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## 38th Annual WKU Student Research Conference

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*Student Research Council, Western Kentucky University*

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*38th Annual  
WKU Student  
Research Conference*

Saturday, April 12, 2008  
Carroll Knicely  
Conference Center

## **Schedule of Events**

**7:30-8:00 AM- Registration**

**8:00 AM- Welcome and Plenary Session with remarks  
by Barbara Burch, Provost in Room 163B**

**8:30-9:40- Concurrent Session Number 1**

**10:25-11:40- Concurrent Session Number 2**

**12:00- Poster Session in Room 130 (refreshments  
provided)**

**1:00-2:15- Concurrent Session Number 3**

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### Graduate Posters (Room 130)

“Is Conscientiousness Related To Performance Rating Accuracy and Perceived Difficulty In Rating?” **Jeremy Alexander**, Dr. Anthony Paquin\*

“Transport of the Pesticide Atrazine within the Logsdon River, Mammoth Cave, Kentucky” **Julie Schenck Brown**, Dr. Stephen T. Kenworthy\* coauthor

“Real-time Visual Motion Detection System” **Gyuchoon Cho**, Dr. Ahmed Emam\*

“Variation in Reported Human Sex Ratios” **Pramod Gupta**, Dr. Elmer Gray\*

“Synthesis of Pure Hydrogen titanosilicate for the determination of the strontium ion exchange mechanism” **Samantha Kramer**, Dr. Aaron Celestian\*

“Conversion of Traditional Taxonomy-Centered Botany Labs to Case-Based Inquiry Learning” **Hajara Mahmood**, Dr. Heather Johnson\*

“Prostate Cancer Screening and Mortality in Blacks and Whites: Results from a Hospital-based Case Control Study” **Heather Owens**, Laura Stephens co author, Dr. William Mkanta\*

“Numerical approximation method for a seven-step radioactive decay sequence using Excel” **Brian Peyton**, Dr. Cathleen Joyce Webb\*

“Synthesis of Organic and Organometallic Compounds for Semiconductor Research” **Joseph Scott**, Dr. Chad A. Snyder\*

“Social Skills Deficits and Causal Reasoning in Children with Autism Spectrum Disorder” **Kyla Surdyka**, Dr. Carrie Pritchard\*

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### Undergraduate Posters (Room 130)

“Abraham Lincoln” **Benjamin Berry**, Kim Chalmers\*

“Gerewol Dance, Wodaabe” **Summer Bolton**, Matthew Tullis\*

“Population structure of buckeye butterflies (genus *Junonia*) in Texas based on Cytochrome Oxidase II DNA sequences” **Juan Burbage**, Dr. Jeffrey Marcus\*

“San Fermin Festival” **Holle Cannon**, Matt Tullis\*

“Floating Elements” **Larisa Chavarria**, Laurin Notheisen\*

“Alkoxyamine Polymers: Versatile Materials For Surface Ligation Applications” **David Dahl**, Jessica Moore; Belinda Lady; Hasan Palandoken coauthors, Dr. Hasan Palandoken\*

“The Effect of Endothelin-1 and Fluorouracil on Wound Healing of Bovine Corneal Endothelial Cells” **Angela Dao**, James Lutz coauthor, Dr. Kenneth Crawford\*

“Experimental and theoretical studies of cyclophane-PAH interactions” **Christopher Davies**, Dr. Thandi Buthelezi\* coauthor

“South Korea: Past & Present” **Michelle Graham**, Matthew Tullis\*

“Olds-mobility: Do older drivers tell the truth?” **Whitney Greenwell**, Jennifer A. Chapman coauthor, Dr. Dan Roenker\*

“A Popular Man” **Brandon Hagan**, Kim Chalmers\*

“Thermal Analysis of the Denaturation Temperature of BSA Using Fluorescence Spectroscopy” **Katie Harwood**, Dr. Cathleen Joyce Webb\*

“Pyridazyl Complexes via 1,2-Diacylcyclopentadienes” **Daniel Hinson**, Dr. Chad A. Snyder\*

“A Novel Pervious Cement Reaction Barrier (PCRB) In Situ Arsenic Remediation System” **Morgan Jones**, Dr. Cathleen Joyce Webb\*

“Comparative and Equivalent” **I-Ping Kuan**, Kim Chalmers\*

“The Mass Games” **Lindsay Jarvaun**, Matt Tullis\*

“Reaction of Cisplatin Analogs With Selenomethionine” **Rebekkah Lively**, Stephen C. Chmely coauthor, Dr. Kevin M. Williams\*

“Samoa Festival (World FireKnife Competition) **Alaina Matthews**,  
Matt Tullis\*

