmission energy volume and required amount of imported fuel regarding emissions and environmental impacts. As the proposed model considers four fuzzy minimization objective functions, a fuzzy linear programming approach is applied to solve the proposed model by transforming the fuzzy multi-objective model to a crisp single objective optimization problem. A case study is presented to illustrate the impacts of different factors such as changes in prices and environmental risks, etc.

Phylogeny of The Tribe Cyclocephalini (Coleoptera: Scarabaeidae: Dynastinae): A Combined Analysis of Morphology and Molecular Loci

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Phylogenetics provides information about evolutionary relationships and is an essential tool in understanding broad patterns within groups. The scarab beetle tribe Cyclocephalini (Coleoptera: Scarabaeidae: Dynastinae) includes 15 genera and approximately 500 species that are distributed primarily in the New World. Species in the group are important pollinators of aroids, palms, and lilies; some are agricultural pests; and a few are invasive in areas where they have been introduced. This group as a whole has only been examined in a strictly alpha taxonomic way. While individual species of economic importance have been studied, the monophyly of the tribe and relationships of genera has not been addressed. A phylogenetic framework of this group will be an invaluable tool in predicting invasiveness of species in new environments; understanding co-evolution and pollination with host plants; and examining the evolution of interesting biological characters. Using molecular and morphological methods, my research will be the first to examine the phylogeny for this tribe of beetles.
Social Stories: A User-Friendly Intervention?

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Department of Counseling, Educational, and School Psychology

Social Stories™ are a popular intervention used to address the social impairments of children with Autism Spectrum Disorders (ASDs). The extent to which Social Stories™ are user friendly was examined in this research. Fifteen parents and professional educators read a condensed version of Gray’s guidelines and then wrote a social story. Then, they wrote a second story after additional training. Participants demonstrated limited knowledge of the components of social stories after only reading the condensed version. They had the most difficulty with writing the sentence types correctly. After the additional training, participants demonstrated increased knowledge and skill of the major aspects of writing Social Stories™.

A Preliminary Investigation of Eye-Gaze Patterns on Fast-mapping Abilities of Children with ASD

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Department of Communication Sciences and Disorders† & Department of Psychology

Research on eye-gaze patterns with children has suggested that storybook reading is a picture-focused activity, implying that children’s eye-gaze is primarily focused on the picture versus the text. Further research with written fast-mapping (FM) skills has indicated that children acquire orthographic images of words during story reading after minimal exposures. Limited research, however, has been conducted on the FM or orthographic skills of children with autism spectrum disorder (ASD). The research purpose was to investigate the eye-gaze patterns of children with ASD when presented with novel words and pictures to assess their orthographic and written FM abilities. Twin six year old boys with ASD and 2 seven year old typically developing (TD) boys participated in this pilot study. FM skills were assessed by presenting 12 novel words paired with pictures of novel objects through a storybook context presented on a computer. After each presentation, participants were asked to generate the novel word through a written response and receptive identification. Eye-gaze patterns were analyzed using Tobii Studio 2.0.1 eye tracking software program. The results indicated that the ASD group was more focused on the images versus text as compared to the TD group. Receptive FM displayed a positive trend with fixation count and duration; whereas written FM revealed a negative trend.
Physician Assistant Attitudes on the Risks to the Public Involved When Wearing Contaminated Work Attire Outside of the Medical Setting

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Department of Physician Assistant

It is relatively common to see healthcare employees in their uniforms outside of the workplace. Research has shown that microorganisms can be transmitted from patient to employee, resulting in concern that pathogens on the uniforms may then be spread to other individuals. The purpose of this study was to investigate the perceptions and practices of physician assistant (PA) students and practicing PAs in Kansas regarding the manner of wearing medical uniforms outside the clinical setting. A majority of respondents (82%) to an email survey admitted to wearing medical uniforms outside the clinical setting. Professional organizations should consider the development of educational programs to increase awareness of the possibility of disease transmission from clothing worn in the clinical setting.

Separation of Metallic and Semiconducting SWNTs by Density Gradient Ultracentrifugation and Formation of Donor-Acceptor Hybrids using Porphyrins

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Density-gradient ultracentrifugation (DGU) is one of the successful techniques for separating metallic and semi-conducting single wall carbon nanotubes. In the present investigation, HiPCo SWNTs have been separated using DGU on a sucrose gradient medium. The nanotubes thus separated were characterized by near-IR absorption and emission, as well as Raman spectroscopic techniques. Further, using semi-conducting SWNTs, donor-acceptor hybrids were formed via ion-pairing of water soluble cationic porphyrins. Both steady-state and time resolved emission studies revealed efficient quenching of the singlet excited state of porphyrins in the nanohybrids, suggesting either electron or energy transfer from the excited porphyrins to SWNTs. Further investigations are underway using different sizes of separated SWNT with suitable donor molecules to study the photochemistry of the donor-acceptor hybrid and also building organic solar cells.
Effects of Body Position and Vision on Speech Understanding

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Participants were 32 adults (eight in a pilot study and 24 in a main study) between the ages of 18 to 39 years old who spoke English as their first language. All subjects first completed screenings of hearing, vision, balance and ocular-motor function. Subjects who passed screenings then completed speech-in-noise tasks in the sound field in which they repeated back randomized lists of 20 sentences from the BKB-SIN Test. Sentences were heard under four different conditions: With each participant sitting and standing with their eyes open or sitting and standing with their eyes blindfolded. To maintain blindness in data collection, one examiner adjusted the test conditions while another examiner scored subjects responses. The pilot study suggested that the four different conditions produced differences in Signal-to-Noise Ratio-50s among the participants. The main study is nearly completed as of this submission. Data, however, will not be analyzed until all 24 subjects have been tested. At that time, data will be analyzed using a 2-way within-subject by within-subject ANOVA. This normative research is the first of several inter-modality studies planned at this laboratory addressing speech understanding in younger and older persons with normal or impaired balance, vision, and hearing. This normative research is the first of several inter-modality studies planned addressing speech understanding in individuals with normal or impaired balance, vision, and hearing.

Scholarship of Teaching: What Do PhD Students Know?

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The development of the Scholarship of Teaching and Learning (SoTL) is essential to foster learning for all students and to enhance the practice and profession of teaching. Little is known about the knowledge PhD students have about the SoTL or the value they place on it. The purpose of this study was to assess the understanding and intended use of the SoTL by PhD students. An online survey was sent to 61 CSD programs in the United States and Canada. The results indicated that PhD students may have heard of the term SoTL but over a third of the participants did not have a working model. Also, many participants did not distinguish between the different levels of scholarly teaching.
CFD Modelling of Rectangular Microchannel with Increase in Heat Flux and Effect on Nusselt Number

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Faculty: Ikram Ahmed
Department of Mechanical Engineering

A laminar convective heat transfer coefficient of a rectangular microchannel is investigated under constant heat flux value throughout the wall. Two dimensional numerical simulations were performed using the FLUENT and GAMBIT software packages for a rectangular microchannel with a breadth of L and a length of 200L. Based on the temperature distributions obtained from simulations, both the local and average Nusselt numbers for different Reynolds numbers ranging from 100 to 400 for different heat flux values are determined.

