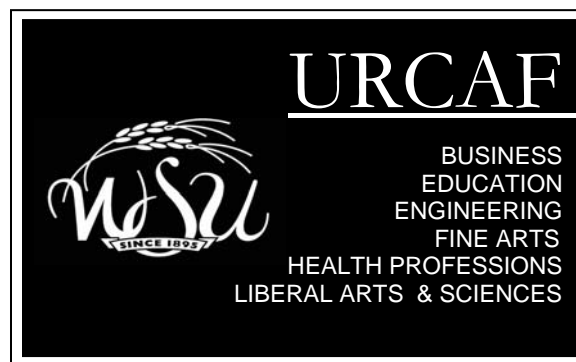


# PROGRAM and ABSTRACTS

## 2<sup>nd</sup> Annual Symposium on Graduate Research and Scholarly Projects

## 6<sup>th</sup> Annual Undergraduate Research and Creative Activity Forum



April 28, 2006

Rhatigan Student Center, Wichita State University

David M. Eichhorn, GRASP Chair  
Francis D'Souza, URCAF Chair

## **2006 GRASP Symposium**

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Ted Adler, Assistant Professor, Ceramics (Fine Arts)  
Sriram Beldona, Assistant Professor, Management (Business)  
George Bousfield, Associate Professor, Biology (LAS\_Natural Sciences)  
Pat Dooley, Associate Professor, Communications (LAS\_Social Sciences)  
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2<sup>nd</sup> Annual Symposium on  
Graduate Research and Scholarly Projects (GRASP)

6<sup>th</sup> Annual  
Undergraduate Research and Creative Activity Forum  
(URCAF)

**PROGRAM GRID**

(Note: All Break/Poster Sessions are in Room 223)

| Opening Session in Ballroom |  |  |                          |
|-----------------------------|--|--|--------------------------|
| 8:00 – 8:30                 | <b>Registration</b>  |  |                          |
| 8:30 – 8:45                 | <b>Opening Remarks –Dean Kovar, VP Hutchinson<br/>Associate Dean Eichhorn, Professor D’Souza</b>                                   |  |                          |
| 8:45 – 9:15                 | <b>Keynote Address – George Wilson, University of Kansas<br/>“Flattening” the University: Fostering Multidisciplinary Research</b> |  |                          |
| 9:15 – 9:30                 | <b>Refreshments and Poster Viewing in Room 223</b>   |  |                          |
|                             | <b>GRASP</b>   | <b>URCAF</b>                             |                          |
| 9:30 – 10:30                | <b>Sess. 1 Ballroom</b>  | <b>Fine Arts Rm. 305</b>                 | <b>Nat. Sci. Rm. 215</b> |
| 10:30 – 10:45               | <b>Break/Posters</b>   | <b>Break/Posters</b>                     | <b>Break/Posters</b>     |
| 10:45 – 11:45               |  |  | <b>Nat. Sci. Rm. 215</b> |
| 10:45 – 12:15               | <b>Sess. 2 Ballroom</b>  | <b>Soc. Sci Rm. 305</b>                  |                          |
| 12:15 – 1:00                | <b>Lunch/Poster Viewing in Room 223</b>  |  |                          |
| 1:00 -1:45                  |  | <b>Awards Room 215 – Assoc. VP Loper</b> |                          |
| 1:00 – 2:30                 | <b>Sess. 3 Ballroom</b>  |  |                          |
| 2:30 – 2:45                 | <b>Break/Posters</b>   |  |                          |
| 2:45 – 3:45                 | <b>Sess. 4 Ballroom</b>  |  |                          |
| 3:45 – 4:15                 | <b>Break/Posters</b>   |  |                          |
| 4:15 – 5:00                 | <b>Awards Ballroom<br/>Pres. Beggs</b>   |  |                          |

**The URCAF and GRASP organizers are indebted to the following people for serving as judges in the competitions:**

**URCAF**

Dan Close, Communication  
Krishna Krishnan, Industrial and Manufacturing Engineering  
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John Watkins, Electrical and Computer Engineering  
William Woods, English  
David Wright, Sociology  
Eva Yao, Management

## URCAF Oral Presentations

### URCAF Fine Arts Session, Moderator Dan Close

- 9:30 **O. Dyson-Smith**, “Koiane” Pg. 12
- 9:45 **O. Dysin-Smith**, “The Jester” Pg. 12
- 10:00 **M. Tate**, A. Simonson, R. Squires, H. Fowler, A. Johnson, M. Calhoun,  
and C. Caley, “Caregiver” Pg. 13
- 10:15 **J. Hart**, “Secret Susie” Pg. 13

### URCAF Social Sciences Session, Moderator Barbara Smith

- 10:45 **A. Curry**, “The façade of state: The Obsolescence of the Nation-State in  
an Era of Globalization” Pg. 14
- 11:00 **M. Hedrick**, “Angola: A Nation Born to War” Pg. 14
- 11:15 **J. D. Hudson**, “Death in Good Shepard” Pg. 15
- 11:30 **C. Kline** and R. Zettle, “Investigating the Relationship between Amount  
of Exercise and Incidence of Addictive and/or Obsessive Compulsive  
and Narcissistic Personality Traits” Pg. 15
- 11:45 **R.I. Rolph**, “Caspar David Friedrich: Art and the Romanticization of  
Christian Narrative” Pg. 16
- 12:00 **C. Smith**, “Dig” Pg. 16

### URCAF Natural Sciences Session, Moderator Francis D’Souza

- 9:30 **B. Cooper**, “Building a Transcriptional Regulatory Network for Pollen-  
Specific Genes in Arabidopsis” Pg. 17
- 9:45 **J. Grove**, T. Cooper, and M. Van Stipdonk, ‘Differences in Collision-  
Induced Dissociation Energies for Protonated Peptides with Adjacent  
Amino Acid Enantiomers’ Pg. 17

|       |  |        |
|-------|--|--------|
| 10:00 | <b>S. Osburn</b> and M. Van Stipdonk, “Probing the Decomposition of Peptide Ions in the Gas-Phase Using Tandem Mass Spectrometry”  | Pg. 18 |
| 10:15 | <b>H.D. Pham</b> , J.G. Bann, and R.J. Collier, “Anthrax Toxin Pore: The Site Specific Incorporation of P-Fluoro-Phenylalanine within the Phenylalanine Clamp”                     | Pg. 18 |
| 10:30 | <b>Break</b>   |        |
| 10:45 | <b>K.M. Tran</b> , A.L. Schumacher, P.M. Smith, and F. D’Souza, “Electropolymerization and Characterization of Zinc Porphyrin-Fullerene Dyads for Solar Energy Conversion Devices” | Pg. 19 |
| 11:00 | <b>K. Walsh</b> , “Offline Training of a 2-and 3-Qubit Experimental Entanglement Witness”  | Pg. 19 |
| 11:15 | <b>L.M. Colwell</b> and K.R. Sharp, “Should Pain be Assessed as the Fifth Vital Sign?”   | Pg. 20 |
| 11:30 | <b>C. Bower</b> and D. McDonald, “Viability of PKU Mice”   | Pg. 20 |

## GRASP ORAL PRESENTATIONS

### GRASP Session 1, Moderator David McDonald

|       |  |        |
|-------|--|--------|
| 9:30  | <b>R.B. Naidu</b> , S.S. Bhargavi, C.K. Thorbole, and K.A. Soschinske, “Simulation of Hypervelocity Impact of Space Debris on a Spacecraft”    | Pg. 21 |
| 9:40  | <b>N.D. Ford</b> and L.S. Hale, “Measuring the Effectiveness of an In-Patient, Pharmacist-Managed Anticoagulation Service”                     | Pg. 21 |
| 9:50  | <b>J.R. Zimmerman</b> and D.M. Eichhorn, “Model Complexes for the A-Cluster of CODH/ACS”   | Pg. 22 |
| 10:00 | <b>J.L. Ceciliano</b> , “A Multiobjective Generation Expansion Model”  | Pg. 22 |
| 10:10 | <b>J.N. Howard</b> , “Visual Spatial Frequency and Color Association with Differential Waveform Driven Force-Feedback Vibration Periodicities” | Pg. 23 |
| 10:20 | <b>A. Gumm</b> , “A Bunch of Garbage?: How Sedgwick County’s Trash Came to be Exported and its Innovator Ignored”                              | Pg. 23 |

**GRASP Session 2, Moderator TBA**

- 10:45 **D. Aralumallige**, “Increased Stability of Solutions to the Helmholtz Equation” Pg. 24
- 10:55 **D. Williams**, J. Chau, J. Staib, B. Taylor, J. Trospen, and J. Wilson, “Effects of Cryotherapy on Quadriceps Concentric Peak Torque” Pg. 24
- 11:05 **S.B. McGehee**, “Vocabulary Strategies to Help Students to Remember Definitions” Pg. 25
- 11:15 **C. Patel**, S. Rao, and B. Driessen, “A Testbed for Mini Quad-Rotor Unmanned Aerial Vehicle with Protective Shroud” Pg. 25
- 11:25 **I.R. Santos-Pinzon** and M.A. Schneegurt, “Abundance of NifH Genes in Urban, Agricultural, and Pristine Prairie Streams Exposed to Different Levels of Nitrogen Loading” Pg. 26
- 11:35 **K. Dandel** and A. Griffin, “Are Primary Care Providers Identifying and Addressing the Use of Performance Supplements in Adolescent Athletes?” Pg. 26
- 11:45 **K. Grillo**, “Las Vegas, Capitalist Sin City to New Capital of American Freedom: A Case Study of the Use of Branding and Metaphor in Image Restoration” Pg. 27
- 11:55 **P. Tippayagosai**, “Feedback Quantum Control” Pg. 27
- 12:05 **S. Wilson**, “Towards an Artistic Synthesis of Audio/Video Composition” Pg. 28

**GRASP Session 3, Moderator Dennis Burns**

- 1:00 **M. Hanief** and T.S. Raviigururajan, “Bio-Thermal Battery for ICD's” Pg. 28
- 1:10 **C. Hall** and S. Nyberg, “Feeding Strategies of Premature Infants: Is Breast Milk Sufficient in Minimizing Growth and Neurodevelopmental Deficits?” Pg. 29
- 1:20 **S. Srikanthan**, J.L. Bowser, and J.V. May, “Expression of Germ Cell Nuclear Factor (GCNF) by Ovarian Cancer Cell Lines” Pg. 29

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|------|--|--------|
| 1:30 | <b>B. Summers</b> and L. Bakken, “The Effects of Family Structure and Parenting Style on the Overt Aggressive Behavior of Adolescents in High School”  | Pg. 30 |
| 1:40 | <b>R. Chandramohan</b> and J.E.Steck, “Adaptive Critic Flight Control”   | Pg. 30 |
| 1:50 | <b>W. Chien</b> , Q. Wu, D.A. Hanna, M.V. VanStipdonk, and G.S. Groenewold, “Gas-Phase H <sub>2</sub> O and O <sub>2</sub> Addition to UO <sub>2</sub> Complexes Containing Single Nitrile, Ketone or Amide Ligands” | Pg. 31 |
| 2:00 | <b>L. Parsons</b> , C.M. Elniff, N. Heersche, M. Jacka, and N. Maxwell, “Static vs. Dynamic Stretching on Vertical Jump and Standing Long Jump”  | Pg. 31 |
| 2:10 | <b>C. Cabrales-Clawson</b> , “Moving Beyond a Stereotype: Male/Female Income Differences among the Largest U.S. Hispanic Population”   | Pg. 32 |
| 2:20 | <b>D. Kalla</b> and P. Lodhia, “Committee Network (CN) Force Prediction Model in Milling of Carbon Fiber Reinforced Polymers”  | Pg. 32 |

**GRASP Session 4**, Moderator Twyla Hill

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|------|--|--------|
| 2:45 | <b>A. Kolachalama</b> and K.S. Raju, “Viscoelastic Clamp-up Relaxation of Blind Fasteners in Composites”   | Pg. 33 |
| 2:55 | <b>A. Weaver</b> and T. Quigley, “Attitudes and Practices of Physician Assistants in the State of Kansas with Regards to Opioid Management in Chronic Non-Malignant Pain Patients” | Pg. 33 |
| 3:05 | <b>K. Reuter</b> , “Inferior Vena Cava Filter Blockage: A Study of the Pressure Gradient across a Greenfield Filter which has Captured Emboli”                                     | Pg. 34 |
| 3:15 | <b>C. Feuille</b> , “A Structural Decomposition of the Marriage Premium”   | Pg. 34 |
| 3:25 | <b>P.K. Gagnebin</b> and S.R. Skinner, “Shift Register Using Quantum Bits”   | Pg. 35 |

## URCAF Non-Oral Presentations

**URCAF Poster Session**, Moderator Amy Mattson Lauters

- UP1 **J.D. Blakemore**, R. Chitta, and F. D'Souza, "Biotinylated Ferrocene and Fullerene Derivatives for Probing the Avidin-Biotin Molecular Recognition Process" Pg. 35
- UP2 **D. Franks**, J. Grove, and M. VanStipdonk, "Amide Derivatization and ESI Characterization of Fatty Acids" Pg. 36
- UP3 **C. Leavitt**, "Generation of Gas-Phase  $VO^{2+}$ ,  $VOOH^+$  and  $VO_2^+$ -Nitrile Complex Ions by Electrospray Ionization and Collision-Induced Dissociation" Pg. 36
- UP4 **E. Ndegwa**, E. Maligaspe, S. Gadde, and F. D'Souza, "Formation and Studies of Metal 8-Hydroxyquinolino-Fullerene Complexes" Pg. 37
- UP5 **L. Opara** and M.E. Zandler, "The Study of the Group Additive Properties of Fluorophore Appended Fullerene Dyads and Triads" Pg. 37
- UP6 **S.A. Perkins** and M.A. Schneegurt, "Ammonia Oxidation and the Detection of AMOA (Ammonia Monooxygenase) in Hypersaline Soils" Pg. 38
- UP7 **M.A. Simpson**, N. Milan, M. Giglip, R. Jones, J. Swearagin, and C. Radford, "Xylitol, the Molecular Battle against Bacteria and its Resultant Dental Diseases" Pg. 38

## GRASP NON-ORAL PRESENTATIONS

- GP1 **J. Bowser**, S. Srikanthan, W.J. Hendry, and J.V. May, "Expression of Growth Differentiation Factor-9 in the Developing Ovary and in Nonovarian Tissues" Pg. 39
- GP2 **G. Duncan**, **O. Garcia**, and **J. Straka**, "Comfort Suit for Formula 1 Racing" Pg. 39
- GP3 **L. Hein** and R. Muma, "C-Reactive Protein in the Detection of Inflammation and It's Role in Coronary Artery Disease" Pg. 40
- GP4 **J. Jaganathan**, V. Narayana, and S. Krishna, "Virtual Reality System with Haptic/Auditory Devices for Assembly and Maintenance Training" Pg. 40
- GP5 **L.K. Kliment** and K. Rokhaz, "Experimental Study of Aircraft Wake Vortices in Ground Effect" Pg. 41

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| GP6  | <b>L. Lohofener</b> and D. Cochran-Black, “Pregnancy Outcomes Comparing Low Molecular Weight Heparin vs. Unfractionated Heparin in Treating Thrombotic Conditions in Pregnancy” | Pg. 41 |
| GP7  | <b>T. Shagott</b> , M. Shepherd, and S. Wituk, “Trends among Consumer Run Organizations”  | Pg. 42 |
| GP8  | <b>L. Stiner</b> , “Report Rainbow United Inc, Autism Project: Spring 2004-Spring 2005”   | Pg. 42 |
| GP9  | <b>P. Vang</b> and D. Day, “Advantages and Disadvantages between Allograft versus Autograft in Anterior Cruciate Ligament Replacement”  | Pg. 43 |
| GP10 | <b>P. Wilson</b> , “Job Satisfaction of School Psychologists in Kansas”   | Pg. 43 |
| GP11 | <b>S. Arnold</b> and T. Quigley, “A Comparison of Psychotherapy to No Therapy in the Treatment of Patients with Personality Disorders”  | Pg. 44 |
| GP12 | <b>J.A. Dunlap</b> , “The Effects of Self-Questioning on Comprehension of Expository Text and Development of Content Writing with Second Grade Students”                        | Pg. 44 |
| GP13 | <b>S.S. Gowda</b> and J.D. McDonald, “Effect of Large Neutral Amino Acids on the Maternal Phenylketonuria Offspring”  | Pg. 45 |
| GP14 | <b>S. Holman</b> and S. Nyberg, “Determining Attitudes of Kansas Chiropractors Regarding Immunization Practices”  | Pg. 45 |
| GP15 | <b>S. Lacey</b> , S. Nyberg, and R. Muma, “Factors that Influence the Hiring of Physician Assistants by Specialist Physicians: A Pilot Study”                                   | Pg. 46 |
| GP16 | <b>A.B. Lakkundi</b> and K. Soschinske, “Developing Design Skills in a Global Learning Environment”   | Pg. 46 |
| GP17 | <b>M. Runnion</b> and W. Yang, “Fluvial and Lacustrine Depositional Systems and Cyclostratigraphy of Upper Permian Wutonggou Formation, Southern Bogda Mountains, NW China”     | Pg. 47 |
| GP18 | <b>K.D. Satish</b> and K.S. Raju, “In Plane Shear Response of Laminated Composites at High Strain Rates”  | Pg. 47 |
| GP19 | <b>J. Vestle</b> and J. Carter, “Evaluation of Primary versus Secondary Prevention of Cervical Cancer: An Evidence Based Literature Review”                                     | Pg. 48 |