“Apparent Surface pKas of Mercaptocarboxylic Acid Self-Assembled  
Monolayers on Polycrystalline Gold” **Winston Maupin**, Yi Zhou, An-  
drew Ebelhar, Michael Daugherty coauthors, Dr. Stuart Burris\*

“Aylisascaris Procyonis Infection in Raccoons Trapped from Warren  
and Barren Counties of Kentucky” **Alyssa Mavi**, Chad Groce and  
Cheryl Davis coauthors, Dr. Cheryl Davis\*

“A Collection of Planets and Other Things” **Elisa McCabe**, Yvonne  
Petkus\*

“Chasms in care: Implications of a disparate system on childhood  
overweight” **Sara Miller**, Dr. Marilyn Gardner

“Aids in Africa” **Danialle Moore**, Meredith Moore and Tharpam  
Chamjock coauthors, Sandra Ardrey\*

“Bowen ratio computations and its relation to surface fluxes of malo-  
dors at a swine lagoon in Logan County, Kentucky during summer  
and winter seasons” **Monica Motley**, Arturo Quintanar, John Lough-  
rin, Nanh Lovanh, Dr. Rezaul Mahmood\* coauthors

“School Bus Safety Program for Bristow Elementary School” **Amanda  
Mounce**, Meredith Hall, Janelle Ward, Mackenzie Francis coauthors,  
Dr. Grace Lartey\*

“Pedestrian Safety Program for Dishman-McGinnis Elementary  
School” **Elizabeth Murray**, Mahsa Kariman, Karie Starkey, Kayla  
Clausen, Antoinette Danridge coauthors, Dr. Grace Lartey\*

“PWNEED: Leadership and Videogames” **Kalu Njoku**, William Ritson

coauthor, Dr. Douglas Smith\*

"Abraham" **Stephen Ogden**, Kim Chalmers\*

"Coital Connotations" **Galen Olmsted**, Tom Bartel\*

"Mercury Concentrations of Blue Sucker and Freshwater Drum in the Green River" **Trisha Parsons**, Dr. Cathleen Webb\*

"1,2-Diacylcyclopentadiene Synthesis: Starting Materials for Thienyl and Pyridazyl Complexes" **Chad Phillips**, Chad A. Snyder\*

"Flash Flood Climatology of the Appalachian Region (1978-2005)" **William Rodgers**, Dr. Rezaul Mahmood\* coauthor

"Application of the Agresti-Coull's interval estimation on Quality Control Data" **Adam Rusnock**, Dr. Jonathan Quiton\* coauthor

"Spectroscopic Characterization of Over the Counter Medication" **Sabina Salkic**, Michelle Perry and Dr. Thandi Buthelezi\* coauthors

"Powers of "Five" **Kelly Scheurich**, Laurin Notheisen\*

"Nanoscale Colloid Displacement Lithography" **Christopher Snyder**, Dr. Stuart Burris\*

"Conditioning of *Otocinclus affinis* using conspecific sounds" **Patrick Stewart**, Dr. Michael E. Smith\*

"Removal of Cationic Reactive Dye from Water Using Anion Exchange Membrane with Immobilized Surfactant" **Dino Sulejmanovic**, Siao Jhen Chen coauthor, Eric Conte\*

"Historical ranking of 2007 drought and summer heat wave for the Mid-South" **James Thompson**, Stanley D Wingard, Kylie Batson coauthors, Greg Goodrich\*

"Progress towards cariporide analogs for sodium-proton exchange inhibition" **Jacob Vervynckt**, Jessica Moore; Mark Graves, II; William



Harley; Fredric Gorin; Hasan Palandoken\* coauthors

“Surfactant-Immobilized Cationic Exchange Membranes as SPE Adsorbents” **Sarah Vied**, Chao-Chang Hsu, Guan-Lian Chen, Shing-Yi Suen, Dr. Eric Conte\* coauthors

“Kunapipi Rituals of Aboriginal Australians” **Jenni West**, Matt Tullis\*

“A Deeper Insight to Hg Bioaccumulation in the Bat Population in Kentucky and Tennessee” **Erika Whitehouse**, Lindsey Clark coauthor, Dr. Cathleen Webb\*

“Bicycle Safety Program for Safe-T-City Bowling Green” **Daryl Williams**, Jillian Bracewell, Kuol Deng, Katie Bittel coauthors, Dr. Grace Lartey\*

“Skateboarding Safety Program for Parker Bennett Curry Elementary School” **Nan Willoughby**, Randa Johnson, Lisa Meeks, Conrad Meeks coauthors, Dr. Grace Lartey\*