PI Controller Design for Robust Stability of a Steam Generator Unit in the Presence of Additive Uncertainty

Manoj Gogoi*
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Department of Electrical Engineering and Computer Science

In this paper, a graphical design method for finding all achievable Proportional Integral (PI) controllers that stabilize a non-reheat steam generator unit for a range of plant parameters has been introduced. Single-Input Single-Output (SISO) modeling for the single area non-reheat steam generator unit is presented. Stabilization of this control system is critical for Automatic Generation Control (AGC), which has a primarily goal of matching consumer load demand with the generator electrical output. Additive uncertainty method is used to describe the uncertain perturbed system for simplification of design. The ability to graphically select PI controllers for a system with additive uncertainty is unique and operator friendly. A key advantage of this procedure is that it depends only on the frequency response of the system and does not require the plant transfer function coefficients. This simplifies the complexities involved in plant modeling, which in turn enables the designers to place more emphasis on obtaining robust stability.
Characterization of Drug-Carrying Nanocomposite Spheres for Targeted Drug Delivery

Janani Sri Gopu*, Heath Misak
Faculty: Ramazan Asmatulu
Department of Mechanical Engineering

Active targeted drug delivery occurs when a drug is associated with a biodegradable polymer and a bio-targeting compound and administered to the site of interest. In this study, these nanocomposite spheres are characterized using various techniques. In-vitro characterization of the nano-spheres containing therapeutic agent and fluorescence molecules are accomplished by culturing live cells in microscopic cells, and introducing the nano-spheres. In-vivo studies are conducted using immune-deficient mice. Other characteristics such as release rates, percent entrapment efficiency and size are studied with UV-Vis spectroscopy, TGA, and TEM.

Car Talk: Gender-specific Observer Communication at the Kansas State Fair Nostalgic Car Show

Melissa Granville*
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Elliott School of Communication

The Kansas State Fair (KSF) Nostalgic Car Show provides an environment where both male and female observers can showcase their communication style. The focus of this research was designed to address the research question: “What are the gender differences or similarities in communication among observers at the Nostalgic Car Show?” The grounded theory [2] and Boyatzis’ method of thematic analysis [3] were used to yield insights into the similarities or differences in communication among male and female observers at the car show. Findings indicated that male initiated communication is more technical and female initiated communication is more aesthetically based. The data implies that context is not an important factor in influencing gender and communication style. Furthermore, females and males at the KSF Nostalgic Car Show communicated in stereotypical manners consistent with research on general biological sex differences in communication.
Sources of Permian Sediments in the Turpan Basin, NW China

Wei Guan* and Brad Jeffrey
Faculty: Wan Yang
Department of Geology

The location, lithology, and unroofing history of provenance affect the type, amount, and texture of sediments filling half grabens. Both distant Northern Tianshan arc and proximal local horsts are possible sources of Permian sediments in the Turpan basin, NW China. Petrographic and stratigraphic data were used to identify the main source and to reconstruct its unroofing history. Stratigraphic data suggest sediments deposited in fluvial and lacustrine deltaic environments. 1500 grains in 5 arenites were counted. Two petrofacies, A and B, have compositions of Q5F7L88 and Q32F8L60, respectively. The lithics are mainly volcanic, indicating the Tianshan arc was the main source. The dominance of volcanic grain and rarity of quartz in Facies A suggest an undissected Tianshan arc during initial arc unroofing; the significantly increased quartz in Facies B suggests a transitional arc where intrusive rocks were partially unroofed. The interpretation is supported by clast counting results of 4 conglomerates (2060 point-counts) in the lower 190 m of the section. In addition, upsection sandstones become finer and conglomerates less abundant and finer, suggesting lowered provenance relief and increased catchment size. Provenance and catchment evolution had significantly improved the compositional and textural maturity of sandstones filling the half graben. Similar trends are probably present in other grabens of the Turpan basin.

Ankle Range of Motion and Vertical Jump Height are not Affected by Six Weeks of Static Gastrocnemius Stretching

Ashley C. Hall*, Amber M. Russell, Jerod A. Sharp
Faculty: John W. Carter
Department of Physical Therapy

Studies that investigated the correlation between chronic stretching and vertical jump height are scarce in the literature. Therefore, the purpose of our research study was to examine the effects of a six week chronic static stretching program on gastrocnemius flexibility and vertical jump height. Twenty-five healthy college students between the ages of 20-30 years old participated in this study. Subjects were tested for bilateral ankle ROM and vertical jump height at 0, 3, and 6 weeks. The stretching protocol consisted of four stretches, for five repetitions, done once a day, five days a week, for six weeks. The results showed that there was no significant difference (p ≤ 0.05) in ROM and vertical jump heights between the beginning and end of the 6 week stretching program. No significant correlations were found between change in ankle ROM and change in vertical jump height. Based on our study, it does not appear that chronic static stretching has a positive or negative effect on vertical jump height.
Development of a Cooperative Soaring Flock of Uninhabited Aircraft

Zachary Hazen*
Faculty: Scott Miller
Department of Aerospace Engineering

The use of atmospheric updrafts as an energy source for long endurance flight has proven to be extremely advantageous for birds, remote control sailplanes, and manned soaring vehicles. In recent years, work by Michael Allen at NASA and Dan Edwards at the North Carolina State University has demonstrated the viability of using a UAV to search for, detect, and gain altitude using thermal updrafts. This research aims to complement existing autonomous soaring efforts by introducing multiple cooperating vehicles that reduce the time spent searching for lift while simultaneously increasing the time spent in lift gaining altitude and/or saving fuel. UAV missions calling for multiple vehicles can use this approach to reduce the demand for on board energy storage by using environmental energy more effectively than a vehicle flying alone. Early simulations performed to validate this idea have given rise to further analysis and experimentation with two custom airframes, each equipped with instruments to detect updrafts and autonomous capabilities to test cooperative soaring algorithms in the real world. Several systems have been integrated to experiment with this idea. Initial flight testing and data analysis have been performed to study the task of making the simulated benefits of cooperative soaring a reality for future UAV use.