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| GP20 | <b>C.C. Vu</b> , M.D. Sheperd, S.A. Wituk, and G.J. Meissen, “Hand in Hand: Supporting the Development of Organizations Run by People with Severe and Persistent Mental Illness”   | Pg. 48 |
| GP21 | <b>D. Benning</b> and A. Griffin, “Is Atomoxetine as Effective as Methylphenidate in Controlling Behavioral Problems in Children with Attention-Deficit/Hyperactivity Disorder?”   | Pg. 49 |
| GP22 | <b>R. Chitta</b> , G. Suresh, M.E. Zandler, A.L. McCarty, A. Sandanayaka, A. Yasuyaki, I. Osamu, and F. D’Souza, “Design and Physico-Chemical Studies of “Two-Point” Bound Supramolecular Porphyrin-Fullerene Conjugates Formed by Cation-Crown Ether Complexion and Axial Coordination or $\pi$ - $\pi$ Interactions” | Pg. 49 |
| GP23 | <b>L. Humphries</b> and R. Muma, “A Comparison of Interviewed and Non-Interviewed Student Cohorts for the PA Program of Study and National Physician Assistant Certification Exam Scores”  | Pg. 50 |
| GP24 | <b>L. Harvell</b> and <b>E. Lamm</b> , “Desperate Culture: An Analysis of ‘I Love Lucy’ and ‘Desperate Housewives’”  | Pg. 50 |
| GP25 | <b>K. Marlow</b> and R. Muma, “Evidence of Psychopharmacological Treatment Causing Suicidal Ideation or Suicide among Adolescents and Children”  | Pg. 51 |
| GP26 | <b>R. Prezas</b> , “Determining Optimal Spanish Speech/Language Words for Testing Young Spanish-speaking Children: Creating a Foundation for Improving Assessment Procedures”  | Pg. 51 |
| GP27 | <b>F. Sayeed</b> and J.E. Steck, “Damage Tests on an Adaptive Flight Control System”   | Pg. 52 |
| GP28 | <b>C.A. Widener</b> , “Evaluation of Post-Weld Heat Treatments for Corrosion Protection in 2024 and 7075 Aluminum Alloys”  | Pg. 52 |
| GP29 | <b>D. Wilson</b> and R. Muma, “Packrat: A Predictor of PANCE Score”  | Pg. 53 |
| GP30 | <b>R. Yedehalli</b> , “Capacity Partitioning and Resource Allocation Framework for Appointment Allocation in Rehabilitation Outpatient Clinics”  | Pg. 53 |
| GP31 | <b>S.R. Alavi-Soltani</b> , “Bioengineering Applications of Lithium-Ion Batteries”   | Pg. 54 |
| GP32 | <b>K. Blackburn</b> , “Drug Usage Evaluation: Nesiritide (Natrecor <sup>®</sup> )”   | Pg. 54 |

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| GP33 | <b>T. Gregory</b> , S. Wituk, and G. Meissen, “Compassion Kansas: Strengthening Community and Faith Based Organizations through Capacity Building”  | Pg. 55 |
| GP34 | <b>K. Joice</b> and P. Bunton, “Etiology of Depressive Symptoms in Parkinson's Disease: A Result from Neuroanatomical Deficiencies or a Consequence of the Psychosocial Stress of PD Diagnosis” | Pg. 55 |
| GP35 | <b>Y.M. Kim</b> and J.M. Watkins, “Robust and Reduced Order Fault Detection Filter Design Via LMI Approach”   | Pg. 56 |
| GP36 | <b>R. Kirgan</b> and D.P. Rillema, “A Study of a Calix[4]Pyrrole Containing the Side Groups 4,5-Diazafluorene”  | Pg. 56 |
| GP37 | <b>S. Lakshminarayanan</b> and J.E. Steck, “Different Control Methods for Adaptive Flight Control System”   | Pg. 57 |
| GP38 | <b>J. Stanley</b> and A. Griffin, “The Effects of a Mediterranean Diet vs. a Low-Carbohydrate Diet on C-Reactive Protein Levels”  | Pg. 57 |
| GP39 | <b>R. Yeilding</b> , “Where is Mr. Clean? Household Division of Labor and the Pay Gap between Men and Women”  | Pg. 58 |
| GP40 | <b>I. Alwis</b> and W. Hendry, “Mechanism of Ovarian Disruption by Neonatal DES Exposure: A Modified Ectopic Approach”  | Pg. 58 |
| GP41 | <b>R. Crowe</b> , “Does it Start in the Home? An Analysis of the Effects of Family Structure on Academic Achievement”   | Pg. 59 |
| GP42 | <b>A. Dugan</b> , “Assessing the Validity and Reliability of a Paper-and – Pencil Piagetian Test”   | Pg. 59 |
| GP43 | <b>T. Emami</b> , “A Unified Procedure for Continuous-Time and Discrete-time Root-Locus and Bode Design”  | Pg. 60 |
| GP44 | <b>B. Gates</b> and A. Griffin, “Pharmacologic Treatment Options for Post-Stroke Depression: Selective Serotonin Reuptake Inhibitors vs. Tricyclic Antidepressants”                             | Pg. 60 |
| GP45 | <b>B. Koster</b> and R. Muma, “Factors Contributing to Tobacco Use Among Physician Assistants in Kansas”  | Pg. 61 |
| GP46 | <b>P. Lytle</b> , “Virtual Reality as a Tool for Assuring Code Compliance in Facility Design and Construction”  | Pg. 61 |

- GP47 **G. Nighojkar** and J. Watkins, “Constrained Area Coverage for Mobile Sensor Network” Pg. 62
- GP48 **L. Rogers**, S. Yellappa, and F. D’Souza, “Physico-Chemical Studies of Interactions of Water Soluble Brominated Porphyrins with DNA” Pg. 62
- GP49 **M. Takaishi**, P. Bunton, and R. Muma, “Attitudes Towards and Awareness of Gay and Lesbian Patients: A Survey of Physician Assistants” Pg. 63
- GP50 **Musa Aykut Canbolat**, SreeRamya Yelisetty, and Kamesh Namuduri, “Video Surveillance Using Wireless Sensors” Pg. 63

# Koiane

Orion Dyson-Smith

*Department of Studio Art, College of Fine Arts*

The intent with this painting was to weave a visual story on the panel. Color and imagery were combined to craft a setting, a mood, character elements, and a loose narrative - a foundation distilled from our common experience of stories and fairy tales. Like many of my recent paintings, the work relies not on any specific published story, but rather on our ability to communicate deeper experiences through the metaphor of story.

Visually, the painting strikes a balance between realism and abstraction. Five cranes intertwine in the foreground, plummeting towards the earth. The birds not only function as character elements, but also as realistic elements to provide a viewer with an “entry point”, or point of familiarity. Their bodies dissolve into a background of abstract green-black night, which helps create a somber mood. A city on a hillside below provides setting, and specific detail appears with a lone spinning wheel on a rooftop in the foreground.

The implied narrative describes the devastation of the city by the cranes, harbingers of both destruction and rebirth. The vertical proportions of the piece, referencing doors, columns, and the figure, have built an underlying structure of transitional and spiritual themes. Laid over this foundation, the theme of the city’s destruction becomes a metaphor for human struggle. Artistic influences include: William Turner’s depictions of landscapes, Jan Vermeer’s study of light, Caspar Friedrich’s simplicity of composition, Eadward Muybridge’s bird photography, and Chinese landscapes by Ando Hiroshige for their elegant compositions in a vertical format.

# The Jester

Orion Dyson-Smith

*Department of Creative Writing, Fairmount College of Liberal Arts and Sciences*

Chris, the protagonist, is a new employee at a novelty store in a New Mexico shopping mall. Jersey, an older co-worker, also in High School, convinces Chris to hide in the store overnight with him and deface the interior as a prank. Their mischief takes a serious turn in the early hours of the morning when Jersey introduces his very real plan for robbery. Their opposing worldviews and unspoken jealousies boil to the surface, and in the last scene of this one-act, Chris must struggle to choose between his unproven morals, greed, and his desire for acceptance.

The focus is on the dialogue between the two young men and the clashing of their wills and backgrounds. In their conversation, a tension is strung between similar interests and mutual competition. Along it travel the topics of love, religion, morals, music, and, occasionally, an impossible yearning for friendship. Throughout the story, the reader is kept close to the motion of Chris’ heart: his confusion, conflicting desires, loneliness, and idolization of the older Jersey. As the characters unearth their histories, the Halloween costumes, superhero masks, and games they vandalize in the store become physical symbols of the childhood they are leaving behind.

The author is greatly indebted to short stories by Hemingway and Joyce Carol Oates for their emphasis on dialogue and adolescence, Shakespeare’s Othello in its study of jealousy and manipulation, and the short works of T.C. Boyle for their delicate but poisonous twists within the complex threads of a relationship.

## Caregiver

Maria Tate (choreographer), Amy Simonson, Ryan Squires, Hayley Fowler,  
Angela Johnson, Michelle Calhoun, and Christina Caley  
*School of Performing Arts, Department of Dance, College of Fine Arts*

This is a contemporary dance work in the neo-post modern tradition. It explores how we care for those we love, and this brings us pain. This work was created through a rehearsal process, including discussing with the dancers their own feelings and experiences of either caring about someone too much, or not allowing people to take care of them. From these discussions we found movement I felt expressed or at least explored this.

## Secret Susie

Jeanne Hart

*Department of English, Fairmount College of Liberal Arts and Sciences*

My story began as an assignment mid-way through creative writing class, testing the skill of using concrete details to develop a convincing reality that is literally impossible. By applying new fiction writing techniques, taught as the course progressed, I revised my narrative craft bringing it to the point it is today.

“Secret Susie” exhibits mankind’s desire and need for acceptance by other people. It portrays an extreme that a person will go to in order to gain the approval of another. Insecurity and the fear of being alone after the loss of a loved one are also touched on.

Death steals Mary’s husband. Mary wishes her children, Greg, a senior in high school, and Janelle, remain just that...children. Greg objects when his mother gives his sister a doll named Secret Susie for her eighth birthday.

Janelle desperately seeks her older brother’s approval and senses his seeing her extensive doll collection as a sign of immaturity and a substitute for real friends, so she attempts to change his opinion.

Secret Susie joins forces with Janelle and gets revenge for Greg’s attack. He simmers over the doll’s actions, loses control, and threatens to move out of the house.

In the end, one sibling stands outsmarted by the other.

# The Façade of State: The Obsolescence of the Nation-State in an Era of Globalization

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In an era during which commerce, communications and humanitarian initiatives outgrow geopolitical boundaries and purport themselves at the global level one may rightfully wonder what role the individual state assumes throughout this process of globalization. Is this role active, regulatory, symbolic, or even *sideline*? In conducting a literature review of relevant academic sources the researcher will elucidate several military, economic, and juridical developments that obviate the role of the nation-state in the dissemination of political power. Recent domestic upheavals and revolutions do not affect the global agenda. The global political order is legislatively responsive to the wealthiest geographic regions. It is militaristically responsive to terrorist networks with no geopolitical claims. Finally, it is increasingly financed by corporations and collectivized funds. Thus, the researcher will conclude that these globalizing trends demonstrate the growing obsolescence of the nation-state within a framework that can only be called “international” or “united” in theory.

## Angola: A Nation Born to War

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The goal of this paper was to examine the lessons that could be learned from Angola’s 30 year civil war. The research focused on two key questions. What factors contributed to the length and intensity of the conflict? And, why did international attempts at peace keeping fail so utterly?

Research combined traditional library time with internet access to official documents, and conversations with diplomatic experts. The library proved useful for finding thorough background, the internet provided access to documents prepared by peacekeeping experts associated with government and non-government groups and the experts I spoke with provided insight into the realities of diplomacy.

Over the course of my research I found that Angola’s civil war reflects many stereotypes associated with African civil wars, including: superpower manipulations, diamond smuggling, brutal violence against civilians, and the complete failure of outside mediators to initiate a lasting peace. The failure of two UN peacekeeping forces demonstrates how little practical expertise exists in the fairly new field of peacebuilding. In examining the peace that came seemingly out of no where, my research showed that key elites can play incredibly powerful roles in the persistence of conflict.

While my research left many unanswered questions, it provided a glimpse of the wealth of knowledge that can be gleaned from analyzing this archetypical civil war. Angola’s civil war represents the types of challenges that the field of peacebuilding will face as it develops in this new century.

# Death in Good Shepard

Jade D. Hudson

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“Death in Good Shepard is a short story that focuses on the basic human need for family. A young man, Blake, is struggling with an odd problem. He has, for six years, kept up a charade that his father is alive. He has been placed in the Good Shepard Mental Ward. Blake knows that he does not belong in the ward. He is even nervous about his fellow mental patients discovering that there is nothing wrong with him. He hates the ward and he hates the doctors. However, he knows that he cannot escape without simply admitting that his father is dead (the last thing on Earth he wants to do). There is humanity in this characteristic of denial. He will ignore all other aspects of suffering to accommodate an illusion that keeps him from being alone. His illness is one of selfish need (human need).

I wrote this story for my English 301 fiction writing course. I did numerous drafts and ended up weeding out quite a bit that was not crucial. In construction I broke my habit of using too much thought. I wanted Blake to be more defined through his eyes and his personality.

## Investigating the Relationship between Amount of Exercise and Incidence of Addictive and/or Obsessive Compulsive and Narcissistic Personality Traits

Crishel Kline and Dr. Robert Zettle

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The relationship between different exercise groups and specific personality characteristics was investigated. A total of 145 participants took part in the study. All participants completed the Personal Experiences Questionnaire, which consisted of 123 items total. Of those items, ten pertained to the exercise category of the participant. The remaining items were randomly assigned in forced-choice true/false formats that were designed to access characteristics of narcissistic personality, addictive personality, and obsessive-compulsive personality. Four groups of exercisers were derived from the data gathered: nonexercisers, moderate exercisers, intense exercisers, and competitive bodybuilders. No significant differences were found among the four groups of exercisers on the previously mentioned personality variables, which conflicts with findings from other studies that have documented elevated levels of narcissism among competitive bodybuilders. Bodybuilders participating in this project, however, were significantly older than the other three groups of exercisers and bodybuilders evaluated in other studies, suggesting that the psychological functions served by bodybuilding may vary by age.

# Caspar David Friedrich: Art and the Romanticization of Christian Narrative

Rebecca Irene Rolph

*School of Art & Design, Department of Art History, College of Fine Arts*

**Research Questions:** Unlike English, French, and Spanish Romantic artists, who avoided overt references to Christian narratives, German Romantic painter Caspar David Friedrich frequently explored these themes in his art. How did Friedrich’s understanding of humankind’s relationship with God affect the content of his landscapes? How did Friedrich’s depictions of nature and individualism reflect nineteenth-century Protestant sensibilities?

**Methods:** This study requires historical examination and interpretation of Friedrich’s oeuvre, as well as an analysis of 19<sup>th</sup>-century German spirituality, secular philosophy, and continental European landscape painting conventions.

**Findings and interpretations:** Unlike his other European contemporaries, Friedrich addressed the significance of Christianity through extended interrogations of landscape and mappings of humankind’s relationship to that landscape. Through a simplification of Christian narrative and iconography, Friedrich’s paintings—such as *Abbey in the Oakwood* from 1809-1810—fashion nature as the ultimate intermediary between the individual and God.

**Summary and conclusions:** The cultural conditions present in 19<sup>th</sup>-century Germany fashioned Romanticism as a movement that could incorporate significant elements of the spiritual and the secular. Friedrich’s works reflect an understanding of Christianity based not only on Biblical narrative, but also humankind’s individual relationships with nature and environment.

## Dig

Corey Smith

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These are the character-driven, coming-of-age short stories about Midwestern young people, all told in the first person narrative. The language is colloquial and the voices urgent and often desperate. This collection shows the clear influence of J.D. Salinger, especially Holden Caulfield in *Catcher in the Rye*. The stage of life, the personality, and the situation of each character varies, but all see themselves as outcasts.

“Teenage Guide to Mary Pat” is a rollicking tale about four high school sophomores tutored in sex by their older, but immature friend Mark. “Dig” warns the reader of the dangers involved with assuming and believing in stereotypes. A young house framer is nervous when he has to spend the day alone with his foreman, the older and overbearing Kelly, whose wife has just left him. When they hit a bulldog on the way to see Kelly’s wife, both try to hide their emotions.

“Maps of Jennifer” is narrated by a broken-hearted eight-year-old boy coming to terms with his feelings of abandonment after his sister Jennifer runs away. The boy feels guilty; he had a fight with her before she left. Ultimately, he wanders into the night in search of Jennifer.

“Todd’s Punch” deals with the judgments we cast on others. A shy, seventeen-year-old boy skips school to plan a bachelor party with his sister’s boyfriend Todd. The boy is apprehensive because Todd is flamboyant, confident, and at times an intimidating man. Ultimately, the narrator learns that in a pinch Todd is responsible and selfless.

# Building a Transcriptional Regulatory Network for Pollen-Specific Genes in Arabidopsis

Bailey Cooper

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Cis-elements are short DNA sequence motifs in the promoter of a gene. As binding sites for transcription factors (proteins which turn genes on or off), they are important in regulating gene expression. Interactions between cis-elements and transcription factors can be used to build a transcriptional regulatory network, providing a resource for analyzing gene expression at the transcription level. The objective of this research is to identify cis-elements in the promoters of pollen-specific genes, thus identifying the elements that are responsible for the specific expression. Understanding the regulation of pollen-specific genes will provide insight to our knowledge and potential application in agriculture. To achieve our objective we used computational approaches to identify cis-elements in the promoters of genes that are expressed similarly in pollen. We used the fully sequenced Arabidopsis genome and its abundant genomic resources to identify pollen-specific genes and their promoter sequences.

We have isolated some promoters from genes that are specific to pollen based on microarray data. Initially we identified genes earlier identified as pollen-specific that appear not to be specific. Our next step is to use computer programs such as MEME and MotifSampler to identify consensus sequences from promoter of co-expressed genes. To validate the function of these sequences in pollen-specific expression, we will compare them with cis-elements identified previously or examine their ability to drive reporter gene expression in an experimental system.