“January 29-30th Squall Line Impact on Kentucky Mesonet Sites” **Joseph Wilson**, Jane Marie Wix coauthor, Dr. Stuart Foster\*

“Mehni” **Briana Worle**, Matt Tullis\*

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## Student Presentations

### 8:30 AM Session

#### Room 163 B Graduate Presentations

8:30- “The Demand for Long-Term Care Insurance” **Aaron Young**, Dr. David Zimmer\*

8:45- “A selective study on the use of caffeine and theobromine imprinted polypyrrole surface elcctodes” **Anil Vinjamuri**, Dr. Darwin B. Dahl\*, Dr. Stuart Burris\* coauthors

9:00- “Genetics Diversity of Invasive Wine Raspberry” **Ashley Wint**, Lawrence Alice\*

9:15- “First report of Trypanosoma cruzi infection in raccoons and opossums from Kentucky” **Chad Groce**, Cheryl Davis\* coauthor

9:30- “Biological synthesis of gold nanoparticles” **Daniel Starnes**, Shivendra V. Sahi\*

9:45- "Landscape Construction at the Felts Log Cabin" **Elizabeth Alewine**, Martin Stone\* coauthor

### Room 112

8:30- "Food and Corporations" **Greg Capillo**, Nathan Phelps\*

8:45- "Introduction to the Seven Revolutions" **Joseph Colvin**, Christy Beyke, Bradley Morgan coauthors, Dr. Nathan Phelps\*

9:00- "C. S. Lewis: A Panentheist?" **Cole Puterbaugh**, Joseph Trafton\*

9:15- "Circuit and EM model integration for core loss calculations in transformers" **Anthony Merriam**, Joshua Chelf coauthor, Dr. Collett\*

9:30- "The Economic Impact of the Kentucky Green River Conservation Reserve Enhancement Program (CREP)" **Lorie Owen**, Dr. Michelle Trawick\*, Dr. Roy Howsen\*

9:45- "Nearby Galaxy Supernova Search I: Fuzzy Exploding Stars on a Computer Screen" **Schuyler Wolff**, Andrew M. Gott coauthor, Louis-Gregory Strolger\*

### Room 113

8:30- "Underwater Threat Detection Using Pulse Neutrons" **Brian Cooper**, Dr. Alex Barzilov\*, Dr. Ivan Novikov\*, Michael Simpson coauthors

8:45- "The Journey" **Erin Goad**, Michael Kallstrom\*, Michele Fiala\*

9:00- "90% Microbial Mass" **Megan Kelley**, Yvonne Petkus\*

9:15- "An Analysis of the Third Objection to the Forms in Plato's *Parmenides*" **Corey Smith**, Dr. Arvin Vos\*

9:30- "Flow and Sports: Gender Differences between Mens" **Evelyn Oregon**, Dr. Bruce A. Larson\*

9:45- "What is responsible for activating Active Galaxies?" **Austin Fatkin**, Richard Gelderman\*

### Rm 138

8:30- "The Price Elasticity of Kentucky Universities" **Jeanne Johnson**, Michelle Trawick\*, Alex Lebedinsky\*, Bill Davis\*

8:45- "Not as They Seem: Gender Blurring in Margaret Atwood's *Oryx and Crake* and Colson Whitehead's *The Intuitionist*" **Rebekah Russell**, Dr. Kelly Reames\*

9:00- "Associative and Rule-Based Processes in Younger and Older Adults Causal Learning" **Lauren Jennings**, Dr. Sharon Mutter\*

- 9:15- "Becoming the Beast: The Moral Criticisms of the British Area-Bombing Campaign Against Germany in World War II" **Brian Phillips**, Dr. Jan Garrett\*
- 9:30- "Comparison of conspecific click sound production between *O. affinis* and *P. gibbiceps*"
- 9:45- "Dialectics" **Benjamin Lowery**, Dr. Deb Logan\*

### Room 163A

- 8:30- "Diamond Caverns Drip Water Analysis; Preliminary Results" **Chelsea Brunner**, Heather Monohan, Samantha Kramer, Andrew Wulff\* coauthors
- 8:45- "Unmanned ground vehicles to defuze IED's" **Christopher Davenport**, James Lodmell, Phillip C. Womble\*, Alexander Barzilov, Jon Paschal, Robert Hernandez, Kyle T. Moss coauthors
- 9:00- "Moral Ambiguity in Hawthorne's Short Stories in Light of American Romantic Transcendentalism" **Gwen Son**, Dr. Sandra Hughes\*
- 9:15- "Marx's Historical Materialism and Rousseau's Radical Pessimism and Their Political Thought: A Study of Theories of History" **Edgar Mills**, Edward Yager\*
- 9:30- "A Lesson in International Propaganda: The 1936 Olympics" **Jacob Glover**, Eric Reed\*
- 9:45- "Kentucky's Budget Crisis and its Effects on Postsecondary Education" **Vince Bonetti**, Katie Beard, Mattea Carver, Kyle Payne, Blake Garner, Don Burton, Jason Boeck, Kendra Howard, Matthew Jones, Adam Heugel, Lance Coulter coauthors, Dr. Ardrey\*