The Development of Ottoman Ceramics

David William Hellman*
Faculty: Ted Adler
Department of Ceramics

Many of the world’s ceramic objects can trace their aesthetic lineage to one source, Ming Dynasty export porcelain. Turkish or Ottoman ceramics is a tradition that drew inspiration from luxury goods acquired through trade along the Silk Road. Centrally located between Asia and Europe, Istanbul, the former capital of the Ottoman Empire became a trading center for these wares. An entire genre of ceramic work was produced in reference to these vessels. My research shows the influence of Chinese imports as the spring board for developing Ottoman ceramics, by examining the advances in under-glaze painting, Frit-ware clays and glazes, and the interdisciplinary collaboration between artisans and design guilds, in turn making these Iznik ceramic vessels and tiles so distinguishably Turkish.
Benefits of the Wii Fit as an Exercise Program for Older Adults

Hermes D, Hitch S, Honea A, Stephenson J* & Bauer J
Faculty: Camilla Wilson and Nicole Rogers

Department of Physical Therapy

Purpose: To determine if Wii Fit is an effective older adult exercise program compared to a traditional exercise program (TRAD) with respect to functional fitness (FF) and balance. Method: Wii Fit women (n=4) were matched on multiple variables to TRAD subjects (Ss)(n=4) and a control group (CON)(n=4). Interventions were 8 weeks and consisted of flexibility, strength, and balance training. Wii group followed the Wii program and TRAD participated in traditional classes. Pre and post measures included FF and balance. Results were evaluated using qualitative comparison. Results: No baseline difference existed. With respect to FF, TRAD exhibited largest changes. With respect to balance, Wii exhibited similar large changes. Conclusions: Using Wii Fit appears to be as effective as TRAD for balance.

Kansas Pharmacists’ Attitudes/Beliefs and Current Practices Regarding Implementation of Fall Prevention Strategies in Older Adults

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Faculty: LaDonna S. Hale

Department of Physician Assistant

Falls among older adults are a significant economic and social health care issue. Evidence-based fall prevention guidelines exist but are not routinely implemented. Purpose: Evaluate Kansas pharmacists’ attitudes/beliefs, current practices, and barriers/facilitators regarding implementation of fall assessment and prevention strategies in older adults. Methods: A 67-item, non-validated survey was mailed to all 2,601 registered Kansas pharmacists in 2010. Results: 97% of pharmacists believe falls are a significant public health problem and >85% believe falls are preventable. Although 89% believe they have a professional responsibility to perform medication reviews, only 33% routinely do. Conclusions: Most pharmacists believe falls are a significant preventable health problem; however, few currently implement fall prevention strategies in daily practice.
Bone density among the average population has been researched, little has been reported on the effects of Severe Mental Illness (SMI) on bone density (BMD). BMD of the forearm, femoral neck and body composition was measured by a DXA unit (Hologic QDR 4500). 30 individuals (17 male; 13 female) with SMI (bipolar (N=14), schizophrenia (N=5), schizoaffective (N=4), major depression (N=2), and other (N=5)) volunteered for the study. Total group (N=30) body fat % (37.3±8.4) and BMI (32.4±6.06) is significantly greater than national and state averages. Forearm BMD results showed t-score values of -0.3±1.1 and femoral neck t-scores of -0.4±0.8. By groups, bipolar (N=14) showed the highest body fat % (39.1±8.1 vs. 30.7±9.4 %, p<0.05) forearm t-score = -0.1±1.0 and femoral neck t-score = -0.1±0.8 were normal). Schizophrenia group (N=5), (body fat % = 26.38±8.0; forearm t-score -0.6±1.43; femoral neck t-score -1.0±1.08), schizoaffective (N=4), (body fat % = 27.33±3.8; forearm t-score -0.4±1.56; femoral neck t-score -0.4±0.51), major depression/depression (N=2), body fat % = 32.8±8.13; forearm t-score 0.8±0.42 femoral neck t-score -0.4±0.42), and other (N=5), (body fat % = 34.7±8.33; forearm t-score -0.7±0.91; femoral neck t-score -0.9±0.70) were within normal range. People with SMI do not appear to be at greater risk of low BMD. Body composition findings agree that a higher incidence of obesity exists in individuals with SMI. The bipolar group had significantly higher body fat % than other diagnosis. Supported by WSU U-Link

Kinetic studies of protein-carbohydrate interactions at the bilayer interface of catanionic vesicles

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In this poster, we describe our work on surface functionalization and modification of catanionic vesicles with an aim toward increasing their range of applications. Conventional vesicles are formed from double-tailed phospholipids and have important roles in biology. Unlike conventional phospholipid vesicles, aqueous mixtures of cationic and anionic single-tailed surfactants can spontaneously form unilamellar vesicles without sonication or extrusion. These vesicles dubbed “catanionic vesicles” in the literature are extremely stable with respect to salt and pH and are composed of inexpensive components. They are promising candidates for a variety of biotechnological applications including drug delivery and vaccine development. Our studies report that the ability to control the distribution of glycoconjugates in the vesicle bilayer surface provides a method to study protein-carbohydrate multivalent binding kinetics in a biomimetic environment. The exterior of catanionic vesicles was controllably functionalized by insertion of the hydrocarbon chain of the glycoconjugate n-dodecyl-β-D-glucopyranoside (C12-glucose) at varying concentrations. We demonstrate how this platform consisting of carbohydrate functionalized bilayer can be use to evaluate binding inhibitors for the lectin ConA.
Academic Performance in Middle School: Friendship Influences

Lisette T. Jacobson  
Faculty: Charles A. Burdsal  
Department of Psychology  

The results of this study build on previous research findings demonstrating relational significance of peer influences to academic performance during adolescence. Whereas family, teachers, and peers play a significant role in a student’s academic career, extant literature about the relational dynamics between peers and academic achievement remains scarce. This study evaluated the constructs of social support and negative interchanges in relation to academic performance. Additionally, students’ gender, race, and perception of a friend’s level of school interest were measured. The sample consisted of 321 participants in the 6th, 7th, and 8th grade from three public middle schools in the Midwest. Results supported the hypothesis that adolescents’ relationships with peers influence academic performance.