## Differences in Collision-Induced Dissociation Energies for Protonated Peptides with Adjacent Amino Acid Enantiomers

Jerod Grove, Travis Cooper and Mike Van Stipdonk

*Department of Chemistry, Fairmount College of Liberal Arts and Sciences*

Collision-induced dissociation and tandem mass spectrometry are widely used to identify peptides and proteins. In this study, we explored the extent to which various fragmentation reactions/pathways of protonated and metal-cationized peptides, and in particular the CID energies required to generate sequence ions, are influenced by the presence of different enantiomers of the same  $\alpha$ -amino acids in adjacent sequence positions.

Peptides with general sequence XYGG, GXYG, GGXY and GGXYG, (X and Y represent l- or d-leucine) were synthesized and subjected to CID in protonated or Na-cationized form. The peptides were designed such that adjacent XY residues were either d-d, d-l, l-d or l-l. Influences of enantiomer arrangement were identified using dissociation profiles (changes in product ion intensity as a function of applied activation voltage), generated using energy-resolved CID.

The results clearly show that different enantiomers of the same amino acid in adjacent positions along a peptide chain can influence the collision energies required to generate sequence ions. Preliminary investigations suggest that the magnitude of the influence is dependent on the amino acid, and follows the trend  $V > L > A$ . This observation is consistent with the pronounced

# Probing the Decomposition of Peptide Ions in the Gas-Phase Using Tandem Mass Spectrometry

Sandra Osburn and Michael Van Stipdonk

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While collision-induced dissociation/tandem mass spectrometry is the method-of-choice for rapid peptide and protein identification, many details about how peptide ions fragment in the gas-phase remain poorly understood. The  $b_x^+$  type ions formed by collision-induced dissociation form a partially cyclized structure. The  $b_x^+$  ions dissociate to form  $a_x^+$  ions by the loss of CO. We studied the effect of changing the size of the R group on the cyclic portion of the  $b_3^+$  ion on the formation of the  $a_3^+$  ion using a series of peptides with general sequence GGXG. This GGXG series was compared to a GXGG series, in which the X amino acid was next to the cyclized portion of the  $b_3^+$  ion. Both of these sets of peptides were studied in different cationized ( $H^+$ ,  $Li^+$ ,  $Na^+$ ,  $Ag^+$ ) form to see how the presence of different metals effected the formation of the  $a_3^+$  ion. For both the GGXG and GXGG series the larger the R group on the X amino acid got the less energy it took to form the  $a_3^+$  ion. We found that the GGXG series required less collision energy to form the  $a_3^+$  ion than the GXGG series. When comparing the metal cations it was found that the larger the metal ion present the more energy it took to form the  $a_3^+$  ion. It was further noted that the presence of metals stabilized the  $a_3^+$  ion, where the proton did not.

## Anthrax Toxin Pore: The Site-Specific Incorporation of P-Fluoro-Phenylalanine within the Phenylalanine Clamp

Hang D. Pham<sup>1</sup>, James G. Bann<sup>1</sup>, and R. John Collier<sup>2</sup>

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The anthrax toxin, derived from *Bacillus anthracis* has three vital components that are effective when combined. The anthrax toxin consists of protective antigen (PA<sub>83</sub>), lethal factor (LF), and edema factor (EF). Proteases would cleave the PA<sub>83</sub> into two fragments: PA<sub>20</sub> and PA<sub>63</sub>. PA<sub>20</sub> would dissociate meanwhile PA<sub>63</sub> would remain attached onto the cell and undergo oligomerization to form the heptameric prepore structure. The binding of LF and EF to PA<sub>63</sub> would cause the formation of the toxic complex. Within the stem of the  $\beta$ -barrel are seven phenylalanine residues (F427), it is hypothesized that it may play a significant role in the channeling of the toxin factors. So, by site-specifically incorporating p-fluoro-phenylalanine can we determine the distance of the residues and its role in channeling of the toxin factor? A technique that will be utilized is the *Rolf Furter Method*, which incorporates the *E. coli* strain K10-F6 $\Delta$  with genes for the yeast PheRS, yeast suppressor tRNA<sup>Phe</sup>, and the amber stop codon. By site-specifically incorporating p-fluoro-phenylalanine, we can analyze with <sup>19</sup>F-NMR. Data have been gathered but will be interpreted and discussed at the meeting. By site-specifically incorporating p-fluoro-phenylalanine we can determine if the seven phenylalanine residues play an important role in the regulation of channeling of the toxins into the cytosol, which can further enhance medicinal therapies for anthrax and contribute research for a cure.

# Electropolymerization and Characterization of Zinc Porphyrin Fullerene Dyads for Solar Energy Conversion Devices

Kim M. Tran, Amy L. Schumacher, Phillip M. Smith, and Francis D'Souza  
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Porphyrins have been vastly utilized as donors in solar energy conversion and electron transfer systems. Similarly, fullerene,  $C_{60}$ , as acceptor offer advantages in constructing artificial photosynthetic systems due to their ability to accept six electrons reversibly. For developing solar energy harvesting devices, the donor and acceptor entities need to be attached to a surface in a well-defined fashion. This has been achieved in the present study where two porphyrin derivatives, namely, tetrakis N,N-diphenylaminophenyl-porphyrinatozinc and tetrakis dimethylaminophenyl-porphyrinatozinc, were newly synthesized and polymerized on electrode surfaces. The porphyrin films were formed on both platinum and indium tin oxide (ITO) electrodes by multiple oxidative cycling using cyclic voltammetry. These electrodes were then allowed to self-assemble via axial coordination to imidazole appended fullerene thus forming donor-acceptor dyads on the electrode surface. The surface modified electrodes were characterized by electrochemistry and optical absorption methods. Preliminary studies using fluorescence spectroscopy displayed efficient electron transfer in these donor-acceptor systems suggesting that these electrodes could be useful for constructing solar energy harvesting devices.

## Offline Training of a 2- and 3-Qubit Experimental Entanglement Witness

Kathy Walsh  
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Entanglement is a fundamental property of quantum systems which makes quantum computation possible. With quantum communication and computing we will be able someday to do calculations which are either very very difficult or impossible with conventional methods. The measurement of entanglement therefore becomes of great interest. Here, we develop a method for the determining the entanglement of a 2- or 3-qubit quantum system. We use a quantum learning algorithm to train the quantum system to measure its own entanglement. We present the results of simulations using MATLAB, and compare our results to other published methods. Unlike all other published methods, we can find the entanglement of a system whose state is unknown, and with comparable accuracy. If quantum computing is to be more than a very expensive method for calculating things we already know, we need a general, scalable method for programming. Neural and AI methods offer a rich potential that we are just beginning to exploit.

## Should Pain be Assessed as the Fifth Vital Sign?

Lisa M. Colwell and Kimberly R. Sharp  
*College of Health Professions*

Does assessing pain as the fifth vital sign aide in improving patient outcomes? Does developing a collaborative pain management plan with the patient decrease the severity of pain and minimize complications and morbidity? Does the use of non-opioids, in conjunction with opioids and adjuvants aide in more effective pain management? The methods used were peer review, randomized controlled clinical trials, nonrandomized case control studies, and meta-analysis. Findings and interruptions indicated that pain should be managed as the fifth vital sign, collaborative pain management plans with the patient does decrease severity of pain and minimizes complications and morbidity, and the use of non-opioids, in conjunction with opioids and adjuvants does increase the effectiveness of pain management. Due to the Veteran's Administration findings, JCHCO implemented assessing pain as the fifth vital sign in all hospitals that accept Medicare as mandatory practice as of 2001.

## Viability of PKU Mice

Christina Bower and David McDonald

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Phenylketonuria (PKU) is a metabolic disorder in which phenylalanine (phe) is not correctly converted into tyrosine (tyr). This disorder causes an excess of phe to accumulate in the blood, which can cause mental retardation and other debilitating affects. In this study, mice were used as a model to study PKU. Matings were performed with a male homozygous mutant genotype and a female heterozygous mutant genotype. The sex and phenotype were collected when mouse pups were weaned from their mother. The data were analyzed to investigate the hypothesis that mutant PKU mice will have a survival rate at weaning no lower or higher than that of non-PKU mice. The results indicated that the null hypothesis was rejected. There was a significant drop in mouse survival of PKU mutants compared to that of non-PKU mice. One possible explanation is that PKU mutant mice are runted at birth so they compete for attention and food; however it is unclear at this time what the definitive cause may be. This may be uncovered upon further research.

# Simulation of Hypervelocity Impact of Space Debris on a Spacecraft

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Space debris or space junk, are small fragments, in Earth orbit, from spent rocket stages and non-functional satellites. Accumulated in the lower earth orbit, these often cause considerable damage to orbiting spacecraft. Hence it is necessary to develop ways to protect the newly placed spacecraft from the debris. The motivation for the project stems from the current NASA EPSCOR grant for designing a portable friction stir welder intended to repair damage to the spacecraft. The development of this system requires an understanding of the extent of damage caused to the spacecraft shielding, typically consisting of a sacrificial shield and a pressure shield. The goal of the project was to predict the extent of damage on the pressure shield for various impact scenarios by modeling and validating the debris generation due to this high velocity impact. Initially a one shield model was used. LS-DYNA, a non-linear finite element dynamic analyzer, was used to perform simulations using a spherical impactor (5, 10 and 15mm diameter) impacting a plate of 2.5 mm thickness. The material for the plate and impactor was alloy Al6061-T6. Correlation of the model with a published experimental result provided a benchmark to simulate cases with varying impactor sizes. It was inferred that petaling effects and the size of hole formed in the shield reduced with the increase in impact velocity. Future work would involve modeling a two shield system to obtain the extent of main pressure shield damage.

## Measuring the Effectiveness of an In-patient, Pharmacist-Managed Anticoagulation Service

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**Background:** Warfarin and heparin are anticoagulant medications that require individualized dosing and intensive laboratory monitoring to avoid both serious bleeding and blood clots. **Objective:** This continuous quality improvement study provides descriptive information regarding the effectiveness of an in-patient, pharmacist-managed anticoagulation service in meeting national consensus treatment guidelines, including: 1) heparin pretreatment, 2) warfarin dosing/monitoring, 3) vitamin K and blood product usage, and 4) adverse events and outcomes. **Methods:** Computerized medical records and patient charts were reviewed for 28 patients receiving this service from Sep 2004 to Mar 2005 as well as 29 case-matched controls, managed by individual prescribers. Comparative statistical analysis was not performed due to small sample size. **Results:** Of 29 pharmacist-managed patients evaluated, 17 patients were taking warfarin prior to admission and 11 patients started during hospitalization. Only 36% of patients received a warfarin/heparin overlap in full accordance with guidelines and 36% were discharged before warfarin became effective. None of the patients exceeded the recommended warfarin starting dose. Three patients required administration of vitamin K or a blood product. Four patients were readmitted within 6 months of discharge for excessive anticoagulation - no patients were readmitted with blood clots. The pharmacist- and prescriber-managed groups showed similar results. **Conclusion:** This pharmacist-managed service did not entirely meet the desired consensus treatment goals. Possible improvements to the service and its delivery are explored.

# Model Complexes for the A-Cluster of CODH/ACS

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Carbon Monoxide Dehydrogenase / Acetyl CoA Synthase (CODH/ACS) is a bifunctional enzyme that catalyzes the reduction of CO<sub>2</sub> to CO and the assembly of Acetyl CoA. The A-cluster – site of Acetyl CoA synthesis - has a number of features which distinguish it from other natural-occurring metalloenzymes: it is one of few enzymes which contain an active-site nickel atom, some of the donors to the metal are amide nitrogens from the protein backbone, and the catalytic cycle involves an organometallic intermediate. Crystallographic characterization of the A-cluster (Figure 1, Darnault, *et al.*, *Nat. Struct. Biol.* **2003**, *10*, 271) shows a Fe-S cubane bridged by a cysteine thiolate to a dinuclear Ni( $\mu$ -CysS)<sub>2</sub>Ni cluster. Model complexes are useful in gaining a more complete understanding of the catalytic mechanisms. We report our efforts aimed at the synthesis of models for the asymmetric dinuclear cluster (Figure 2) with two nickel atoms bridged by two sulfur atoms: Ni<sub>d</sub>, having N<sub>2</sub>S<sub>2</sub> coordination and Ni<sub>p</sub> having NS<sub>3</sub> coordination.

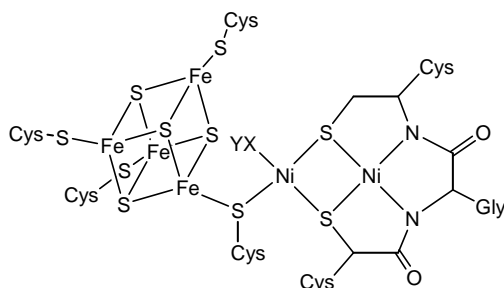


Figure 1: Structure of the CODH/ACS A-Cluster

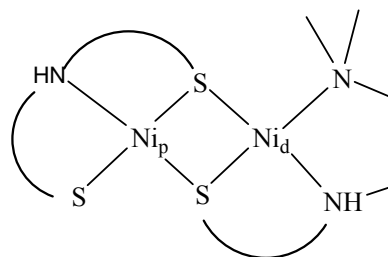


Figure 2: Proposed dinuclear nickel model complex

## A Multiobjective Generation Expansion Model

Jose L. Ceciliano

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This paper describes and evaluates a multiobjective model for power generation expansion planning problem. In this model, we try to optimize multiple objectives while giving priorities to renewable generation technologies and having several geographical location alternatives for the planned generation units. Using multi-criteria decision making methods as multiobjective linear programming and analytical hierarchy process, we propose a method to solve this problem. A case study from the Mexican Power System is used to illustrate the proposed framework.

# Visual Spatial Frequency and Color Association with Differential Waveform Driven Force-Feedback Vibration Periodicities

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This study investigated the relationship between visual stimulus spatial frequency, force-feedback (FF) square, triangle, and sinusoidal wave driven vibrational periodicities, and their association with the visible light spectrum colors (red, orange, yellow, green, blue, indigo, violet) ROYGBIV. A customized FF joystick program presented randomly ordered .01, .015, .03, .045, and .09 seconds-per-cycle period FF vibrations while soliciting participant color-choice. Each vibration was randomly presented 10 times across 50 trials. Analyses indicate significant but differing color-association preference for square, triangle, and sinusoidal waveform driven vibrations. Results also suggest cross-modality processing of tactile-vibration and color-vision information as dependent upon the natural order of visible spectrum light—significant color and vibration association results occurred exclusively when a color visual stimulus was presented in a low spatial frequency natural sinusoidal wave pattern (rainbow) vs. a high spatial frequency unnatural square wave grating pattern.

## A Bunch of Garbage?: How Sedgwick County's Trash came to be Exported and its Innovator Ignored

Angie Gumm

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The EPA estimates that the average American throws away 4.6 pounds of trash per day, of which 57%, or 114 million tons per year, is disposed of in one of the nation's 3,500 landfills. Despite the growing presence of trash, innovative trash-handling methods have not been adopted in Sedgwick County, and landfills and transfer stations have been the consistently chosen solutions of local leaders, leaving other options in the dustbin of public policy. The transferring of waste from our community and the attention given to "feel good" but non-cost effective measures like recycling, have minimized concern over the heaping trash problem.

A local man, Bill Compton, has spent 35 of his 83 years trying to persuade local, state and national officials, as well as private industries, to adopt the technique of pyrolysis, which is based on ancient technology and works like a distiller to convert all non-metal trash into oil, carbon and gas, turning waste into profit. With the help of friends and businesses, Compton built a prototype of his pyrolysis plant and successfully operated it for 300 hours, converting approximately 750 pounds of trash into oil, carbon and gas in his own backyard.

In the late '90s local officials expressed interest in Compton's pyrolysis proposal and innovative trash options in general, but when the County finally released their Five Year Solid Waste Plan Review in 2003, there was no mention of pyrolysis, technology, or innovations. This paper will examine why local officials over the last three decades have extensively debated the waste issue, yet maintained their temporary, non-innovative solutions like local landfills and transfer stations. Additionally, it will show to what extent alternative options, like pyrolysis, were ever considered.

# Increased Stability of Solutions to the Helmholtz Equation

Deepak Aralumallige

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Study of the Cauchy problem for Helmholtz equation is stimulated by the inverse scattering theory and more generally by remote sensing. Remote sensing is a general field of study in which one obtains the properties (shape, size etc) of an obstacle using the reflected waves (acoustical or electromagnetic waves). This phenomenon is modeled by the Helmholtz equation. This paper explains the increased stability of the Cauchy problem for Helmholtz equation when the frequency increases. This is demonstrated using analytical and numerical results. The stability estimate is obtained inside the whole domain. The numerical algorithm used is based on the spherical harmonics and Bessel functions.

# Effects of Cryotherapy on Quadriceps Concentric Peak Torque

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**Study Design:** Single-occasion, repeated-measures design.

**Objective:** Examine the effects of ice on concentric muscle strength, as measured by peak torque, of the quadriceps muscle following exercise.

**Background:** Cryotherapy is the application of cold for the treatment of acute trauma, subacute injury, and for the decrease of discomfort after reconditioning or rehabilitation. If applied following an injury, cryotherapy has been shown to decrease pain, muscle spasms, tissue damage, and/or swelling. Research results are equivocal about the effects of cryotherapy after exercise and its effects on strength production.

**Methods:** A convenience sample of 30 adult male volunteers was studied. Inclusion criteria required a BMI of  $\leq 29.9$ . The control group consisted of 13 subjects; the treatment group, 14. Concentric quadriceps peak torque was measured using an isokinetic machine at 60°/s and 240°/s. Peak torque was measured pre and post exercise. The treatment group received ice after exercise and peak torque was measured until both groups returned to baseline.

**Results:** The treatment group took significantly longer to reach baseline peak torque at 60°/s. Torque production immediately following icing is significantly decreased at a speed of 240°/s.