The Nature and Origins of a Stratigraphic Boundary in a Continental Setting, Southern Bogda Mountains, NW China

Brad Jeffrey  
Faculty: Wan Yang  
Department of Geology  

A stratigraphic boundary where major change in depositional environment occurs indicates drastic changes in environmental conditions. The type and magnitude of environmental shift across a nonmarine boundary is highly variable due to irregular topography, rapid lateral change, and local sedimentary processes. This hypothesis is tested for the boundary separating Lower-Permian Lucaogou and Hongyanchi formations, composed of fluvial-lacustrine strata deposited in a half graben and exposed in the southern Bogda Mountains, NW China. The boundary is identified by major environmental shifts on 5 stratigraphic sections 0.2-5 km apart in a ~80 km² area. Regionally, the boundary indicates a drastic shift from a large, NE-deepening lake with deltas in the SW during end-Lucaogou time to early-Hongyanchi lake contraction, fluvial incision in the NE, deltas in the NW and SE, and deepening to the SW. Lake contraction may be caused by increased climatic aridity, or tectonic source uplift and infilling of the lake with sediments, or a catastrophic spill point lowering event. Future microscopic and XRD results will enhance interpretations, assist correlation, and enable speculation of such controlling processes.
Does Individualizing Vocabulary Instruction Combined With Fluency Instruction Increase Reading Comprehension To Students Scoring Below The First Quartile

Michelle D. Jennings  
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After pre assessing students in a third grade classroom, the researcher noted four students, scoring below the 25th Percentile on the reading portion of the Northwest Evaluation Association (NWEA) in fall, 2008. As the researcher further assessed the students, it was noted that these students lacked proficient fluency and vocabulary skills. Research revealed that “Providing vocabulary instruction is one of the most significant ways in which teachers can improve students’ reading and listening comprehension” (Curtis & Longo, 2008). “Reading fluency is the bridge from decoding skills to comprehension” (Penner-Wilger, 2008). The researcher used a combination of the Power Pak Reading program and coupled it with individual, vocabulary strategies to assist readers with fluency and comprehension. As their reading progressed, students were challenged to next levels. Data was analyzed using the NWEA assessment, Houghton Mifflin Leveled Reading Assessment and Kansas State Reading Assessments during the course of the school year to mark progress. The research examined the question “Does individualized reading vocabulary combined with fluency instruction increase reading comprehension in below quartile, third grade readers?”

Component-wise Energy Breakdown In a Laptop

Hemanth Kothuru  
Faculty: Vinod Namboodiri  
Department of Electrical Engineering and Computer Science

In the modern age, there is an exponential growth in the usage of laptops for computing and communication. However, the battery life of laptops is only a few hours at best. Further, studies indicate that laptops have a stake of approximately one percent in the overall global energy consumption. Thus, there are significant incentives to minimize energy consumed by laptops. To achieve this goal, it is important to break down the consumption of power of each component. In this work, we systematically study the power consumed by each component of a modern laptop. Our results indicate that wireless communication is a significant consumer of power along with obvious power hogs like the Display, Graphics card and the Processor.
Impact of Crane Availability
During the Construction Phase of the Wind Farm

Ranjith Kumar Krishnamurthi
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Department of Industrial and Manufacturing Engineering

The availability of the high capacity crawler cranes at the project site during the construction phase of the wind farm may help the turbine assembly rate, which may significantly vary due to the terrain at the project site. Increasing the crane availability at the project site by optimizing the crane utilization rate will reduce the project duration. As a result, the number of turbines that generate electricity early in the construction phase will increase and the payback time will be reduced, although increasing the number of cranes will result in higher investment costs. In this study, the impact of interest rate, sales price of electricity, terrain effects and availability of cranes on the duration of installation and payback period for the project is analyzed.

Determination of All Stabilizing Fractional-Order PID Controllers

Yung K. Lee
John M. Watkins
Department of Electrical Engineering and Computer Science

In this paper, a novel method for finding all fractional-order (FO) proportional-integral-derivative (PID) controllers that stabilize a given system of integer or non-integer order is proposed. The stability bounds of such FO PID controllers are calculated in the frequency domain and are given in terms of proportional gain (Kp), integral gain (Ki) and derivative gain (Kd). For this paper, they will be plotted on the (Kp, Ki) plane. The results are verified using Nyquist plots and step responses and are compared with the results of existing methods. An example is presented to illustrate the effectiveness of this method. The method is also applicable to conventional integer-order PID controllers. The approach presented here has an advantage in that it provides stability bounds even when the transfer function of a system is not available, as long as the frequency response of the system can be obtained. Furthermore it does not require complicated mathematical calculations.
Questioning the Construction of Reality

Joe Leonard
Faculty: Ted Adler
Department of Ceramics

How do we arrive at ourselves, is it the question of nature vs. nurture, or is there a greater sense of manipulation? People are locked into an uncontrollable controlled system, which they both develop and absorb. I think we are created by a society that we have adopted and manipulate during our lives.

As a ceramic artist, objects which interrogate both external and internal spaces are a constant source of investigation. These forms are used as surrogates or metaphors in investigating how people engage and understand objects, and places. Within my current body of work various hand building processes are utilized to construct pieces that refer to both the altered landscape and architecture. This juncture of the naturally occurring and the produced is most intriguing to me because of its direct relation to humans and their “natural” inclination to manipulate their direct environment to suit a personal need. That is why within my work I focus on how it is that an individual will procure and surround themselves with commodities, objects of desire and communication in order to connect and project their own personal understanding of society and self.

Critical Thinking Dispositions in Physician Assistant Students and Relationships with Board Scores and Graduate GPA

Samantha Livingston* and Jeffrey Schroeder*
Faculty: LaDonna S. Hale
Department of Physician Assistant

Physician assistant (PA) students require strong critical thinking skills to be successful both academically and clinically. This study examines relationships between critical thinking skills and dispositions and program GPA and performance on the PA National Certifying Exam (PANCE). A convenience sample of 42 WSU PA students took two validated and reliable critical thinking tests, the Health Science Reasoning Test (HSRT) and the California Critical Thinking Disposition Inventory (CCTDI). Each was taken twice, within one month of beginning and completing the program. There were no significant changes between pre and post HSRT or CCTDI scores. GPA and PANCE scores were positively correlated, r = 0.668, p<0.01, as were GPA and pre and post HSRT scores, r = 0.423, p<0.01 and r = 0.350, p<0.03 respectively. Neither HSRT nor CCTDI were associated with PANCE scores. GPA was strongly associated with PANCE success, indicating that GPA may be a way to identify students requiring remediation for certification preparation. Interestingly, significant growth in critical thinking skills was not seen, indicating that admitting students who already possess strong skills is important. Pre-program HSRT was modestly associated with program success as measured by GPA; therefore, the HSRT may be a valuable tool in the program’s admission selection process.
Qualitative Data Analysis: Dialogue and Mindsets

Lisa Lutz
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Department of Educational Leadership, College of Education

Since the late twentieth century, the ability to connect and communicate with others has been available through a variety of information and communication technologies. Access to mobile communication technology is a characteristic that makes today’s learners different and which presents challenges and opportunities in the classroom. This study embraced the use of communication technologies by music students in different parts of the world to collaborate on musical compositions. Students and teachers used web based social networks and collaboration software to communicate collaborate and compose music. Participant communications were captured online and analyzed to determine feasibility of technologically enables collaborations with a global reach to provide an environment for gaining an awareness of intercultural perspectives. Analysis was conducted using the Emerging Mindedness Continuum.

English Vowel Production for Japanese Adults: Comparison of Two-Training Methods

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Department of Communication Sciences and Disorders

American English vowels are generally challenging for adult English-language learners, because the vowels’ articulation is difficult to observe and describe without special instrumentation. Also, the mechanisms tuned to their native language influence both production and perception of English as a second language. A computer-assisted system has been applied for language learning in addition to the traditional approach. Although the computer provides visual feedback and is flexible in terms of time, space, and self-pacing; human instructors are still supported because of pedagogical flexibility, constructive feedback, and personal interaction. The purpose of this preliminary study was to investigate the effects of two short-term methods: computer feedback only (Group I) and computer feedback with instructor’s assistance (Group II), on American English vowel production for Japanese adults. Five Japanese adults were divided into two groups and received training for 30 minutes twice a week for three weeks. Their vowel productions were recorded pre- and post-training and evaluated by three native speakers of American English. Overall the results demonstrated a slight improvement of the vowel productions for Group II, however, no change was found for Group I.
Harvesting Solar Energy via Artificial Photosynthesis

Eranda Maligaspe  
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Department of Chemistry

Photosynthesis, the process of converting light energy into chemical energy, involves two major steps, absorption and transportation of light energy of appropriate wavelength by the antenna light harvesting molecules to the reaction center, and photoinduced electron transfer (PET) to generate charge separated entities by using the electronic excitation energy. Mimicking these functions using relatively simple synthetic molecules is of paramount importance since they can be directly used to build devices to convert light energy into electricity, like in photovoltaic devices and organic solar.

Testing species limits in the highly variable scarab Cyclocephala sexpunctata (Coleoptera: Scarabaeidae: Dynastinae)

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Department of Biological Sciences

Assessing inter- and intraspecific variation provides an important foundation for studies of evolution, ecology, and systematics. Many insects display high degrees of intraspecific variation, but the mechanisms that generate variation remain largely unexplored in this taxon. Members of the speciose genus Cyclocephala (Coleoptera: Scarabaeidae: Dynastinae) often exhibit intraspecific variation of elytral patterns and genital morphology, creating diagnostic difficulties that confound study of the group. The aims of this study are to comprehensively describe and identify causes of intraspecific variation in Cyclocephala sexpunctata and closely allied species using morphological, molecular, and phylogeographic techniques. Molecular analyses of the mitochondrial CO1 and the nuclear CAD gene loci will be compared with morphological data to establish the level of isolation between species and populations. Field observations of C. sexpunctata populations indicate that intraspecific variation may be distributed along clines of elevation and latitude. Detailed locality information obtained from museum collection databases will facilitate exploration of salient spatial and environmental factors contributing to patterns of variational clines. This scientific approach will add greatly to the understanding of variation within the genus Cyclocephala, and the methods may be widely applicable to similar studies of insects and other taxonomic groups.
Hip Flexibility and Strength Capacity Immediately Following Manual Therapy Interventions

Courtney Morse*, Sam Cheatham, Christina Greiner, Ryan Cook
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Department of Physical Therapy

Studies have shown that manipulations and mobilizations have resulted in increased strength and range of motion (ROM). Our study examined hip internal and external rotation, hip abduction, and hip extension strength, as well as hip internal and external ROM both before and immediately after manual intervention. Our goal was to determine if manipulation and/or mobilization would increase strength and ROM greater than that of the control group. Sixty-one college aged students participated in this study and were randomly assigned to one of three groups: a control group, a mobilization group, and a manipulation group. Control group received no intervention, the mobilization group received grade III/IV side lying hip mobilizations, and the manipulation group received a supine SI joint regional manipulation. There was no significant difference within the control, mobilization, and manipulation groups when testing external rotation strength or in pre and post test measurements between the three testing groups in any of the dependent variables.

The Role of Working Memory on Mood and Comprehension

Melinda Mueller
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Department of Counseling

This study examined the relation between emotional experience and working memory, and their effects on reading comprehension processes. Previous research has shown that those with higher working memory feel emotions to the same extent as those with lower working memory, but are better able to suppress emotional responses. Participants were induced to feel a sad, happy, or neutral mood after watching video clips. Although the mood induction was successful, there were no differences based on working memory in the degree to which participants experienced the induced emotions. There was a marginally significant effect in the type of comprehension processes used between high versus low working memory participants as a function of mood.
Inverse Doping Profile Analysis for Semiconductor Quality Control

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Inverse doping profile problems are linked to inverse conductivity problems under the assumptions of zero space charge and low injection. Unipolar inverse conductivity problems are analyzed theoretically via three uniqueness proofs, the first of which has been published as a paper in Inverse Problems (May 2009). Also, optimized numerical methods are developed for solving the unipolar direct conductivity problem with a piecewise constant conductivity coefficient. Finally, the unipolar inverse conductivity problem is solved for inclusions defined by as many as 9 parameters, or by as many as 120 parameters when an initial guess for each parameter is known with less than 10% error. Our free boundary identification algorithm produces a sequence of improved approximations in a way that provides both regularization and accelerated convergence towards the solution.

Effects of Negative Middle-Ear Pressure on Auditory Steady-State Responses: A Preliminary Study

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The auditory steady-state response (ASSR) is a type of auditory evoked potentials, which are electric activities of the auditory system in the presence of sounds and recorded with electrodes from the scalp. The ASSR is a recording technique with specially designed sound signals. Research has proven it to be a useful tool for evaluating the function of human’s auditory system and to be superior to conventional techniques in estimating hearing thresholds in certain special populations. The middle ear function is a critical factor for a reliable interpretation of ASSR outcomes. Negative middle ear pressure (MEP) is one of the most common pathologies in humans, particularly young children. A negative MEP causes retraction of the eardrum which affects the transmission of sound. However, impact of this condition on the ASSR has never been investigated. The purpose of this study was to make a preliminary observation on ASSR recordings in ears with negative MEP. The experiment has been conducted in 10 human subjects. A positive ear canal pressure (200 daPa) has been applied to simulate a negative MEP. The effect of negative MEP is expressed by the change of ASSR amplitude caused by the air pressure. Compared to the baseline measures, ASSR amplitudes for all four frequencies were reduced by approximately 20% or more. Statistical tests will be performed to examine the significance of the effect.
The Implications of Gendering Childhood Obesity PSAs

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The percentage of overweight and obese children is at or above 30% in 30 U.S. states. In light of this nationwide epidemic, examining messages concerning childhood obesity becomes increasingly important. One strategy employed to help combat childhood obesity is public service announcements (PSAs). In marketing, gender is one of the leading variables employed to tailor messages to audiences. The Constant Comparative Method was used to content analyze 20 childhood obesity PSAs located on YouTube and 10 PSAs located on the “Let’s Move” website. Analyses indicate that PSAs on YouTube, while still biasing the male population, represented females more often than those on the “Let’s Move” website. Implications for gender biased childhood obesity PSAs are discussed.