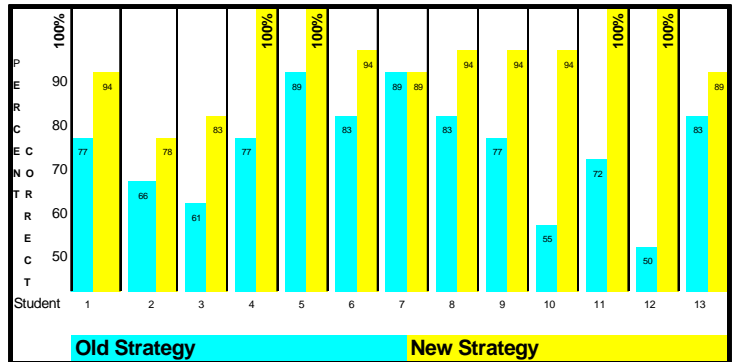
**Conclusion:** The results indicated icing may affect peak torque production or time required to return to peak torque of the quadriceps muscle group. Athletic performance may suffer a temporary impairment resulting in an injury.

# Vocabulary Strategies to Help Students Remember Definitions

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The goal of this study was to determine if a specific strategy designed to teach students vocabulary words would affect long term memory. Students should remember words even after the test. The students were members of a fifth grade reading class. The group, 13 students, was taught vocabulary for 3 weeks using one strategy and then 3 weeks using a different strategy. Long term evaluations were given 2 weeks after each week of initial instruction to evaluate long term memory. The latter strategy used research-based activities incorporating three different modalities. Research was supported because class averages increased by 20%. All students increased individual percentages except 1 student who maintained the same percentage. The graph below shows individual student averages for each strategy.



# A Testbed for Mini Quad-Rotor Unmanned Aerial Vehicle with Protective Shroud

Chirag Patel, Srinivas Rao and Brian Driessen

*Department of Mechanical Engineering, College of Engineering*

Potential application of small rotorcraft unmanned aerial vehicles (UAVs) ranges from military missions to exploration of the Planet Mars. Tasks like, exploration of unknown territories, formation flying, intelligence gathering etc, require unmanned aerial vehicle to be capable of flying very close to other flying or steady objects. Exposed rotary wings limit rotorcraft vehicle's capability to fly in proximity of other objects. In some applications, like rescue operation, urban warfare etc, it is highly desirable to cover exposed blades of UAVs. A little or no research work has been done on designing, building and testing of protective shroud for rotorcrafts. This research work proposes a protective shroud for a mini quad-rotor unmanned aerial vehicle to demonstrate the capability of a rotorcraft to continue its flight after an impact with other objects in environment, like brick wall. A quad-rotor helicopter has been considered as a base vehicle. A protective shroud for base vehicle has been designed and built from carbon fiber tubes to protect rotors against environmental objects. A proportional and derivative controller has been designed, implemented and tested to ensure the attitude stability of the vehicle in the presence of high frequency noise, vibrations and disturbances. Successful experiments have been carried out to prove the stability of the quad-rotor vehicle after an impact with wall. Many more applications of rotorcraft UAVs can be explored after a successful completion of this research work.

# Abundance of *NifH* Genes in Urban, Agricultural, and Pristine Prairie Streams Exposed to Different Levels of Nitrogen Loading

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The biosphere has been highly enriched with nutrients, especially nitrogen, by human activities. In most ecosystems, nitrogen availability should be limited, but soils and aquatic ecosystems have been heavily impacted by human activities such as agriculture, recreation, and urbanization. Nutrient dynamics are important to our understanding of the processes of eutrophication and oligotrophication. Ecosystem processes drive biogeochemical cycles that influence input and losses of nutrients in the environment. In streams, the availability of nutrients, geochemical characteristics, hydrodynamics, and human activities influence the metabolic activities and structure of microbial communities. A combination of process-level and molecular microbial ecology techniques are being applied to study nitrogen fixation in small prairie streams with different nitrogen impact histories, from pristine to heavily polluted. Nitrogen fixation was measured with acetylene reduction assays. Impacted urban and agricultural streams exhibited low nitrogen fixation activity. On the other hand, nitrogen fixation was relatively high in a pristine stream at Konza prairie, particularly in leaf litter samples. Simultaneous sampling of sediments and leaf litter was performed for later molecular analyses of the nitrogen-fixing microbial guild. Direct DNA extracts were examined using real-time PCR of a nitrogenase complex gene (*nifH*, which has one of the largest non-ribosomal sequence databases from diverse uncultivated microorganisms) to determine the abundance of nitrogen-fixing organisms. The construction and sequencing of PCR-based clone libraries will assess diversity and community distribution in these different streams. This study will provide a link between the abundance of *nifH* genes and nitrogen fixation activity. An understanding of the effect of nitrogen pollution on nitrogen cycling communities in small streams will increase our ability to overcome the challenges of nutrient pollution. This work is supported by Kansas NSF EPSCoR.

## Are Primary Care Providers Identifying and Addressing the Use of Performance Supplements in Adolescent Athletes?

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**Purpose:** This study was designed to determine if health care providers are taking the appropriate measures in educating and screening adolescent athletes for supplement use. **Methods:** A non-random questionnaire was distributed to 89 Wichita State University athletes assessing (1) supplement use as an adolescent athlete and (2) if health care providers asked and advised these adolescent athletes about supplement use. Data was statistically analyzed to determine its significance. **Results:** Of those surveyed, 18% reported using some form of supplement while participating in high school athletics. This percentage was significantly greater among male athletes. 29% reported having been asked by a health care provider about supplement use at their annual physical, and 33% reported having had some form of education regarding the use of supplements. **Conclusion:** Performance substances are being used by adolescent athletes and have potential for adverse side effects. Health care providers need to screen their adolescent patients about supplement use and offer appropriate advice.

# Las Vegas, Capitalist Sin City to New Capital of American Freedom: A Case Study of the Use of Branding and Metaphor in Image Restoration

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Destination branding warrants more attention from rhetorical scholars than it has already received because of the economical, political and rhetorical significance of countries, states and cities packaging themselves as products. This global trend has been studied abroad, but for the first time an American city has joined the trend with interesting results. The Las Vegas Convention and Visitor's Authority launched the Las Vegas Freedom Party marketing campaign in September of 2000 complete with their own candidate, Brock Wilder, whose primary goal was to promote Las Vegas to potential tourists as a place for them to start their own party. The campaign is more than image restoration or branding and yet it is still both. The campaign's significance lies in the opportunity to study the partnering of branding and metaphor within image restoration. The campaign that ran from September through December of 2000 featuring Wilder can only be fully understood by incorporating the previous research of Kenneth Burke's writings on metaphor, Morgan, Pritchard, & Piggott's 2003 study of branding and William Benoit's theory of image restoration to reveal what other destinations can learn from Las Vegas when establishing their own brand. It is the purpose of this paper to find the implications of combining metaphor and branding with image restoration strategies.

## Feedback Quantum Control

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The quantum systems with nonlinear dynamics are considered. The problem formulation is to parameterize quantum feedback control as a nonlinear stochastic control problem such that the system is globally stabilizing.

A major role in quantum stochastic control theory is played by the filtering equation, which recursively updates the information state of the system under observation. The output from the system is used to propagate the conditional state of the filter.

An approach to stochastic control separates the problem into two parts. First, we construct the filter which propagates the estimate. The Kalman filter technique will be considered. Secondly, we find the feedback control for the filter. The feedback signal is of state feedback form with respect to the conditional state.

# Towards an Artistic Synthesis of Audio/Video Composition

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The quest for innovation and experimentation in art is ongoing. The early electronic music explored by Babbitt, Stockhausen and others provided a new creative outlet for composers. Computers are now capable of real-time video manipulation, which, when combined with electronic sound synthesis, can create an exciting new mode of artistic expression. It is analogous to creating a film in real time, where the abstraction of music replaces the cinema's insistence on a traditional narrative.

I intend to research audio manipulation techniques and how they can be combined with and applied to video. Audio manipulation effects, such as chorusing, flanging, and bit reduction, are quite common in sound synthesis, but are largely unexplored in video applications. I believe this could be a fertile area for artistic endeavor.

Pure Data, a graphical programming environment, allows the composer detailed control and composition of aural and visual material. This program is an excellent tool for bringing these media together through sequencing or in a real-time environment. Also, it is particularly useful for the proposed research because it allows the user to build anything they can conceive.

My project will consist of a composition demonstrating a coherent synthesis of audio and video by exploring the application of audio concepts to video. My work will take the form of a prerecorded composition as well as a real-time, interactive demonstration environment that illustrates the techniques developed for the project.

## Bio-Thermal Battery for ICDs

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Life-saving implants like implantable cardioverter-defibrillators (ICDs) share a common disadvantage when it comes to their power sources – limited lifetime of the batteries. This forces an ICD patient to undergo surgical procedure to get a replacement battery in order to ensure proper functioning of this device. The very nature of this replacement procedure is stressful for patients and carries the risk of post operative infection. This technical article presents a brief history along with the characteristics that is expected in a modern day ICD battery. The paper ends by discussing a new idea for powering ICDs – bio-thermal battery. Thermal battery, which has been in use for decades in high power applications like artilleries, bio-thermal application is at the other end of application. Here the application is low power in nature. This battery will take advantage of temperature difference that exists in different parts of the human body to drive heat (thermal) energy to a reservoir and store it as electrical energy. This mechanism will keep replenishing the reservoir as energy will be used up from it by ICD from time to time. Life expectancy for this bio-thermal battery is three plus decades, a marked improvement over the current five to ten year limit. This new battery has the potential to run some of the low power devices like pacemakers directly. This means skipping the reservoir mentioned earlier completely. This device, when implemented, has the potential to enhance the reliability of powered implant devices.

# Feeding Strategies of Premature Infants: Is Breast Milk Sufficient in Minimizing Growth and Neurodevelopmental Deficits?

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**Introduction:** Preterm infants are frequently discharged from the hospital with significant growth deficits and show reduced rates of growth throughout childhood. However, nutrition during the post-discharge period has been neglected. Preterm infants who are exclusively breast fed after discharge seem to show greater developmental deficits, suggesting these infants would benefit from post-discharge nutritional supplementation. **Methodology:** To assess the efficacy of breast milk in this population, a systematic literature review was performed. Twenty-five articles addressing neonates of less than 37 weeks gestation were reviewed using evidence-based methods. Variables examined included infant weight gain, height, head circumference, neuron-development, motor development, and subsequent intelligence quotients. **Results:** The findings suggest early nutrition in preterm infants can have a permanent effect on development, stressing the importance of dietary management decisions. In fact, exclusive feeding of unsupplemented human milk in premature infants was found to be insufficient for adequate nutrient retention and utilization. Furthermore, evidence was found to support the hypothesis that supplementation of breast milk is required for adequate brain growth and motor development and may provide permanent cognitive benefits. **Conclusion:** Nutrient supplementation is necessary to optimize the use of human breast milk in this population. The clinical significance of this study is especially important because no feeding standard exists today for premature infants following discharge.

## Germ Cell Nuclear Factor Expression by Ovarian Cancer Cell Line

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Germ cell nuclear factor (GCNF/NCNF/RTR, NR6A1) is an orphan nuclear receptor family with repressive transcriptional activity whose expression is reportedly relegated to the germ line in adult animals. During investigations relating to its expression during ovarian organogenesis we became interested in its potential expression in ovarian cancers of germ cell and somatic cell origin. Ovarian cancer cell lines of germ cell (CRL-1572, teratocarcinoma) as well as epithelial cell (OVCAR-3, adenocarcinoma; ES-2, clear cell carcinoma; TOV-112D, adenocarcinoma) origin were obtained from the American Type Culture Collection and maintained in monolayer culture under continuous passage. Total RNA was prepared from flasks of cells and GCNF mRNA was detected via RT/PCR. Oligonucleotide primers spanning regions of exons 4-6 were generated. Strong mRNA signals for GCNF were found in all four cancer cell lines. Based upon investigations in the hamster ovary we assessed cancer cell line expression of growth differentiation factor-9 (GDF-9) and the stem cell factor Oct-4. None of the cell lines expressed Oct-4 mRNA but all expressed GDF-9 mRNA. GCNF is reported to repress the expression of both in the ovary; hence the lack of Oct-4 expression was not surprising. However, the expression of both GCNF and GDF-9 was surprising and suggests that GCNF regulation of GDF-9 is different in these cells. The expression of GCNF by ovarian cancer cell lines appears not to have been reported previously and suggests this transcription factor might be important in maintaining the continual growth state of these cells at least in vitro.

# The Effects of Family Structure and Parenting Style on the Overt Aggressive Behavior of Adolescents in High School

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The focus of this project (scheduled to be completed by 02/2006) examines how father-absent households working in conjunction with parenting style impact the adolescent's aggression level. Research indicates that certain ecological niches have a higher probability of being related to overt aggressive behavior in youths with two and single parent households and authoritative parenting related to the greatest overall well-being of the child, while two and single parent households and neglectful parenting relating to the greatest negative impact<sup>1,2</sup>. This study will survey high school seniors in three local area high schools questioning them on their gender, ethnicity, socioeconomic status, family structure, and their parents' style of parenting. A MANOVA will be used to examine the significant differences in family structure, parenting style, and the interaction effects between these two variables.

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## Adaptive Critic Flight Control

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The Objective of the study is to design an adaptive flight control system for a general aviation aircraft. The design of a controller for a non linear dynamic system so as to minimize a cost is a challenging task as it necessitates the solution of a non linear two point boundary value problem. Adaptive critics (AC's) provide a practical solution for the design of the controller to minimize the cost. AC's consist of two neural networks, an actor that approximates the optimal control law, and a critic that approximates the value or the cost-to-go function. The neural network parameters are varied such that they converge to the optimal solution over time. In this study classical and neural control systems are synthesized to combine the advantages of linear control theory and neural control. The neural network architecture and parameters are determined from classical control theory and forms the *pre-training* phase of the design. In the next phase called the *online training* phase the parameters of the neural networks are varied online and compensate for non linear effects as well as control failures. This control design approach is applied to the control of a general aviation aircraft as aircraft dynamics are highly non-linear with uncertainties in system parameters. Initially the linear control laws are developed using linear control theory and used in the *pre-training* phase. Further work involves the implementation of the *online training* phase and controller evaluation.

# Gas-Phase H<sub>2</sub>O and O<sub>2</sub> Addition to UO<sub>2</sub><sup>+</sup> Complexes Containing Single Nitrile, Ketone or Amide Ligands

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The speciation and reactivity of uranium is a topic of sustained interest because species-dependent chemistry controls processes ranging from nuclear fuel processing to mobility and fate in the geologic sub-surface. The solution chemistry of uranium is dominated by the uranyl ion, UO<sub>2</sub><sup>2+</sup>. Theoretical studies suggest that specific interaction with solvent is likely to influence the behavior of uranyl complexes in the environment. To better understand intrinsic interactions between uranyl complexes and solvent, we have turned to gas-phase studies using ion-trap mass spectrometry. Typically, formal U(VI) species such as [UO<sub>2</sub>NO<sub>3</sub>]<sup>+</sup> and [UO<sub>2</sub>OH]<sup>+</sup> react in the gas phase with H<sub>2</sub>O to form mono-, di-, and tri-hydrates. We have recently discovered that complexes containing UO<sup>2+</sup>, a formal U(V) cation, are unique in that they also show a tendency to add O<sub>2</sub>. We examined H<sub>2</sub>O and O<sub>2</sub> addition tendencies for UO<sub>2</sub><sup>+</sup> complexes containing a single nitrile, ketone or amide ligand to investigate the influence of ligand basicity, with controls for ligand mass and degrees of freedom, on the relative tendencies to add H<sub>2</sub>O or O<sub>2</sub>. Our results demonstrate that more basic ligands enhance the initial addition of O<sub>2</sub> over H<sub>2</sub>O. For example, for complexes containing UO<sup>2+</sup> with propionitrile, acetone or N-methylformamide ligands with similar masses and vibrational degrees of freedom, the tendency for direct addition of O<sub>2</sub> was highest for the amide, and lowest for the nitrile. For the nitrile and ketone-containing complexes, O<sub>2</sub> addition was more favorable after initial addition of a H<sub>2</sub>O ligand in the gas phase.

## Static vs. Dynamic Stretching on Vertical Jump and Standing Long Jump

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**Objectives:** The purpose of our study is to determine whether a significant difference exists between static and dynamic stretching on lower extremity power production using measurements of vertical jump and standing long jump in young healthy males. **Background:** Other studies show certain athletic activities involving power may see greater performance results by performing one type of stretch versus another. No studies were found that observed standing long jump and vertical jump immediately following static or dynamic stretching routines. **Methods and Measures:** Thirty-four healthy male volunteers, between the ages of 14-18, were randomly divided into one of two groups (static or dynamic). Each group was tested separately. Following a warm-up, each subject participated in a series of 3 pre-test standing long jump and vertical jump trials. Each subject performed the assigned stretching routine. Immediately following the stretching routine, each subject performed 3 posttest standing long jump and vertical jumps. **Results:** The statistics indicate a significant difference between static and dynamic stretching on vertical jump. There was no significant difference found in standing long jump. **Conclusion:** The results indicate that young healthy males tested on vertical jump immediately following dynamic stretching perform better than those who stretch statically.