Measuring the Effects of Rhythmic Movements Implemented in a High Poverty Elementary Classroom

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Department of Education

This study investigated the effects of rhythmic movements implemented in a classroom of students with high poverty background. The study concentrated on a fourth grade class from a Title 1 building, where the majority of students were scoring below grade level in reading and math. A series of exercises were implemented in the classroom for 15-20 minutes daily for nine weeks. The exercises were done as whole class, and focused on rhythm, patterns, eye-hand coordination and balance. The behavior, emotions and academic growth of the students were monitored and recorded during this time. The results showed a certain decrease in negative behavior and increase in student engagement. Surveys showed less stress and worries among the students, in addition to students feeling more successful in school. Academically, math did not show considerable gains or losses, as compared with the control group, whereas reading scores significantly increased.
Overcoming Disorienting Dilemmas in Global Intercultural Encounters: An Online Role-Play Simulator CMS

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Global Learning and Curriculum & Instruction

Breakdowns in communication between members of multi-cultural, multi-national, globally-distributed project teams represent a significant challenge for ventures such as designing and building new passenger aircraft, air traffic control systems, or space craft; or overcoming the effects of climate change, pandemics, and terrorism. An important element of the preparation of global graduates is learning how to systematically overcome disorientation that arises from the unexpected during global teamwork. An online role-play simulator—Cultural Misconceptions Simulator (CMS)—has been enhanced to allow users and authors from multiple language and cultural backgrounds to play scenarios and to write new scenarios. To date, CMS has been available in English only, with scenarios written from a Western perspective. The goal of this project is to make CMS available initially in Chinese, Russian, Kanji, Hindi, Arabic and English and later in many more languages. CMS comprises an SQL database for storing multiple interface elements and scenarios. Global collaborators and their students continue to test CMS. They are located at Australia, Austria, Canada, China, Germany, India, Japan, and Russia. As well as being a learning tool, CMS is also a research tool. CMS captures patterns of learning that help us to understand Intercultural Communication Competence development.

Numerical Simulation of Heat Transfer in Cryoprobe

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Department of Mechanical Engineering

Computational Fluid dynamics (CFD) analysis was carried to evaluate the heat transfer performance during the freezing process in cryotherapy. Cryoprobes are generally used for the treatment of diseases tissue in cryotherapy. As the hydraulic diameter of the cryoprobe is very small, it was considered as a mini/microchannel. CFD software packages FLUENT and GAMBIT was used for the simulation of a cryoprobe. Nitrous oxide was used as the working fluid. The working fluid was passed through the channel at a very low temperature of 183K. The simulation was carried out for different channels with hydraulic diameter varying from 20µm to 1500µm. Reynolds number were varied between 0.01 and 10 in order to vary the velocity at the inlet. It was found that with an increase in hydraulic diameter, there was a delay in the saturation boiling of the working fluid. The investigation also showed that the delay in boiling process occurred with an increase in Reynolds number as well. The pressure drop was very high in the channels and it decreased with an increase in the hydraulic diameter of the channel. On the other hand, pressure drop increased with an increase in the Reynolds number.
Test-Retest Reliability of Various Measures for Limits of Stability Using the Balance Master 6.1

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Faculty: Barbara S. Smith
Department of Physical Therapy

This research focused on determining test-retest reliability of dynamic measures of balance using Balance Master 6.1 (BM6.1) with 18-30 years old adults without balance deficits. Fifteen participants completed pre and post-test limits of stability (LOS) testing. LOS testing was completed under four conditions: eyes open on platform, eyes closed on platform, eyes open on foam, and eyes closed on foam. The main outcome measures included the following: Movement Velocity (MVL), Endpoint Excursion (EPE), Maximum Excursion (MXE), Directional Control (DCL). An intra-class correlation coefficient (ICC) determined reliability. The results showed that the eyes closed platform condition exhibited the highest ICC with the exception of backward movement which concluded that BM6.1 cannot solely measure LOS changes for this age group.

Implementation of an Asthma Prompting Form to Improve Asthma Care in a Pediatric Office

Debra Pile
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Asthma, the most common chronic illness of childhood, can be a life-threatening experience. This project tested the effectiveness of a prompting form to improve preventive asthma care during a non-asthma office visit. Thirty randomly selected charts from 2008 without a prompt form were compared with thirty randomly selected charts from 2009 with a completed form for differences. The number of medications reviewed (p = .001) and the frequency of refills written (p = .024) were significantly higher in the prompt group. Education was higher (p = .000) if smoking was included. Use of an asthma plan was not significantly different between groups. Triggers were more frequently discussed in the prompted group. The use of a prompting form facilitates discussion and improvement of preventive asthma care.
Autism Spectrum Disorders Screening and Diagnostic Practices: A Survey of Physicians

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In 2006, the American Academy of Pediatrics (AAP) issued a policy statement recommending physicians screen all children for autism spectrum disorders two times prior to the child’s second birthday. It is imperative, therefore, that physicians are well trained to recognize, screen, and diagnose children who may present with characteristics of Autism Spectrum Disorders (ASD) early in a child’s development. It has been documented, however, that children are not being diagnosed with ASD until they are six years of age. **Purpose:** The purpose of this survey is to identify Kansas physicians’ professional training and continuing medical education (CME) in the area of ASD, as well as their screening and diagnostic practices for ASD. **Method:** A survey will be distributed to licensed physicians who have been randomly selected from a public mailing list provided by the Kansas Medical Society. **Results:** Survey responses will be aggregated into group data and analyzed to determine the physicians’: (1) professional and CME training; (2) screening practices for ASD; (3) tools used to screen for ASD; (4) diagnostic practices for ASD; and (5) knowledge and use of complementary alternative medicine for children with ASD.

The Effects of Two Phytohormones in Medicago Truncatula Plants Infected with Macrophomina Phaseolina

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*Macrophomina phaseolina* is a necrotrophic soil-borne fungal pathogen that causes a disease commonly known as charcoal rot. This fungus has the potential to infect over 500 different plant species worldwide including many important crops such as soybean, corn and sorghum. The fungal infection dramatically decreases the yield of a crop due to loss in biomass, low seed quality and plant death. Currently, there is not an effective method for controlling the symptoms caused by the disease. Jasmonate and ethylene are two phytohormones that are important for triggering biotic and abiotic stress responses in plants, therefore, we propose to study the effect of these two hormones on *Medicago truncatula* plants infected with *M. phaseolina*. Our results indicate that jasmonate or ethylene slightly increase the resistance of *M. truncatula* to this fungus. This investigation may lead to the development of chemical treatments that will help to reduce or avoid the disease symptoms caused by *M. phaseolina*. 
Metafilm: Visual Storytelling in the Postmodern Age