# Moving Beyond a Stereotype: Male/Female Income Differences among the Largest U.S. Hispanic Population

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This study focuses on the wage gap between Mexican American men and Mexican American women and factors contributing to this disparity. People of Mexican descent make up 67% of the U.S. Hispanic population. Previous research tends to lump Hispanics together, masking differences between groups. Studies considering Hispanic subgroups rarely look at gender differences on income. Using secondary data analysis of the March 2004 Current Population Survey Annual Social and Economic Supplement, this study examines an often neglected subgroup, Mexican Americans, and the gender gap within this group. The sample size is 3,411; Mexican American men comprise 55.3% of the sample and Mexican American women 44.7%. This research employs an income determination model composed of three model segments. Theoretical model mechanisms include individual (variables such as age and education), structural (variables such as occupation and skill level), and gender/race (variables such as sex and immigrant status) components. Uni-, bi-, and multivariate analysis are used to examine independent effects of independent variables on income as related to Mexican American men and women. Based on mean annual earnings, analysis shows that net of other factors, an 81% wage gap exists between groups with Mexican American men earning \$30,435 and Mexican American women \$24,511. In addition, men earn more than women at all levels of education except at graduate degree level or higher, suggesting that more research needs to be done looking at education within this group and possible underlying cultural influences poorly understood as related to Mexican Americans.

# Committee Network (CN) Force Prediction Model in Milling of Carbon Fiber Reinforced Polymers

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Fiber reinforced polymers are widely used in the transportation, aerospace and chemical industries. In rare instances these materials are produced net-shape, and secondary processing may be required to produce a finished product. Because fiber reinforced polymers are heterogeneous materials, they do not machine in a similar way to metals. Thus, the theory of metal machining is not valid for the analysis of machining of fiber-reinforced composites. Previous attempts to model this problem have adopted Merchant's theory from metal cutting by assuming that chip formation takes place in a shear plane which inclination angle is determined by the minimum energy principle. This class of models showed that predictions are valid only for fiber orientations less than  $60^{\circ}$ . The work presented here focuses on providing predictive models for the cutting forces in unidirectional composites. The models are based on the specific cutting energy principle and account for a wide range of fiber orientations and chip thickness. Results from two forms of non-linear modeling methods, non-linear regression and committee neural networks, indicate that the latter provide better prediction capability by smoothing and capturing the inherent non-linearity in the data. The model predictions were found to be in good agreement with experimental results over the entire range of fiber orientations from  $0^{\circ}$  to  $180^{\circ}$ .

# Viscoelastic Clamp-up Relaxation of Blind Fasteners in Composites

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The clamp-up force of the blind-fastener can directly affect the long-term performance of mechanically fastened composite joints. The relaxation of this force is due to viscoelastic character of composite materials. So on the downside, continuous high clamp-up cannot be assumed or guaranteed over long periods. This study investigates the clamp-up force relaxation with time for different grip length ratios. A test program was conducted to measure clamp up force using miniature load cells and different fastener grip ratios achieved by using spacer washers. The analysis of preliminary results indicate that the initial clamp up force is proportional to grip ratio and the clamp up force relaxation of up to 8% occurs after 21 days at room temperature/dry conditions. Further, the relaxation rate increases with decrease in grip length ratio.

# Attitudes and Practices of Physician Assistants in the State of Kansas with Regards to Opioid Management in Chronic Non-Malignant Pain Patients

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**Introduction:** Acute and chronic pain are common conditions practitioners continually face in diagnosing and treating patients. The use of prescribing opioids in chronic non-malignant pain (CNMP) patients is controversial due to fear of legal issues and a lack of awareness of state guidelines for treatment. The purpose of this research was to investigate the attitudes and practices of Physician Assistants (PAs) in Kansas in the treatment of CNMP and their awareness of state guidelines for controlled substances. **Methods:** A cross sectional, non-randomized survey study was administered to all licensed PAs (N=577) in the state of Kansas in 2005. The survey consisted of specific questions regarding attitudes toward opioid management, prescribing habits, and familiarity with the recommended guidelines of the state of Kansas. **Results:** Slightly less than half of the PA's in this study were aware of state guidelines for the use of controlled substances in CNMP and actively follow three of the five clinical documentation recommended. Among the 179 PAs responding in study, only nine percent stated they would never prescribe an opioid for the use of CNMP. There was a significant relationship between awareness of state guidelines and clinical documentation of a history and physical, treatment, and informed consent. **Conclusion:** Practitioners continue to be hesitant in prescribing opioids for CNMP due to concern for legal issues and fear of potential substance abuse in patients. This pilot study highlights the need for larger studies of primary clinicians and the potential of patient undertreatment of CNMP.

# Inferior Vena Cava Filter Blockage: A Study on the Pressure Gradient across a Greenfield Filter which has Captured Emboli

By Kim Reuter

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Venous thromboemboli disease is a serious medical condition that affects thousands of patients in the United States. Pulmonary embolism (PE), which is the most severe complication of venous thromboemboli disease, is diagnosed in 355,000 patients and results in as many as 240,000 deaths each year in the United States.<sup>Error</sup> PE occurs when a blood clot formed in a vein breaks free, becomes an embolus, travels to the lungs, and blocks pulmonary blood vessels.

The most common preventative treatment for PE is anticoagulation therapy. Although anticoagulation therapy reduces the risk of a fatal PE, it is not always effective and may not be used to treat all individuals due to complications with hemorrhaging. Inferior vena cava filters provide an alternative preventative treatment for PE.

Emboli that cause PE are most often developed in the deep veins within the legs as a result of poor circulation or damaged veins. The inferior vena cava (IVC) returns the blood from the lower extremities, pelvis, and abdomen to the heart's right atrium. By placing a filter in the IVC, emboli may be captured before they travel to the heart.

One of the more common complications with IVC filters is that they obstruct blood flow, especially when they "capture" the emboli. To assess how the blood flow in the IVC is inhibited by an IVC filter, the pressure gradient across the filter must be considered. In this study, calculations have been completed to determine the pressure gradient across a Greenfield IVC filter. Various IVC diameters and embolus sizes are considered.

## A Structural Decomposition of the Marriage Premium

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This thesis examines the wage gap among married and never married men. It is generally accepted that married men will have higher earnings than never married men. An income determination model was created to control for individual, structural, and gender level components. Theories were utilized for each model segment and provide a foundation from which this thesis builds upon. Through univariate, bivariate, and multivariate statistical analysis it was found that net of other factors married men will earn \$3,186.00 more per year than never married men. The findings of this thesis provide support for other literature examining the wage gap between married and never married men, commonly referred to the "marriage premium".

# Shift Register Using Quantum Bits

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A scheme to implement a qubit shift register in a one-dimensional series of superconducting quantum interference devices (SQUIDs), using a sequence of pulsed biases, will be described. Each SQUID is coupled to its neighbors through an untunable coupling parameter. The only variable parameter of the system is the bias on each SQUID, which is pulsed low during a shift operation. Our design requires only two bias control signals for any size of shift register, with an additional one on the output qubit to shift out the data. The shift register operation is realized by copying the state of one qubit onto another, in the direction of the shift, during the bias pulse. As the no-cloning theorem prohibits the cloning of an unknown arbitrary quantum state, this device works as a classical shift register or, in other words, a binary wire. We show here how to find the time duration of the bias pulse and the minimum value of the bias during the pulse given the fixed physical parameters of the system.

# Biotinylated Ferrocene and Fullerene Derivatives for Probing the Avidin-Biotin Molecular Recognition Process

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Biotin has been of great interest to chemists in recent years due to its biological abundance. As a biomolecule, biotin is involved in many processes including cell growth and the production of fatty acids; it also plays a role in the Krebs cycle, the process by which energy is released from food. Biotin binds to avidin, a glycoprotein, as well as alternative proteins such as streptavidin and neutravidin. The affinity ( $K_a \sim 10^{15} \text{ M}^{-1}$ ) is quite strong; consequently, the method of binding between these two molecules has been fully investigated.

Chemical sensors for probing biotin binding to avidin are important and often involve utilizing biotinylated compounds. Here, redox- or photo-active entities are covalently attached to biotin which would transduce a signal upon biotin-avidin binding. In this project, two new biotinylated ferrocene- and fullerene-based chemical sensors have been synthesized and characterized using NMR and UV-Visible spectroscopy. The ferrocene and fullerene probes are both redox- and optically active molecules. These compounds are useful for the modification of electrode surfaces and can be used for sensing of avidin in solution or at an electrode surface. Additionally, the biotinylated fullerene shows fluorescence emission, which is another possible mode of sensing. Synthetic methodology adopted for these molecules and their binding to avidin will be presented.

# Amide Derivatization and ESI Characterization of Fatty Acids

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Electro-spray-ionization mass spectrometry has been utilized successfully for the characterization of amino acids, peptides, and proteins. Fatty acids are another important class of biological molecules that are more difficult to characterize by ESI-MS. In this study, a new approach for analyzing fatty acids by ESI-MS was developed. The approach involves derivatizing the fatty acid to an easily ionized amide in one step, using ps-carbodiimide resin. Ionization efficiency is improved through the introduction of a basic site (pyridine or imidazole) on the amide group thus providing a protonation site and the ability to charge the molecule for ESI/MS. The derivatization procedure will be presented, as well as the use of this new method to characterize fatty acids from dietary supplements and household cooking oils.

# Generation of Gas-phase $\text{VO}^{2+}$ , $\text{VOOH}^+$ , and $\text{VO}_2^+$ -Nitrile Complex Ions by Electrospray Ionization and Collision-Induced Dissociation

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Electrospray ionization (ESI) was used to generate gas-phase complex ions containing the vanyl,  $\text{VO}^{2+}$ , vanyl hydroxide,  $\text{VOOH}^+$  or vanadium (V) dioxo-cation,  $\text{VO}_2^+$ , and nitrile ligands for study by multiple-stage tandem mass spectrometry. ESI of a 1 mM solution of  $\text{VOSO}_4$  in  $\text{H}_2\text{O}$ , with 10 – 100 fold molar excess of nitriles (acetonitrile, propionitrile, butyronitrile, or benzonitrile) generated complex ions with formula  $[\text{VO}(\text{L})_n]^{2+}$ , where L represents the respective nitrile ligands and  $n=4$  and 5. Collision induced dissociation of  $[\text{VO}(\text{L})_5]^{2+}$  eliminated a single nitrile ligand to produce  $[\text{VO}(\text{L})_4]^{2+}$ . Two distinct dissociation pathways were observed for the subsequent dissociation of  $[\text{VO}(\text{L})_4]^{2+}$ . The first involved the elimination of a second nitrile ligand to generate  $[\text{VO}(\text{L})_3]^{2+}$ . The second pathway lead instead to the formation of  $[\text{VOOH}(\text{L})_2]^+$  through collisions with gas-phase  $\text{H}_2\text{O}$ . CID of  $[\text{VOOH}(\text{L})_2]^+$  caused the elimination of a single nitrile ligand to generate  $[\text{VOOH}(\text{L})]^+$ , which rapidly accepted  $\text{H}_2\text{O}$  or  $\text{O}_2$  by a gas-phase association reaction. CID of  $[\text{VONO}_3(\text{L})_2]^+$ , generated from spray solutions created by mixing  $\text{VOSO}_4$  and  $\text{Ba}(\text{NO}_3)_2$  (and precipitation of  $\text{BaSO}_4$ ), caused the elimination of  $\text{NO}_2$  to produce  $[\text{VO}_2(\text{L})_2]^+$ . Elimination of a single nitrile ligand, with subsequent addition of  $\text{H}_2\text{O}$ , was also observed for CID of  $[\text{VO}_2(\text{L})_2]^+$ , but the addition of  $\text{O}_2$  to  $[\text{VO}_2(\text{L})]^+$  was not. In general, the  $[\text{VO}_2(\text{L})_2]^+$  species required higher collision energies to liberate the nitrile ligand, suggesting that they are more strongly bound than the  $[\text{VOOH}(\text{L})_2]^+$  counterparts. The intrinsic chemistry of vanadium and vanadium-containing complexes is a topic of general interest.

# Formation and Studies of Metal 8-Hydroxyquinolino-Fullerene Complexes

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Luminescent metal complex induced energy/electron transfer reactions have gained attention recently due to their applications in solar energy conversion. Majority of these complexes have been derived from phenanthroline or bipyridine based ligands and various transition metals. 8-Hydroxyquinoline is a well-known ligand which is known to exhibit enhanced fluorescence upon binding to diamagnetic metal ions such as zinc, magnesium, and aluminum via the chelation enhanced fluorescence emission mechanism. In the present study, we have functionalized an electron acceptor, fullerene, to possess 8-hydroxyquinone unit. This compound is subsequently complexed with zinc, magnesium or aluminum metal cations. The resulting metal hydroxyquinolino fullerene complexes are characterized by optical absorption, fluorescence emission, NMR and ESI-mass techniques. Preliminary emission studies revealed electron transfer quenching of the metal quinolino in the newly synthesized complexes indicating that these complexes are useful for building solar energy harvesting devices.

## The Study of the Group Additive Properties of Fluorophore Appended Fullerene Dyads and Triads

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Fulleropyrrolidine is functionalized to possess one or two fluorophore entities such that groups like pyrene, fluorine, naphthalene, phenyl, etc. are attached to the pyrrolidine ring. The total DFT energies and orbital energies are computed with the B3LYP/3-21G\* quantum chemical model. The observation that the total energy can be partitioned into a Benson-like group additive increments, and that the highest occupied orbital (HOMO) energies and orbital profiles are astoundingly constant for group across a series of dyads and triads may lead to remarkable new quantum chemical tool, i.e., for relatively isolated groups dominating an orbital, one can assign molecular orbital energies and profiles to the group which suggests that this model has the ability to predict relative oxidation potentials and site of electron removal. Using the B3LYP/3-21G\* model, computations will be extended to several additional groups.

## Ammonia Oxidation and the Detection of AMOA (Ammonia Monooxygenase) in Hypersaline Soils

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The Salt Plains Microbial Observatory studies microbial communities of terrestrial hypersaline flats in northern Oklahoma. These salt plains are an extreme environment, due to their high salt concentration, up to saturation. Brine flows from below throughout many parts of the Observatory, with salt crystals forming on the soil surface, along with brine pools. With heavy rainfall there is a rapid change in the salinity of the flats. This makes life on the Salt Plains difficult for microorganisms. Those that inhabit the flats must be versatile and adaptable to a variable environment. Do typical biogeochemical cycles exist on the Salt Plains? Earlier research found microbes in saline environments capable of fulfilling some biogeochemical functions, but not others. The current project at the Salt Plains Microbial Observatory is to detect the presence, or absence, of the bacteria responsible for ammonia oxidation to nitrite. Enrichment cultures and direct soil extraction will be used to obtain DNA for PCR amplification of *amoA* genes. Current efforts include real-time PCR to quantify *amoA* gene sequences. PCR amplification has suggested that the gene is present in the soils. Limited real-time PCR sensitivity has made it difficult to count the genes present in the soils. The Salt Plains' unique environment offers many opportunities to isolate diverse groups of novel microbes, and characterize their unique activities and products. This work is supported by grants from NSF Microbial Observatories and Kansas IDeA Network of Biomedical Research Excellence.

## Xylitol, the Molecular Battle Against Bacteria and its Resultant Dental Diseases

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Dental caries and periodontal disease are two of the most prevalent maladies affecting modern civilization. How can the incidence of these diseases be reduced with a simple, economic product, readily available to individuals without the disputed side effects of fluoride? We found the answer to be xylitol; a five carbon sugar molecule. As opposed to six carbon sugars, by design, xylitol does not provide the required number of binding sites for bacteria to thrive. By inhibiting bacterial growth, specifically *S. mutans*, which is one of the primary pathogenic agents responsible for tooth decay xylitol has been shown to reduce caries by up to 59%. It also fights osteoporosis, aids in diabetic control, prevents upper respiratory and ear infections, and animal studies have established bone remodeling properties. It has 40% less calories than ordinary table sugar, is absorbed more gradually, and thus is a more efficient energy source. The human body produces about 15 grams of xylitol daily. It is naturally found in vegetation such as strawberries, plums, pears, carrots, corn, nuts, and birch wood. Xylitol is added to products such as toothpaste, mouthwash, and chewing gum, or can be purchased and used like table sugar. The importance of this project is to create awareness of the numerous benefits of xylitol. It is a sweet way to prevent dental caries and promote healthier smiles. As an alternative to fluoride, studies show xylitol has limited side effects; and many more positive benefits to overall health.

# Expression of Growth Differentiation Factor-9 in the Developing Ovary and In Nonovarian Tissues

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Mammalian ovarian organogenesis is characterized temporally by oogonial mitosis and apoptosis, rescue of germ cells via interaction with somatic cells to form primordial follicles, and entrance into meiosis. Recent studies suggest that germ cells actively participate in this process via the production of local regulatory factors. Growth differentiation factor-9 (GDF-9), a novel transforming growth factor- $\beta$  family member, is expressed in ovaries of various species as a crucial factor in follicular development. The expressional pattern of GDF-9 in nonovarian tissues has remained elusive as current data support its exclusive expression within the mammalian ovary. Recently, we have become interested in the expression pattern associated with GDF-9 as it pertains to ovarian organogenesis and follicle formation in the neonatal hamster and in the possible expression of GDF-9 in nonovarian tissues. Consensus oligonucleotide primer pairs spanning at least one intron for GDF-9 were determined by analyzing the gene sequences for human, mouse, rat, bovine and pig for use in the hamster. mRNA for GDF-9 in ovarian and nonovarian tissues were detected by RT/PCR using total RNA. PCR products were sequenced to determine the % homology of the hamster to that of other species (mouse 91%, rat 90% and human 84%). mRNA for GDF-9 was detected in ovarian samples for all days examined (1,3,5 and 6-9 post delivery, day 0), reflecting periods of active oogonial mitosis, oogonial atresia, and primordial follicle formation. For nonovarian analysis mRNA expression of GDF-9 was detected in liver, kidney, spleen, and testis at various stages of growth and development. White blood cells retrieved from adult hamsters reveal mRNA expression of this novel growth factor. Reports have suggested that GDF-9 is expressed exclusively in the ovary, specifically within the oocytes, and not prior to primordial follicle formation. Our results suggest GDF-9 is expressed in oogonia prior to and during primordial follicle formation, and its expression is not exclusive to the ovary.

## Comfort Suit for Formula 1 Racing

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Cooling suits are a very useful method of obtaining thermal equilibrium for a driver in a Formula 1 race car. There is, however, a problem with the methods used for cooling in commercially available suits today. They are heavy, complicated, and inefficient to the point that Formula 1 teams do not use them. A Formula 1 race car is capable of producing cockpit temperatures in excess of 50°C, which can present dangerous conditions to the driver. The design of our suit will incorporate a thermosyphon or a type of cooling system similar in principle. The cooling suit will incorporate oval shaped tubing sewn into the fabric of the suit in contact with the body as a means of heat removal. The tubing will circulate water from the mid-thigh area of the driver up the torso to the helmet then back down through an outer layer to avoid contact with the skin. The helmet will act as a condenser in the system, while the body of the driver will act as the evaporator, thus creating a closed loop thermosyphon type system. Future research will be modeling of the cooling system design to fully understand the two-phase flow characteristics of the fluid in the system and the inherent impact on the performance of the suit.

# C-Reactive Protein in the Detection of Inflammation and It's Role in Coronary Artery Disease

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Introduction: Heart failure is becoming more common and increasing annually with coronary artery disease (CAD) being the number one cause. Current research is focused on detecting more risk factors and markers for heart disease in order to develop interventions preventing its progression. C-Reactive Protein (CRP), the most widely studied inflammatory protein, plays a role in the atherosclerotic process of vessels, which subsequently can lead to infarct. However, the exact role of CRP in the acute coronary situations is not completely understood. Methodology: The purpose of this study was to perform a systematic evidence-based literature review addressing the issue of CAD and CRP. Medline was utilized to obtain adequate literature associated with certain, specific mesh terms. Articles were categorized into levels of evidence and separated into categories to answer the two main research questions: Is CRP a better marker for detection of inflammation? Is the presence of CRP associated with CAD? Results: Forty-eight articles matched the desired criteria and were reviewed using evidence-based methods. All forty-eight articles determined that CRP was a superior marker in the detection of inflammation. Twenty-four articles correlated CRP with CAD along with other mediated factors of vessel disease, with most being level-one evidence. Conclusion: CRP is a superior marker of inflammation and plays an important role in the development of CAD.

# Virtual Reality System with Haptic/Auditory Devices for Assembly and Maintenance Training

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Virtual Reality system is an efficient tool allowing a participant to experience the real environment through simulations. First and foremost essential step is to have more prevalent use of VR systems in training the user to get accustomed to the VR systems effectively. The major area of concern for any aircraft manufacturer is to analyze and identify the simplified ways to assemble and disassemble the components, which can help in reducing the turnaround time in maintenance. It is also vital to train the maintenance crew to identify defects more precisely. Most of these defects are rare and hence it is very difficult to train using real world models. Our research mainly deals with the application of VR system in training the maintenance crew to identify the defects decisively and newly inducted workers to assemble and disassemble the components. We achieved this by developing four different levels, Level 0 - 3D VR simulation of the work cell and tasks to be performed, Level 1 - VR model with humanoid inserted, Level 2 - allow trainee to interact with the VR model thru Head mounted display and Cyber gloves, and Level 3 - enhance the experience with haptic devices and auditory feedback. These models were implemented and tested practically in major aircraft industries like Bombardier Learjet, Cessna and Raytheon. They found our model as an efficient tool in reducing the time and costs involved in training new workers and more precisely identify the defects by the maintenance crew.

# Experimental Study of Aircraft Wake Vortices in Ground Effect

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Aircraft wake vortices pose a great threat in airport terminal areas, where heavy transport vehicles operate along the same flight paths as lighter aircraft. Flying an aircraft into a vortical wake can cause large changes in altitude and bank angle. These changes in attitude are most dangerous when an aircraft is flying low and slow, either after takeoff or before landing. In addition, vortex strength is proportional to the aircraft weight and inversely proportional to flight speed. Therefore, the strength of the vortices is greatest for heavy aircraft flying at slow speeds. Thus, a good understanding of aircraft wake vortex motion close to the ground is needed.

The purpose of this research is to investigate the behavior of aircraft wake vortices near the ground. The experiments are performed in the water tunnel located in the National Institute for Aviation Research (NIAR) on the campus of Wichita State University. In the course of this research, investigations are made of the motion of a pair of counter-rotating vortices, simulating the wake from the two wingtips of an aircraft, and a pair of co-rotating vortices, simulating the wake from the wingtip and the edge of the flap on one side of an airplane. For both vortex pairs, the motion is studied both with and without the presence of the ground plane.

A unique data acquisition method is used that allows for quantitative measurement of the temporal and spatial behavior of the wake vortices. The water tunnel measurements taken with counter-rotating vortices are shown to be consistent with Lidar data recorded from actual flights near airports and with numerical models tuned with the Lidar measurements. No experimental or computational data is available for comparison for co-rotating vortex pairs.

## Pregnancy Outcomes Comparing Low Molecular Weight Heparin vs. Unfractionated Heparin in Treating Thrombotic Conditions in Pregnancy

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**Introduction:** The type of heparin to administer for treating thrombotic problems during pregnancy has become a debatable medical question. For years unfractionated heparin (UFH) has been the drug of choice. However, low molecular weight heparin (LMWH) has been gaining favor. Currently, the decision of which drug to use has been left up to physician preference due to the limited number of clinical trials that have been conducted during pregnancy.

**Methodology:** A systemic review of the literature was conducted to determine whether pregnancy outcomes differ among those treated with LMWH, UFH, or both for thrombotic conditions during pregnancy. Twenty articles addressing LMWH, UFH, pregnancy outcomes, and thrombotic conditions in pregnancy were reviewed using evidence-based methods. Pregnancies from the first trimester through the postpartum period were included in the review.

**Results:** After a review of the literature, it was found that LMWH is equally if not more effective in treating thrombotic conditions in pregnancy. LMWH was found to have fewer side effects and to be more convenient to administer and monitor than UFH. **Conclusion:** LMWH is as safe and effective as UFH for preventing and treating thrombosis in pregnancy with the added benefits of fewer side effects and convenience of administration.

# Trends among Consumer Run Organizations

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People with mental illness not only require treatment, but they require a social network to provide understanding, and a sense of belonging. Informally people with mental illnesses began meeting outside of programs sponsored by mental health centers. Many found these meetings to complement the day program they were attending at the mental health center. These meetings affected the individuals in ways the programs of the mental health centers could not. It is from these types of meetings that the Consumer Run Organization (CRO) was born. CRO's are non profit organizations run by people with a mental illness (consumer) to provide services to other consumers. Some services offered include social interaction, educational programs, and leadership opportunities.

There are currently 20 active CROs in Kansas. This report analyzes data collected from Kansas CROs each quarter from fiscal year 2000 to fiscal year 2005. Included in the collected data are variables relating to aspects of CROs such as membership, facility operation, finances, and organizational goals and objectives. The data is longitudinal allowing trends among CROs to be identified and tracked. The tracking of these trends allows for analysis that could assist in understanding the inner working of CROs. A greater understanding of CROs, may aid in the development and growth of CROs as well as help guide those who provide the CROs with technical assistance.

## Report Rainbow United Inc, Autism Project: Spring 2005-2005

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A paucity of studies exist that examines the effects of the behavior modification approach for the treatment of autism using the following therapeutic treatments: Discrete Trial Training; Picture Exchange Communication program (PECS); Brain Gym; and Balance Auditory, Vision and Exercises program (Bal-A-Vis-X) on motor performance and imitation skills of children with autism. An exploratory study was performed by Rainbows United Inc. (RUI) based on a combination of these treatments (i.e., eclectic approach) which emphasizes blending the strengths of these intervention strategies to meet the individual needs of each child.

Seven children (3-4 yrs) with autism participated in a 11-mos, 1-8 sessions/mos, 2 ½ hour therapy session program. The 150 minute therapy session began with 60 minutes of PECS, Brain Gym, and Bal-A-Vis-X. This was followed by eight, 10 minute sessions of the following therapy: occupational therapy, speech therapy, academic skills, work box, structure play, self care, artistic skills, and physical therapy. The eight, 10 minute therapy sessions were 1:1 (i.e., child with therapist) while the 60 minute sessions were group sessions (i.e., 3-7 children). Data analysis was done using percent changes.

There were no consistent improvements demonstrated by the children. Indeed, the percent of completed attempts in imitation continued to cycle from high to low throughout the study. The varied amount of shortcomings in methodology were addressed focusing on inconsistencies in task selectivity, task frequency, and testing environment.

# Advantages and Disadvantages between Allograft versus Autograft in Anterior Cruciate Ligament Replacement

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Introduction: As the number of ACL surgeries performed each year rise, giving patients a detailed look at their options for replacement is critical. To accomplish this, the best alternative of allograft or autograft, needs to be identified. A literature review has been conducted on the Advantages and Disadvantages of Allograft vs. Autograft in Anterior Cruciate Ligament (ACL) replacement. Methodology: The purpose of this literature review is to determine whether there is an advantage to the use of an Allograft vs. Autograft in ACL replacement. Over twenty five peer reviewed articles were reviewed with a primary focus the graft donor site, specifically the patellar tendon and the hamstring tendon. Outcomes were evaluated in three to six month increments for up to five years. Results: The literature reviews showed that there was very little statistical significance in the presence of pain, giving away, effusion, Lachman, and pivot shift results. Conclusion: The main concern with Autograft was graft site morbidity. The main concern with Allograft was risk of disease transmission. The choice of Allograft vs. Autograft ultimately comes down to physician and patient preference.

# Job Satisfaction of School Psychologists in Kansas

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The shortage of school psychologists which exists nationwide is especially critical in rural states where children may most likely be underserved. Issues related to recruitment and retention of school psychologists must be examined in order to manage the shortage of professionals in the school psychology workforce. Using the Hygiene and Motivation theory of job satisfaction described by Frederick Herzberg as a foundation, this study examined factors related to job satisfaction of school psychologists in Kansas. 300 licensed school psychologists in Kansas were invited in the fall of 2004 to participate, and the 60% return rate represented approximately 36% of school psychologists in Kansas. The majority of respondents, approximately three-fourths, reported being satisfied or very satisfied with their current job and with being a school psychologist. Using stepwise regression analyses, opportunity for advancement and degree of control over how duties are performed (Motivation variables) along with competence of supervisor, availability of test materials, and salary and benefits (Hygiene variables) were found to be significant predictors of job satisfaction for the respondents in the study. Implications for managing the job satisfaction and retention of school psychologists are discussed.

# A Comparison of Psychotherapy to No Therapy in the Treatment of Patients with Personality Disorders

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Introduction: Personality Disorders, defined as behavior that deviates markedly from the expectations of the individual's culture, have been deemed untreatable by many in health care. Because of the uncertainty surrounding treatment, patients with personality disorders often go untreated. Objective: The purpose of this study is to evaluate psychotherapy as an effective therapy in the treatment of personality disorders. Method: A comprehensive review of the literature was performed locating thirteen studies that reported data on pre-treatment and post-treatment effects and/or recovery at follow up, including three randomized, controlled treatment trials, one randomized comparison of active treatments, and nine uncontrolled observational studies. Results: All studies reported improvement in personality disorders with psychotherapy. Among the three randomized, controlled treatment trials, active psychotherapy was more effective than no treatment according to self-report measures. In four studies, an average of 52% of patients remaining in therapy recovered after an average of 1.3 years of treatment. Conclusion: Psychotherapy is an effective treatment for personality disorders and is associated with a faster rate of recovery in comparison with the natural history of the disorder.

# The Effects of Self-Questioning on Comprehension of Expository Text and Development of Content Writing with Second Grade Students

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The effects of instruction in self-questioning skills on comprehension of expository text and ideas and content and organization traits in writing were explored. The expository reading and writing performance of 19 second grade students in an urban, low SES elementary school receiving instruction in a questioning strategy is compared with a stratified sampling of students from other classrooms in the same school. Pre and post assessments include a graphic organizer to record topic, main idea, and supporting details when reading an article and writing samples scored using the 6 trait analytical rating guide. Students using the strategy made significant progress in reading comprehension ( $P=0.034$ ) and ideas and content in writing ( $P=0.039$ ) but not in the trait of organization ( $P=0.066$ ). Continued use of the strategy with additional explicit instruction in an organizational strategy for writing is discussed.

# Effect of Large Neutral Amino Acids on the Maternal Phenylketonuria Offspring

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Women with untreated Phenylketonuria (PKU), tend to give birth to infants with multiple congenital anomalies, as elevated maternal phenylalanine (Phe) level is teratogenic. The best outcomes occur when strict control of maternal Phe levels is achieved before conception and maintained throughout pregnancy. Such diets are not highly palatable and therefore there is often loss of dietary compliance. An alternative to low Phe diet would be a more normal diet that is altered so that the Phe content is less problematic. Hence, there is an interest in the use of large neutral amino acids (LNAA), which compete with Phe for membrane transport sites in the intestines and the placental barrier and thus alleviate the problems associated with PKU. In our research, we used a PKU mouse model to examine the effect of LNAA supplementation on the maternal and fetal blood Phe levels. 3 different doses of LNAA supplementation were given to different animal groups to observe its effect on the blood Phe levels.

## Determining Attitudes of Kansas Chiropractors Regarding Immunization Practices

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**Introduction:** The number of practicing chiropractors is expected to reach 100,000 in the United States by 2010 and approximately 25% of US citizens visit chiropractors for treatment of health conditions each year. Chiropractors are generally accepted and respected as providers of primary health care services and are in a position to provide the health care consumer with advice regarding health promotion and prevention of disease.

Vaccinations are considered by the traditional medical community to be safe and effective to prevent a number of infectious diseases. It is unknown however, whether chiropractors have similar beliefs regarding the safety and efficiency of vaccines.

**Methodology:** The purpose of this descriptive, cross-sectional study was to investigate the attitudes of Kansas chiropractors regarding immunizations. A survey was distributed to all chiropractors in the state of Kansas. The survey collected demographic information including personal and family immunization status, prior medical school education on immunization practice and, year of graduation. In addition, chiropractors were asked about their attitudes toward safety of immunizations and whether they recommend immunizations to their patients.

**Results:** Standard statistical analysis revealed that the majority (52%) of Kansas chiropractors believe that immunizations are unsafe and do not encourage patients to be immunized. In addition, 40% believe that immunizations are ineffective in the prevention of disease.

**Conclusion:** A significant portion of chiropractors in the state of Kansas believe that immunizations are unsafe and ineffective in the prevention of diseases; thereby discouraging their use. The results of this study have significant potential public health implications in the campaign to increase rates of vaccinations among children, thereby reducing the morbidity and mortality associated with vaccine preventable disease.

# Factors that Influence the Hiring of Physician Assistants by Specialist Physicians: A Pilot Study

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**Introduction:** Traditionally the role of a Physician Assistant (PA) has been to provide primary care (family practice, pediatrics, internal medicine); however, the majority of PAs nationwide are now practicing in specialty areas. The purpose of this study is to determine what factors influence specialist physicians in hiring PAs for their practices. **Methodology:** Specialist physicians practicing in Sedgwick County were surveyed regarding their attitudes that influence hiring of PAs. **Results:** The survey response rate was 37% (n=473). The number of responding physicians that currently employ or have ever employed a PA were 26.7 percent and 27.4 percent respectively. A large majority of specialist physicians (91%) that employ a PA are satisfied with the support PAs provide to their practice. There is a significant relationship between physician knowledge regarding state PA practice regulations and whether they currently employ a PA. Factors physicians ranked as important in deciding whether to hire a PA were the nature of educational training, clinical skills, overall abilities, medical knowledge base, and the reputation of the provider's educational training program. **Conclusion:** This pilot study is the first study to examine the attitudes that influence hiring of physician assistants by specialist physicians. Although data indicates a number of significant relationships, this study sampled only specialist physicians in Sedgwick County, Kansas, and may not be an accurate representation of the trends statewide or nationwide. Further study on a broader scale is recommended.

## Developing Design Skills in a Global Learning Environment

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This paper describes a new engineering design skill a new engineer needs to develop in a global learning environment. Engineering design has undergone drastic changes over the years, including improvements in design visualization, design methods, and instrumentation. In this competitive, global economy, a product may be designed by engineers from several countries around the globe. Differences in cultural background and work attitudes must be understood by all parties involved in order to develop an effective design. A method to understand these cultural differences and global perceptions is called "cage painting", which involves sharing of personal experiences, values, and ethics. The research approach incorporated cage painting methodology with Via Video video-conferencing systems into the senior design class ME662 Mechanical Engineering Practice. This setup was located in the newly developed ME Global Design Lab. Mock sessions and cage painting simulations conducted among local and international WSU students helped them understand cultural differences and difficulties in communication. It was also found that adequate bandwidth and computer RAM was essential for smooth operation of audio and video. A successful connection was established with engineering students from an Indian university although the technical difficulty was still an issue. The next step in this research is to have additional cage painting simulations, interactions with Indian students and talks by experts.

# Fluvial and Lacustrine Depositional Systems and Cyclostratigraphy of Upper Permian Wutonggou Formation, Southern Bogda Mountains, NW China

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Superbly-exposed Upper-Permian Wutonggou Formation in Taoshuyuan, southern Bogda Mountains, NW China, is 240 m thick and was deposited in an intermontane basin. Depositional systems were interpreted from lithology, sediment texture and structures, geometry, and boundary relationships. Upward-fining successions of orthoconglomerate, lithic wacke to subarenite, and mudrock were interpreted as meandering stream systems. Overall upward-fining successions of carbonaceous shale, granular orthoconglomerate, lithic and feldspathic arenite, well-laminated shale, and fossiliferous limestone were interpreted as littoral lacustrine systems. Coarse-grained deposits are well sorted, plane or cross-bedded, laterally persistent with sharp non-erosional bases, and were interpreted as transgressive lakeshore deposits. The laminated shale and limestone were interpreted as littoral deposits. Upward-coarsening successions of shale, cross-bedded lithic wacke to arenite, and channel-fill conglomeratic sandstone overlain by pedogenetically altered mudrock were interpreted as deltaic systems. Individual fluvial and lacustrine systems constitute 91 high-order depositional cycles (average 2.5 m thick). Commonly 3-6 high-order cycles show upward-thickening and/or fining trends, forming 9 intermediate-order cycles. The overall similarity in stacking patterns of intermediate cycles was used to identify 3 low-order cycles. Cycle hierarchy indicates systematic tectonic and climatic processes controlling cycle formation.