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As books and television and films and technology intermingle and breed, new and sometimes remarkable hybrids are born. Contemporary American culture and language strongly favor the audio-visual. Sound bites from film or television become quoted dialogue among friends or even among strangers, forming a sub-language which reflects a common cultural experience. The proposed Metafilm construct represents an opportunity to draw upon the reservoir of shared cultural imagery to tell new stories while deliberately connecting the viewer to their familiar past. It provides a latticework which allows the storyteller to work in multiple dimensions simultaneously. Clips from television or film are chained together so that the dialogue in each clip advances a new scripted storyline. Like hyperlinks, these clips allow the viewer to branch off from the original story into a nostalgic mode from which they can return at any time. Careful selection of clips can reward the experienced viewer and establish a larger thematic pattern or counter-narrative. Some legal and technical challenges exist, but Metafilm represents a refinement to the postmodern manifestation of interconnectedness known as the mash-up. Its low-cost nature gives artists of limited means the opportunity to push back against institutional encroachment upon the collective human experience and to reassert the right to use one’s common audio-visual culture to explore, explain, and enjoy that culture.

A Fully Bayesian Approach for Sample Size Determination

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The sample size determination has a significant role in the design and analysis of many engineering problems and data sampling projects. There is a number of sampling techniques including both classical as well as Bayesian techniques and only some of them consider the economical aspect. The objective of this paper is to offer an economic Bayesian approach for determination of sample size. Mathematical models are derived and used to establish implementation boundaries from economic and technical viewpoints. In addition, numerical examples are used to highlight the economic advantages of Bayesian approach. Using simulated data, the performance of the proposed approach is compared to the classical methods in terms of the number of sample size criterion.
A Model of Cocaine Supply Transformation and the Efficiency of U.S. Federal Interdiction

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This paper develops a model to illustrate factors that may reduce cocaine supply from its original production level in South American countries to its arrival on U.S. streets for final retail sale. Some of the variables in the model must be estimated due to the inherent lack of data on illegal drug trade, while others such as seizure quantities are directly observable. Using data from four U.S. federal agencies and the annual potential production of cocaine as estimated by the United Nations, the agencies’ annual seizure rate is calculated at 26.4 percent of the world supply. However, the proposed model shows that this figure underestimates the actual seizure rate from the U.S. market as it does not account for variables that may reduce cocaine supply to the U.S. The paper suggests that the agencies on average seize more than 26.4 percent of the U.S. supply.

Dynamic Capacity Apportionment Procedure Exposed to Different Business Conditions

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Revenue management (RM) is a methodology used to allocate resources in order to maximize revenue. Capacity allocation is one of the faced problems in RM when demand surpasses the available capacity. This problem is addressed by allocating capacity using a dynamic capacity apportionment procedure (DCAP). In this study, the objective is to analyze the effectiveness of DCAP and present its behavior under different scenarios and business conditions such as, non-decreasing due dates, multiple products, and contracts for capacity reservation. Simulations showed that among 600 experimental conditions replicated 10 times, DCAP resulted in 51.3% increase in total profit as maximum and -0.18% as minimum compared to the first come first serve policy. Additionally, results also demonstrated that factors such as capacity tightness, profit attractiveness, and order rate scenarios significantly influenced DCAP’s performance.
Maternal and Neonatal Post Partum Behaviors Related to Early Breastfeeding

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Purpose. Breastfeeding is optimal infant feeding, particularly in the early months of life. However, breastfeeding rates in the U.S. are far from optimal. This observational pilot study examines maternal-neonatal interactions in the first two hours after delivery. Method. Twenty low-risk primigravida (first pregnancy) women who intend to breastfeed and their newborns are being audio-and videotaped. Recordings are being analyzed for mother-neonate verbal and physical interactions with a particular focus on stereotypical behaviors by mother or infant, the duration of skin-to-skin contact, and breastfeeding outcomes. Results. As of November 2009, data on four mother-infant dyads have been documented. Additional recordings are anticipated from the imminent deliveries of the remaining participants. Analysis of the recordings will be completed by the time of the GRASP meeting. Conclusion. Expected outcomes include the documentation of specific pre-feeding and feeding behaviors common to mother-neonate pairs who remain in close contact immediately following delivery. These behaviors may have a long-term positive impact on breastfeeding.

Varying the Support Level in a Community Exercise Program

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Department of Gerontology

Getting people to adopt and maintain a regular physical activity program are two major challenges facing public health. Providing social support may increase the adoption and adherence rate of participation in exercise programs. PURPOSE: To compare Well-rounded Exercise Program Online Plus (WellREP-O+) to Well-rounded Exercise Program (WellRep) on the outcome measures of functional fitness (FF), balance, and daily physical activity (DPA) in older adults. METHODS: The WellREP-O+ group consisted of 17 older adults. FSAH-O+ group met at a senior center for 12 wk, 2d•wk for a 50 min. training program and did bi-weekly home training programs. The WellRep group consisted of 11 older adults. WellRep group met at a senior center for 12 wk, 2d•wk for a 50 min. training program. Program effectiveness was assessed using the Senior Fitness Test to measure FF (chair stand, arm curl, sit and reach, up & go, scratch test, and 12-min walk), balance: movement velocity (MVL), endpoint excursion (EPE), maximum EPE (MXE), and directional control (DCL) for forward (F), right (R), left (L) and back (B) movements, accelerometer (Kenz Lifecorder Plus HJ-150) measured DPA, and weight. RESULTS: Results will utilize paired samples t-test and repeated measures ANOVA to detect group differences. DISCUSSION: The greater amount of support will result in greater improvement on all measures.
The Case of Wichita: A Study in the Influence of Regional Media on Long-term Facility Care

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Elliot School of Communication

As the baby boomer generation begins to fill nursing facilities nationwide, the prospect of elder abuse and negligent facility practices becomes an ever growing concern for decision-making stakeholders. Many decision-makers use the information provided by regional media outlets to aid in their search for long-term care. This study uses a two tier system of analysis in an attempt to prove a correlation between negative print media and long-term facility occupancy rates. Operating under the sample population of Wichita, KS our study reviews 17 independent long-term care facilities, their bed numbers and occupancy rates. Through content analysis of 200 articles associated to long-term facility care between the dates of January 1, 2004 to December 31, 2008 a collection of codes were identified and assigned as negative, positive or neutral portrayals by the media outlet. The outlet found most accessible to the Greater Wichita area was the city’s regionally circulated newspaper entitled, “The Wichita Eagle.” By using thematic analysis a relationship was discovered between the use of negative media and the projected occupancy rates during a two year period. It was found that 25% of the negatively identified articles were dated during the year 2005; consequently a 2% reduction in occupancy rates was noted to have occurred in the year 2006. These findings suggest a possible correlation between negative media on long-term facility care and decision-makers regarding retirement living.