## In Plane Shear Response of Laminated Composites at High Strain Rates

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The in-plane shear responses of laminated composites have been investigated experimentally using a high-rate servo hydraulic testing machine. The in-plane shear behavior of Newport NB321/3k70 plain weave carbon fabric/epoxy and NB321/7781 fiberglass/epoxy systems were studied using the V-notch rail shear test apparatus. The test coupons were tested at different stroke rates of 10in/sec, 100in/sec, 250in/sec, and 500in/sec, and the in-plane stress-strain behavior recorded. It is observed that the in-plane shear strength increases with loading rate and the shear response tends to become more linear with loading rate.

# Evaluation of Primary versus Secondary Prevention of Cervical Cancer: An Evidence Based Literature Review

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**Introduction:** The Pap smear improves the probability of detecting cervical abnormalities caused by Human Papillomavirus (HPV) at an early stage when HPV is more easily treated. Thus the Pap smear is a valuable tool in the secondary prevention of cervical cancer. Cervical cancer is most commonly found in women who are middle-aged or elderly, low socio-economic status, and minorities. These women are less likely to attend Pap smear screening. **Methodology:** A systematic literature review was performed to assess the efficacy of primary and secondary prevention of cervical cancer. The articles reviewed included women of various age groups, their knowledge of cervical cancer, their attendance at Pap smear screening, risk factors for cervical cancer, and the value of Pap smears. **Results:** Pap smear screening was found to be an effective tool in decreasing the incidence of cervical cancer, however, in order to target women most at risk it is not as effective as primary prevention. Several studies showed a majority of these high risk women do not obtain Pap smears and are not aware of the link between HPV and cervical cancer. **Conclusion:** In addition to promoting Pap smear screening, more consideration should be given toward education and condom use in the prevention of cervical cancer. Together these two prevention strategies can help reduce the morbidity and mortality of cervical cancer in women of all groups.

## Hand In Hand: Supporting the Development of Organizations Run By People with Severe and Persistent Mental Illness

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Consumer-run organizations serve as a form of social identity and support for adults diagnosed with mental illness. These nonprofit organizations, run by people with mental illness, also provide consumers with educational, leadership, and employment opportunities. Because they provide many services that are often inadequately available to people with mental illness, it is important to ensure that consumer-run organizations receive proper assistance and resources in order to continue providing these needed services. Since 2002, the Self-Help Network: Center for Community Support and Research has provided technical assistance to over 20 consumer-run organizations across the state of Kansas. The Self-Help Network has documented the frequency of over 20 types of technical assistance (e.g., grant -run organizations over the past three years (FY2003-FY2005) using a Technical Assistance Contact Form. The goal of the Self-Help Network is to help strengthen and stabilize these organizations through capacity building technical assistance. This research examines these various forms of technical assistance that the Self-Help Network has provided to consumer-run organizations. An analysis of the data indicates technical assistance is focused on two primary areas: 1) dealing with immediate concerns and crisis and 2) building long-term capacity within the organization. This research provides a discussion of the challenges of capacity building among these organizations. An implication of the findings is that there is a need for a better understanding of the nature of consumer-run organizations in order to maximize capacity building assistance.

# Is Atomoxetine as Effective as Methylphenidate in Controlling Behavioral Problems in Children with Attention-Deficit/Hyperactivity Disorder?

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**Introduction:** Attention-deficit/hyperactivity disorder is the most prevalent psychiatric disorder seen in children, affecting 3% to 7% of school-aged children. Treatment primarily consists of pharmacological interventions, particularly stimulants. The most common stimulant pharmacotherapy is methylphenidate. Atomoxetine is the first non-stimulant approved by the U.S. Food and Drug Administration for treatment of ADHD. **Purpose:** The purpose of this study is to determine if atomoxetine is as effective as methylphenidate in controlling behavioral problems in children diagnosed with attention-deficit/hyperactivity disorder. **Method:** A systematic evidence-based literature review was conducted using Pubmed and Medline FirstSearch. The MESH terms used were: attention-deficit/hyperactivity disorder, ADHD, atomoxetine or methylphenidate treatment in ADHD. **Results:** In studies comparing the efficacy of methylphenidate with that of atomoxetine, similar reductions in ADHD symptoms were found in both treatment groups. **Conclusion:** Atomoxetine offers prescribers another option for patients who cannot tolerate stimulants, such as methylphenidate, or for those patients whose parents hesitate to use a stimulant to treat ADHD in their children.

## Design and Physico-Chemical Studies of “Two-Point” Bound Supramolecular Porphyrin-Fullerene Conjugates Formed by Cation-Crown Ether Complexation and Axial Co-ordination or $\pi$ - $\pi$ Interactions

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Design of supramolecular donor-acceptor dyads employing different modes of binding and study of their photo-induced electron transfer processes are of current interest in artificial photosynthesis. Self-assembled dyads with defined distance and orientation are of major importance because of their structural rigidity and efficiency in intra or intermolecular electron transfer reactions. In this regard, porphyrins functionalized with one or four 18-crown-6 moieties and fullerene with an alkyl ammonium cations and a pyridine or phenyl entities were synthesized. As a result of the crown ether-ammonium cation complexation and zinc pyridine co-ordination or  $\pi$ - $\pi$  interactions, stable self-assembled “two-point” bound zinc porphyrin –fullerene conjugates with defined distance and orientation were formed. These complexes were characterized by  $^1\text{H}$  NMR and evidence for these interactions was obtained from UV-Vis, fluorescence, and electrochemical studies.

# A Comparison of Interviewed and Non-Interviewed Student Cohorts for the PA Program of Study and National Physician Assistant Certification Exam Scores

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Introduction: Certain student attributes (e.g., GPAs, personal interview scores) have been used by professional college programs to help differentiate candidates during the admissions process in an effort to select candidates that are likely to be successful. Though certain attributes have been evaluated over the years (e.g., GPA), information is lacking regarding the importance of interviewing candidates. Physician assistant programs have routinely interviewed prospective candidates without knowing if the interview makes a difference specifically on the PA national certifying exam score (NCCPA). Methodology: A retrospective study was done comparing NCCPA aggregate exam scores of WSU PA students. Study subjects included graduates from 1991-1996 who served as the interviewed cohort and graduates from 1997-2002 who served as the non-interviewed cohort. Each study group was subject to descriptive and parametric statistics with the alpha level set at 0.5. An independent sample *t*-test was used to see if there was a significant difference in NCCPA aggregate exam scores between the cohort groups. Results: The mean of each cohort group was similar. The mean for the interviewed graduates was 496.67 (SD +/- 28.54) and the mean for the non-interviewed graduates was 474.33 (SD +/- 15.28), which were not statistically different. Discussion: In this small study, which only evaluated interviewed and non-interviewed cohort's aggregate NCCPA exam scores, no difference was found. A large scale study evaluating the same variables is suggested before generalizations can be made.

## Desperate Culture: An analysis of “I Love Lucy” and “Desperate Housewives”

Lindsey Harvell and Erin Lamm

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“Desperate Housewives” participates in a discourse previously represented by such shows as “I Love Lucy.” These two shows focalize through the eyes of the female character what constitutes a family and what role a housewife should play. This presentation focuses on the rhetorical elements of “I Love Lucy” and “Desperate Housewives” with a particular focus on the Cultivation Theory developed by George Gerbner in the late 1960s and early 1970s. This theory is based on the assertion that the media play important roles in our daily lives. Because television is such a large part in our lives, it affects most things that we say and do which is why it is vital to understand the role it plays and the effects it has on people's lives. The Cultivation Theory is applied to this study by looking at a particular television show. While looking at each television show, it shows a complete picture of what exists in society. These shows also provide an accurate picture of what is important and morally right. More specifically, we will examine how morals, values, sex, violence, and women are portrayed to the American public as the norms and values that the typical American holds. By reflecting on the elements present, we hope to show that television plays a significant role in what contemporary culture sees as socially acceptable and to compare that to the socially acceptable behavior during the popularity of “I Love Lucy.”

# Evidence of Psychopharmacological Treatment Causing Suicidal Ideation or Suicide among Adolescents and Children

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Introduction: Depression among children and adolescents has become increasingly recognized in the medical setting. Until recently, clinicians believed selective serotonin reuptake inhibitors to be the first line of treatment. However, in 2004 the FDA labeled these medications with a warning of a possible increase in the risk of suicide when using the medications among young patients. Since that time medical providers have been left to sift through the evidence in medical literature to ascertain the safest treatment options. Methodology: The purpose of this paper was to perform a systematic review of the literature and examine the cumulative data addressing the issue to present a clearer picture to providers. Articles used included children and adolescents ranging in age from infancy to 18 years of age who met the *Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition* criteria of major depressive disorder from 1971-2004. Variables reviewed in articles included psychotherapy, pharmacotherapy, the combination of both, and suicide. Results: Twenty six articles matched the criteria and were reviewed using evidence-based methods. After close analysis of the data, there lacked a preponderance of evidence linking antidepressant medications and an increased risk in suicide regardless of whether subjects were taking the medication alone or in combination with psychotherapy. In fact, the safest and best outcome was combination therapy. Conclusion: The most effective and safe treatment option for young patients with depression was a combination of cognitive based therapy and fluoxetine.

## Determining Optimal Spanish Speech/Language Words for Testing Young Spanish-speaking Children: Creating a Foundation for Improving Assessment Procedures

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There is a critical need for unbiased assessment instruments for children who speak a language other than English. According to the US Census Bureau, the Hispanic population is the fastest growing minority in the United States. Currently, appropriate speech/language assessment instruments in Spanish are generally lacking. Spanish-speaking children are often over or under identified for special education instructional services. One of the critical issues pertains to the Spanish words selected for testing. If the words are not generally known, the results may suggest that a child has a problem when in reality it is the test, or word choice, that creates the problem. Words that children can name spontaneously, therefore, are deemed preferable compared to words that require varying degrees of assistance or imitation. The goal of this investigation was to determine which Spanish words are known best by young Spanish-speaking children. Seventy pictures of Spanish words were presented to 10 typically developing Spanish-speaking 5-year-old children of Mexican descent. The results indicate that colors, numbers, and body parts were consistently identified more readily by participants. This study will provide additional data regarding differences in children's abilities to recognize pictures of words in Spanish. The results of this study will be used for the selection of optimal words for use in future assessment.

# Damage Tests on an Adaptive Flight Control System

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An Easy Fly System on a Bonanza Raytheon NASA Test-bed has been used by WSU to develop a Neural Network Based Adaptive Flight Control System. This Paper describes a series of simulations done on the control system to evaluate its ability to adapt to damage that may occur to the aircraft in flight. These tests were done to verify that it would be possible for an un-experienced or un-trained pilot to continue flying a damaged aircraft with ease. When the aircraft is damaged, its parameters change causing normal autopilots and other control systems, which are fine-tuned to these parameters of the specific aircraft, to be unable to compensate for the damage and operate effectively. The Neural based Adaptive Flight Controller uses an Artificial Neural Network to compensate for these modeling errors and control surface failures. The simulations were carried out in X-Plane, using its features for simulating damage on the aircraft. Testing was done with longitudinal and lateral controllers to observe their adaptability to the changes on the aircraft. The aircraft was flown in a strict flight pattern, during which various control surfaces, such as portions of the wing and ailerons, or part of the horizontal stabilizer, were removed and the flight pattern continued. Close attention was paid to the change in deflections of the control surfaces when another surface was failed. In all the tests, it was overall found that the controller was able to adapt to the damage and continue flying the pattern as long as no extreme maneuvers were commanded, for which the controller was slow to compensate for.

# Evaluation of Post-Weld Heat Treatments for Corrosion Protection in 2024 and 7075 Aluminum Alloys

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This work was funded by the State of Kansas and the Federal Aviation Administration to investigate the applicability of friction stir welding (FSW) for aerospace structures. Two of the most common aerospace aluminum alloys, 2024 and 7075, were investigated. In the as welded condition, both alloys were found to be highly susceptible to exfoliation corrosion, and 7075 was found to be susceptible to stress corrosion cracking. The goal of this research was to identify proper initial temper selection and post weld aging treatments for the enhancement of the corrosion resistance of both 2024 and 7075 alloys, and their dissimilar joints. A large number of heat treatments were investigated for 7075 in the T6 and T73 tempers, including retrogression re-aging (RRA). Heat treatments were also investigated for 2024-T3 and 2024-T81. Samples were evaluated for resistance to exfoliation corrosion using optical microscopy. Microhardness, electrical conductivity, tension, and fatigue crack propagation tests were also performed on the samples. Beneficial heat treatments were found for both alloys as well as for their dissimilar joints.

# PACKRAT: A Predictor of PANCE Score

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Introduction: The ultimate goal for physician assistant programs is to provide the right amount of education and clinical experience for preparation of their students for clinical practice. In addition, programs must adequately prepare students for successful completion of the Physician Assistant National Certifying Examination (PANCE). Knowing that program completion and PANCE completion are required to practice as a PA, practice exams like the Physician Assistant Clinical Knowledge Rating and Assessment Tool (PACKRAT) may be a good predictor for PANCE performance. Methodology: The purpose of this study was to evaluate whether PACKRAT exam scores served as a predictor of PANCE scores for Wichita State University PA classes 2003-2004. The data of interests included PACKRAT 1 (administered at the end of the first year), PACKRAT 2 (administered at the end of the second year), and PANCE exam raw scores (administered after graduation). The relationship between the scores was evaluated by determination of the correlation coefficient. Analysis of the predictive value of PACKRAT results with respect to passing the PANCE was accomplished using linear regression. Results: Combined correlations of the class of 2003-2004 between PACKRAT and PANCE scores showed correlation coefficients of 0.602 ( $P<0.001$ ) for PACKRAT 1 and 0.744 ( $P<0.001$ ) for PACKRAT 2. Linear regression showed a significant relationship between PACKRAT scores and PANCE performance ( $P<0.001$ ). Conclusion: PACKRAT scores are strongly correlated with PANCE performance. The PACKRAT appears to predict student outcome on the PANCE.

## Capacity Partitioning and Resource Allocation Framework for Appointment Allocation in Rehabilitation Outpatient Clinics

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Rehabilitation outpatient clinics help patients overcome physical disabilities through various rehabilitation services. Customers in rehabilitation outpatient clinics visit the facility regularly to receive treatments. The customers need to schedule appointments before they visit a rehabilitation outpatient clinic. This research is aimed at developing a robust appointment system for rehabilitation outpatient clinics using revenue management principles. Using this system, optimal appointment schedules can be generated while ensuring that more new customers are accommodated into the system thereby maximizing revenue. The proposed framework reserves a portion of total capacity to different customer segments based on the revenue generated from those groups. This framework is tested for various operating conditions using simulation analysis. The simulation results indicate that the proposed framework generates more revenue and results in an increased new customer acceptance when the capacity is tight, demand is high and there is a clear distinction between different customer segments in terms of revenue contribution.

# Bioengineering Applications of Lithium-ion Batteries

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This paper surveys bioengineering applications of Li-ion batteries. The main advantages of Li-ion batteries over other types of batteries are their reliability and longer life cycle. Moreover the safety of these batteries has made them a better choice for providing bioengineering devices with energy.

These characteristics and other characteristics of Li-ion batteries which were studied in previous research about bioengineering applications will be analyzed in this paper. Li-ion batteries proved to be extensively applicable in bioengineering devices especially implantable devices such as cardiac pacemaker, drug pumps, cardiac defibrillators and ventricular assist devices. Although much has been done about Li-ion batteries application in bioengineering devices, there is no study which covers all of the bioengineering applications of these batteries. This study is intended to fill this gap by providing a perfect reference for any future study about bioengineering applications of Li-ion batteries. Concerns on proper specification of Li-ion batteries for bioengineering devices will also be addressed in this paper.

## Drug Usage Evaluation: Nesiritide (Natrecor®)

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Almost one million hospital admissions are attributed to congestive heart failure (CHF), as well as nearly two million secondary diagnoses. Direct and indirect heart failure treatment in the United States topped \$24.3 billion in 2003. Nesiritide, a human B-type natriuretic peptide, is the first new agent for treatment of acute heart failure on the market in over 10 years; it was approved by the FDA in 2001. It carries with it, though, strict monitoring parameters and a high cost. Based on the prevalence of CHF and the high cost of treatment, it is critical that hospitals and health-care providers are able to effectively treat their patients in the most cost-effective way. This drug usage evaluation (DUE) will answer two questions: Does nesiritide administration match the defined protocol at this facility? What are the outcomes of patients who are treated with nesiritide? The study is a retrospective, non-interventional design. It was conducted at Wesley Medical Center in Wichita, Kansas, a 760-bed tertiary care facility and teaching hospital. All patients who received nesiritide over a one-year time period were included in the study. Necessary data was collected from the hospital's integrated computer documentation records and actual patient charts. Twenty-seven percent of nesiritide usage was during coronary artery bypass graft surgery and not for the approved usage in acute heart failure. Blood pressure was correctly monitored in only 42.9% of patients, and the drug was dispensed without the required pre-printed hospital orders in 33.9% of the cases. Average length of total hospital stay was 15.0 days and 10.9 days in an intensive care unit. Mortality rate was found to be 16.1%.

# Compassion Kansas: Strengthening Community and Faith Based Organizations through Capacity Building

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Beyond the intention to “do good” in the community, non-profits sometimes struggle to realize this goal due to a lack of organizational capacity. Capacity is defined by Grantmakers for Effective Organizations as the ability of an organization to fulfill its mission (i.e. possessing technical resources, leadership ability, fund development skills, etc). Compassion Kansas is a statewide initiative of the Self-Help Network: Center for Community Support and Research that is designed to build the capacity of Kansas community- and faith-based organizations (CBOs and FBOs, respectively) to better serve Kansans in need.

The evaluation of the impact of Compassion Kansas efforts with CBOs/FBOs involves the following: a baseline organizational assessment that measures various elements of capacity; a comparison group that receives the assessment and access to online resources only; an intervention group that receives a grant of up to \$10,000 to support capacity building needs, the organizational assessment, access to online resources, and customized technical assistance from SHN staff; and a multiple year follow-up using the organizational assessment. The purpose of the current poster is to describe the outcomes of Compassion Kansas in building the capacity of Kansas FBOs/CBOs.

## Etiology of Depressive Symptoms in Parkinson’s Disease: A Result from Neuroanatomical Deficiencies or a Consequence of the Psychosocial Stress of PD Diagnosis

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**Introduction:** Parkinson’s disease (PD) affects approximately 1 million individuals in the US. Depressive symptoms occur in approximately half of PD patients and are a significant cause of functional impairment. **Methodology:** A computer-based search of the literature, augmented by extensive bibliography-guided article reviews, was utilized to find data on depression and Parkinson’s disease. Twenty articles were reviewed using evidence-based methods. Reviewed topics include PD, depression, neurodegeneration in PD patients, onset of depression in PD, and treatment of depression in PD patients. **Results:** Postmortem and imaging studies have correlated clinical symptoms of depression with the non-motor basal ganglia-thalamic-frontal cortex circuit. PD patients with comorbid depression have smaller subcortical nuclei which is similar to non-PD patients with depression. Changes in both the serotonin and dopamine systems have been implicated in depression. Decreased numbers of serotonin neurons in the dorsal raphe nucleus and dopamine neurons in the ventral tegmental area are found postmortem in PD patients with a history of depression. **Conclusion:** There is accumulating evidence suggesting that depression in PD is secondary to the underlying neuroanatomical degeneration, rather than simply a reaction to the psychosocial stress and disability of the PD diagnosis.

# ROBUST AND REDUCED ORDER FAULT DETECTION FILTER DESIGN VIA LMI APPROACH

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The objective of this research is to develop a practical methodology for designing a reduced order  $H_\infty$  fault detection filter for a plant having the polytopic model uncertainty. A robust fault detection filter (RFDF) is formulated in multi-objective  $H_\infty$  setup for polytopic uncertain system and the filter data can be easily found through LMI technique because it became as a powerful computational design tools in control engineering. Polytopic model uncertainty is very general in engineering and science problem. Also, it is proper for LMI framework because it is convex. The filter order reduction is also another issue because it can relieve the computational burden. The order of RFDF is reduced using LMI technique and the admissible filter with suitable dynamic behavior can be obtained from the solution of convex optimization problem because it is formulated in LMI. The detecting performance is compared with the full order filter. Adaptive threshold is used for the threshold selection for the fewer false alarm. Simple example is illustrated to show the effectiveness of the order reduction and some related perspective is considered.

## A Study of a Calix[4]Pyrrole Containing the Side Group 4,5-Diazafluorene

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Calix pyrroles have been around since 1886 and have been shown to bind different kinds of anions with great affinity. To this date there have been no calix[4]pyrroles that contain groups allowing for the binding of metal cations. In this paper a calix[4]pyrrole containing the group 4,5-diazafluorene will be described. The synthesis, anion binding properties, and the use of the 4,5-diazafluorene as a coordination site for metal cations, specifically for ruthenium based species are included in the description.

# Different Control Methods for Adaptive Flight Control System

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An Easy Fly System on a Bonanza Raytheon NASA Test-bed has been used by WSU to develop a Neural Network Based Adaptive Flight Control System. This paper describes different control methods developed for the Easy Fly System in order to relieve the workload of the pilot while he still has complete control of the aircraft. The simulation is done by interfacing X-PLANE, the flight simulation software, with MATLAB, wherein the controller models are constructed and compiled. The four different types of controllers that have been developed are i) flight path angle ( $\gamma$ ) controller ii) pitch angle ( $\theta$ ) controller, iii) flight path angle rate ( $\dot{\gamma}$ ) controller and iv) pitch angle rate ( $\dot{\theta}$ ) controller. In order to evaluate its stability and response, each controller requires the velocity and its corresponding parameter (for example, flight path angle for the flight path angle controller) to be commanded from the pilot. A trim feature has also been added for the controllers. These controllers have been designed for longitudinal control only, i.e. lateral control is not taken in to account while running the controller. The controllers are currently being evaluated for their performance and behavior by pilots as well as non-pilots, the results of which will be discussed in the presentation.

# The Effects of a Mediterranean Diet vs a Low-Carbohydrate Diet on C-Reactive Protein Levels

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**Introduction:** Obesity is associated with high plasma c-reactive protein (CRP) levels, an independent risk factor for cardiovascular disease. The Mediterranean diet (MD) and low carbohydrate diets (LCD) are gaining popularity and have been studied for their effects on CRP levels. **Purpose:** The goal of this study is to compare the effects of the MD and LCD on CRP levels. **Method:** A systematic evidence-based literature review was conducted comparing these two diets. Databases search were Medline, PubMed, and FirstSearch using the MeSH terms c-reactive protein, diet, low carbohydrate diet, Mediterranean diet, ketogenic diet, and inflammatory markers. **Results:** Sixteen studies were found that examined either the MD or LCD and their effects on serum CRP. Both the MD and LCD had similar effects on CRP. Eight studies examined the MD while the other eight involved a LCD. Half of the articles for each diet showed significant decrease in CRP after dietary change whereas the other half for both diets showed no significant change in plasma CRP levels. **Conclusion:** At this time, no recommendations can be made as far as which diet is more effective at lowering plasma CRP levels. It appears as though the reduction in CRP is directly related to the amount of weight lost while on each diet and/or to the reduction in body mass index.

# Where is Mr. Clean? Household Division of Labor and the Pay Gap Between Men and Women

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The household division of labor and the pay gap between men and women is analyzed using the 2004 American Time Use Survey. Previous research has shown women perform the majority of household labor even when working the same amount of hours as their husbands. These chores are often female-typed chores such as cooking, cleaning, and laundry, which have a stronger negative impact on income than male-typed chores such as household repairs and lawn care. It is hypothesized that women will have a higher rate of performing female-typed chores, and that female-typed chores will have a negative impact on income.

## Mechanism of Ovarian Disruption by Neonatal DES Exposure: A Modified Ectopic Approach

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The proposed project is a continued effort to test whether neonatal exposure to the synthetic estrogen diethylstilbestrol (DES) disrupts the morphogenesis and function of the hamster ovary by a direct or indirect mechanism. To test this hypothesis we exposed neonates directly to DES and assessed subsequent consequences in the ovarian cells/tissue. Circulating gonadotrophin levels were measured in order to determine if any DES-induced alterations of hypothalamus/pituitary were correlated with ovarian dysfunction. The hamster cheek pouch was exploited further to test the hypotheses. This ectopic approach used cross-transplantations of ovarian tissue between control and neonatally DES-treated donor and host animals. Assessments of the morphology of the host's uterus were used to determine the viability and steroidogenic function of the ovarian transplants. Successful ovarian transplants then underwent histological processing and were analyzed for changes in morphology and function. Immunohistochemical analyses were also conducted to test changes in protein expression on a cellular/molecular level. Ovarian function was also assessed by measuring circulating levels of estrogen and progesterone by radioimmunoassay (RIA).

# DOES IT START IN THE HOME? AN ANALYSIS OF THE EFFECTS OF FAMILY STRUCTURE ON ACADEMIC ACHIEVEMENT

By Robin Crowe

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This study examines the influence family structure (two parent or single parent) has on academic achievement as measured through student test scores. In addition, an alternative model comprised of student role performance, school, and other family factors is used to examine various influences on academic achievement. This study employs a secondary data analysis of the Educational Longitudinal Study of 2002. Two hypotheses from each model segment are presented to test the relationship of each segment to academic achievement. Univariate, bivariate, and multivariate analyses are used to determine the relationship between the independent variables and the dependent variable by family structure. Analysis reveals that although family factors, including family structure, contribute more toward test scores than school factors, it is student role performance factors that influence test score outcomes the most, when controlling for other factors. Student Role Performance factors account for 18.3% of the variance in test scores while Family factors, including family structure account for 6.8%.

## Assessing the Validity and Reliability of a Paper-and-Pencil Piagetian Test

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Piaget hypothesized that we understand the world through the use of cognitive frameworks. The strengths and limitations of these cognitive frameworks (or levels) both help and hinder the learning process. Comprehending individuals' cognitive levels is especially essential for teachers to ensure that their students learn. Piaget developed a series of tasks to assess individuals' cognitive levels (typically called "clinical interviews"; however, these tasks require one-on-one interaction between the individual and the task administrator (multiple numbers cannot be assessed simultaneously). Thus, a paper-and-pencil test that could be administered to groups was developed to help teachers determine the cognitive level of the children they teach. Problems with the scoring technique limited the validity and reliability of the instrument; therefore, a revised scoring system was developed that simplified and broadened the scoring of the test. The purpose of the current study is to determine if the reliability and validity of the paper-and-pencil instrument would be significantly increased through the use of the revised scoring procedures. A total of 320 students (80 each from fifth, seventh, ninth, and eleventh grades) took the paper-and-pencil test at three-week intervals. Also, each student completed the Piagetian tasks under the supervision of a trained task administrator in the traditional one-on-one format. Two types of analyses will be conducted: First, to determine criterion-related validity, the scores on the paper-pencil test will be compared with the scores on the traditional clinical interviews to determine the correlation between the two measures. Second, to determine test-retest reliability, the scores between the two paper-pencil sessions will be compared to determine the correlation between the two test-taking times.

# A Unified Procedure for Continuous-Time and Discrete-Time Root-Locus and Bode Design

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*Abstract-* As an alternative to the numerous distinct controller design algorithms in continuous-time and discrete-time classical control textbooks, a simple, unified design approach is presented for all standard continuous-time and discrete-time, classical compensators independent of the form of the system information. This approach is based on a simple root locus design procedure for a proportional-derivative (PD) compensator. From this procedure, design procedures for continuous-time and discrete-time lead compensator are developed. The delta operator, which serves as a link between the continuous-time and discrete-time procedures, offers improved numerical properties to the traditional discrete – time shift operator. With this proposed approach, designers can concentrate on the larger control system design issues, such as compensator selection and closed-loop performance, rather than the intricacies of a particular design procedure.

## Pharmacologic Treatment Options for Post-Stroke Depression: Selective Serotonin Reuptake Inhibitors vs. Tricyclic Antidepressants

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**Background and Purpose:** Post-stroke depression (PSD) affects 20-50% of patients within one year after stroke. Depression is considered to be the most common emotional outcome of stroke. PSD is often not detected or inadequately treated. There is little evidence in the literature to guide health-care providers in regard to selection of pharmacological treatment. This study will focus on the efficacy and safety of selective serotonin reuptake inhibitors (SSRIs) versus tricyclic antidepressants (TCAs) in the treatment of PSD. **Method:** An evidence-based systematic review of the current literature was conducted utilizing multiple databases to identify randomized, controlled trials of the treatment of PSD. MESH terms used were post stroke depression, cerebrovascular accident, antidepressant treatment. **Results:** 22 articles were selected for review. TCAs and SSRIs appear to be equally effective in the treatment of PSD; however, SSRIs are better tolerated and have significantly decreased side effect potential. **Conclusion:** Selective serotonin reuptake inhibitors appear to be the preferred treatment option for post-stroke depression.

# Factors Contributing to Tobacco Use among Physician Assistants in Kansas

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Introduction: Research has been conducted on the prevalence of tobacco use among physicians and nurses and whether or not providers who use tobacco are more or less effective in promoting cessation counseling to their patients. Similar research has not been conducted on PAs. Methodology: The purpose of this cross-sectional study was to explore the prevalence of tobacco use among a convenience sample of physician assistants (PAs) in Kansas, factors contributing to their tobacco use, and whether or not their tobacco use affects their beliefs concerning tobacco cessation counseling. A survey was sent to Kansas PAs regarding these questions and results were analyzed using descriptive statistics and Chi-Square analysis. Results: The survey response rate was 46% (n=577). The number of PAs that smoked and used other forms of tobacco was 4.3% and 2.7%, respectively. Beliefs concerning the health dangers of tobacco and the importance of tobacco cessation counseling, among others, were statistically different among the tobacco users versus the non-tobacco users. PAs who were smokers believed tobacco cessation counseling was less important than non-smokers. Also, PAs who smoked believed counseling was less difficult than the non-smokers. Finally, PAs who use other forms of tobacco believed the health dangers of tobacco were less than those of non-tobacco users. Conclusion: This represents the first evaluation of PA's smoking habits and their perceptions about tobacco cessation counseling. Findings were similar to other health care providers, in particular physicians. A large nationwide study is recommended before generalizing conclusions to PAs.

# Virtual Reality as a Tool for Assuring Code Compliance in Facility Design and Construction

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Virtual Reality (VR) technology has progressed over the last 40 years from its early inception as panoramic view presentation to three-dimensional manufacturing modeling, complete with tactile control and shape and texture modeling. Applications range from motion picture production and selection of vacation resort destinations to manufactured part modeling for product demonstration and sales. VR models have stepped beyond the realm of providing the PC user a 360-degree panorama view of a hotel room to now present the user with a complete "virtual tour". VR is thus a great tool for "selling" facilities to potential customers or clients. However, VR can be used even more as a tool in facility design and the presentation of that design to civic code enforcers for review and approval of the facility design before any expenditure is made on its construction. The objective of this project is to present VR as a tool for assuring code compliance in facility design and construction. As a case study, an office suite is toured in VR, where life safety devices, such as fire alarm horn/strobes and lighted exit signs can be located and tested, and building egress pathways presented and demonstrated to the design and/or enforcement authority for approval prior to construction. This project focuses on VR as a design tool for assuring that the facility is safe and built in a code-compliant manner from the moment the first scoop of dirt is turned to the moment it is turned over to the owner.

# Constrained Area Coverage for Mobile Sensor Network

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A mobile sensor network or robotic swarm is a distributed collection of mobile robots. Swarm robots are equipped with sensors and they work together to execute tasks which are beyond the scope of single robot. Covering an entire area of surveillance is one of the most important tasks in a mobile sensor network. Robots need to cover an unknown environment which may contain obstacles, while maintaining proper communication between their neighbors. This paper will discuss a completely decentralized and scalable algorithm. From the beginning all robots will communicate their current position with their neighbors. Each robot communicates with at least a fixed number of robots  $K$ . The robot is said to have  $K$  degree of *connectivity*. Robots will spread in an environment in such a fashion that their arrangement will maximize the coverage area while avoiding collisions with themselves and obstacle present in the environment. While spreading they maintain the line of sight and communication between their neighbors. Algorithm's performance will be systematically investigated by calculating the percentage of the covered area.

# Physico-Chemical Studies of Interactions of Water Soluble Brominated Porphyrins with DNA

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Interactions of water-soluble metalloporphyrin derivatives with DNA and their applications in DNA cleavage have received great interest in the field of biochemistry. Such water-soluble porphyrins that intercalate in DNA have been shown to be tumor specific and therefore have potential as possible tumor therapy agents. Adding bromine groups to the porphyrin should create a compound that has a more positive center because of the electron withdrawing nature of bromine. This should create a porphyrin that intercalates more readily with DNA. Neutral, water-soluble brominated porphyrins with different metal centers ( $M = Ni^{2+}, Zn^{2+}, Cu^{2+}, Mn^{3+}, Fe^{3+}, Co^{3+}$ ) were synthesized in our lab and their interactions with calf thymus DNA were studied using spectroscopy to provide evidence of the interaction of these water-soluble porphyrins with DNA bases.

# Attitudes Towards and Awareness of Gay and Lesbian Patients: A Survey of Physician Assistants

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**Introduction:** The homosexual subculture provides a unique challenge for all health care professionals. Attitudes of healthcare providers may prevent homosexual persons from seeking and receiving healthcare. Research has been conducted on physicians and medical students concerning their attitudes about homosexuality but a similar study has not been done on physician assistants. **Methods:** The purpose of this study was to survey family practice physician assistants to determine their attitudes towards and awareness of gay and lesbian patients. A survey was sent to all family practice physician assistants in the states of Kansas, New Jersey and Oregon. The results of the survey were analyzed using Chi-Square analysis. **Results:** The survey response rate was 57% (n=168). Regarding physician assistant awareness of gay and lesbian patients, 82.3% and 84.4% of the sample, respectively, were aware of gay and lesbian patients in their practice. The majority of the respondents appeared to have positive attitudes towards gay and lesbian patients in obtaining a sexual history, in providing care, and in attending continuing medical education sessions concerning gay and lesbian health issues. Due to the small sample size, the results should be viewed with caution. **Conclusions:** This preliminary study represents the first study of the awareness and attitudes of physician assistants towards homosexual patients. The findings were positive overall. A nationwide study is recommended before the results and conclusions can be generalized for all physician assistants.

## Video Surveillance Using Wireless Sensors

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**Abstract:** Research in wireless sensor networks is continuously growing in recent years. However, despite the theoretical advances, practical applications are still in prototyping stages. In this paper, we will use concepts of wireless sensor networks for video surveillance application. Video surveillance is usually done with big cameras which have the capability of moving and zooming in and out. We will use small video cameras, which are low-cost and tiny tools, to implement video surveillance. Using a number of these cameras instead of a big camera will lower the cost of implementation. Coding concepts such as multi-terminal coding in sensor networks are applied to make the system efficient. The demonstration includes taking images with two cameras, and see how efficiently they can be transmitted to the base station. Then we will apply some coding strategies, to reduce the rate-distortion of our overall system.