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Data-Intensive Sensor Networks (DISNs) are sensor networks where large amount of different types of sensory data are sensed from physical environment and accessed by multiple users through networks such as the Internet. In such scenarios, networks are under heavy load and the role of an energy efficient medium access control (MAC) becomes more significant than a typical wireless sensor network due to energy constraints. Rather than evaluating MAC protocols using typical metrics such as comparing energy consumption among different MAC protocols, this paper compares different radio devices impacting on battery life, finding which radio device is suitable for DISNs. In experiments, two radio devices RF230 and CC2420 are compared, showing RF230 is more energy efficient and suitable for DISNs.
Load Rate Effects on the Crush Response of Laminated Corrugated Beams

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Department of Aerospace Engineering

This experimental study addresses the progressive crushing responses of laminated corrugated beams fabricated using Newport NB321/7781 E-glass prepreg material. Stacking sequences of [0]n and [±45]n, where n=4, 8 and 12 have been used. The progressive crushing behavior has been studied at quasi-static rates and at selected dynamic loading rates. The test data indicates that the peak load levels increase with load rate, while the sustained crushing load decreases. [0]n surpass [±45]n in terms of energy absorbing capability at various loading rates by at least 30%. The failure modes in [0]n beams was observed to be rate sensitive with the number of fronds and frond fragmentation changing with test speed.

Health Care Occupations: Road to Success or Path to Dead End?

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Health care provides an attractive career choice for individuals seeking employment in a growing field with livable wages and quality benefits. Jobs in health care services are projected to increase rapidly in the coming decades. Like other skilled professions, significant disparities exist regarding who works in the positions that are highest paying and often most rewarding. This project investigates the representation and incomes of minorities in health care professions. Using secondary data, a sample of 19,693 health care workers were used for this study. The findings of this research indicate that net of other factors, minority health care workers earn $3,026 less annually than non-minorities. Additionally, minorities are disproportionately concentrated in lower compensating occupations.
Computational Fluid Dynamics for Condensation in Mini and Microchannels

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Computational fluid dynamics (CFD) analysis was performed to evaluate and compare the condensation of steam in mini and microchannels with hydraulic diameter of 2mm, 2.66mm, 200µm and 266µm respectively. The simulation was run at various mass flux values ranging from 0.5 kg/m²s and 4 kg/m²s. The length of the mini and microchannels were in the range of 20 mm to 100 mm. CFD software’s GAMBIT and FLUENT were used for simulating the condensation process through the mini and microchannels. Steam flowed through the channels, whose walls were cooled by natural convection of air at room temperature. The outlet temperature of the condensate was in the range of 25°C to 90°C. It was found that the outlet temperature of the condensate decreased as the diameter of the channel decreased. It was also evident that the increase in length of the channel further decreased the outlet temperature of the condensate and subsequently the condensation heat flux. The investigation also showed that the pressure drop along the channel length increased with decreasing hydraulic diameter and length of the mini and micro channel. Conversely, the pressure drop along the channel increased with increasing inlet velocity of the stream.

Enhancing the Development of Phonological Patterns in a 2-Year-Old Child

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Most 2-year olds use many words and are understood at least 50% of the time. The child in this case study (age 2 years; 1 month) was experiencing difficulty communicating because of omissions in words and a limited repertoire of speech sounds. In addition, she often refused to even attempt to talk. It was hypothesized that Focused Auditory Input (FAI), which involved auditory stimulation of Primary Phonological Patterns during parallel play, would be the optimal approach for the first semester of intervention. As this semester progressed, the child became more willing to talk to the clinician. The next semester, the focus shifted to productions of phonological patterns that were still deficient. The client participated willingly and was able to produce the target patterns in carefully selected words. Phonological assessment results at the end of the second term showed remarkable gains in the client’s phonological system and in her general ability to be understood while speaking.
The Effects of Computer Animations on High School Students Performance and Engagement in Biology

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Department of Education

Technology and computers today play a huge part of how society and education function. The learner of today has been shaped by digital media such as computers, internet, iPods, and Xbox. Research has shown that learning in biological science is enhanced with the use of computer animations. This study involved 79 biology students from an urban high school participating in a three-week study. In this study a pretest, post-test and retention test was given for assessment. The study focused on the use of computer animations to increase the performance and engagement of cell transport and movement. This action research study shows that computer animations accompanied with traditional teaching increases the performance of high school biology students and should be recommended to aid in the teaching of biological concepts.

Risk Assessment Disparities for Females in the Criminal Justice System

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Department of Criminal Justice

Female adult and juvenile offenders are a forgotten group within the Criminal Justice System. This is one of the primary causes in the lack of research of how females may possibly be assisted to reduce recidivism and avoid future incarcerations. Due to the lack of emphasis on assistance for this particular group of offenders, they have become an expanding group within correctional facilities. Many testing methods used in the criminal justice field do not take into account the difference in gender and therefore analysis should be done into how the questions in these tests can be designed to predict recidivism in females offenders as well as they do in male offenders. Realistic options for female offenders will be defined through qualitative analysis in how females can be helped to adapt after being released from incarceration as well as how to avoid becoming another statistic of future offenders in the female generations.
Editorial Reaction To Obama’s Speech To Students

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This study seeks to determine if the editorial coverage was supportive or not supportive of President Obama’s September 8, 2009 speech to school children. Pressure from the nation’s press may influence the education policy created by President Obama and understanding the position of the newspapers could be used to indicate the success future policy will have. Media framing has an impact on not just policy makers, but also on the readers in the general public. The supportive or non-supportive aspect of editorial discussion of the President’s speech could influence the public’s opinion of the President and his plans for education policy. To evaluate the editorial coverage of President Obama’s speech, the study relied on a data set collected from content analysis of the ten United States newspapers with the highest circulation. An online newspaper archive, LexisNexis, was used to construct the data set of newspaper editorials to examine the supportive (positive) position and the non-supportive (negative) position of the newspapers.

Using graphene in coating materials to prevent UV degradation on advanced composite materials

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The objective of the project presented here was to develop a new nanocomposite coating materials for protection of advanced fiber reinforced composite wind turbine blades against UV degradation and corrosion from weathering. TRIZ method was initially used to create the ideas about how to solve the challenging situation about advanced composite materials having a weak property to sustain UV degradation with its high specific modulus. This paper discussed about to apply graphene as inclusion in coating material, and it successfully increase its ability to resist degradation from Ultraviolet. The results were compared in mechanical strength, water contact angle test, and AFM surface study.
GRASP 2010

Registration – Entrance N

Opening Ceremonies – Lowe Auditorium

URCAF Oral Presentations – Room 132

GRASP Oral Presentations – Room 185

GRASP Oral Presentations – Room 185

URCAF and GRASP Posters – Gymnasium

Awards Ceremonies – Room 132

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