### Room 163C

- 8:30- "Sweet Dysfunctions" **Jason Burnett**, Tom Bartel\*
- 8:45- "Rhetorical Impacts in the Political Sphere: A Semiotic Analysis of Language During the World War II Era" **Sarah Spiker**, Kelcy Hathaway coauthor, Jeffery Osgood\*
- 9:00- "Impossible Itself" **Jake Adams**, Dr. Ted Hovet\*
- 9:15- "Variability of the High Redshift Blazar Q0906+6930" **Emily Peeler**, Michael Carini\*
- 9:30- "Voter Participation" **William Williford**, Cierra Smith coauthor, Dr. Ardrey\*

9:45- "Green Energy Consulting" **Cody Curtsinger**, Ryan Simpson coauthor, Dr. Kevin Schmaltz\*

## 10:25 AM Session

### Room 163B Graduate Presentations

10:25- "Forecasting Financial Time Series On NYSE" **Felix Gill**, Dr. Ahmed Emam\*

10:40- "Thermal analysis of corn oil based biofuel" **Ganesh Latta**, Wei-Ping Pan\*

10:55- "Implementation of the Foundational Three Layers of OSA-CBM" **Hoa Ho**, Dr. Narasimhan\*

11:10- "Correlating Top Soil Chemistry and Mineralogy to Bedrock" **Jake Henderson**, Dr. Andrew Wulff\*

11:25- "Solid-Phase Extraction of Indicators Using Surfactant-Immobilized Glass Fiber Membranes" **Kali Pickering**, Wesley Cartwright, Eric Conte, Shing-Yi Suen coauthors, Dr. Eric Conte\*

11:40- "Searching for binding partners for the novel PHKG1 variant, PhK $\gamma$ -181" **Kishore Polireddy**, Dr. Nancy Rice\*

### Room 112

10:25- "Nearby Galaxies Supernova Search II: Transients, and UFOs" **Andrew Gott**, Schuyler G. Wolff coauthor, Louis-Gregory Strolger\*

10:40- "Guatemalan Intercountry Adoption Policy" **Kathleen Smallwood**, Dr. Joseph Trafton\*, Dr. Amy Cappiccie\*

10:55- "Relationships Between IQ Test Scores and Scores on the Bender Gestalt Visual Motor Test" **Daniel McBride**, Rick Grieve\*

11:10- "Hirokazu Kore-Eda: Blending Documentary and Fiction in Filmmaking" **Brooke Shafar**, Dr. Ted Hovet\*

11:25- "Efficacy: Individuals can change the world" **Amber Adams**, Brandon Colvin coauthor, Dr. Nathan Phelps\*

11:40- "The Revolutionary Final Frontiers" **Brian Bloss**, Ed Rogers John Cox coauthors, Nathan Phelps\*

### Room 113

10:25- "The Fallen Formula" **Lacey Blankenship**, Dr. Joseph Trafton\*

10:40- "Assessing Male Body Image" **Alecia Johnson**, Dr. Rick Grieve\*

10:55- "Defining Space" **Laina Seay**, Tom Bartel\*

11:10- "Modeling Results For Environmental Acoustic Pressure Obstructions" **Jason Smith**, Phillip C. Womble\*, Doug Harper, Joseph Howard, Brian N. Cooper, Chris McGrath, James Phelps coauthors

11:25- "The Effects of Gender on Small Businesses in Kasigau"

**Leslie Abell**, Dr. Jerry Daday\*

11:40- "Randomly Amplified Fingerprints (RAF) and Their Applications to Butterfly Population Structure" **Joseph Marquardt**, Jeffrey Marcus\*

### **Room 138**

10:25- "Developing Control Systems for the Robotically Controlled Telescope" **James Wood**, Richard Gelderman, Louis-Gregory Strolger, Michael Carini\*

10:40- "Confidence Intervals for the Ratio of Two Exponential Means" **James Polcer**, Jonathan Quiton\* coauthor

10:55- "Ending Dating Violence in Kentucky" **Ena Viteskic**, Monique Braun coauthor, Dr. Saundra Ardrey\*

11:10- "Analysis of Debussy's Rapsodie pour Orchestre et Saxophone" **Jonathon Blum**, John Cipolla\*

11:25- "Thomasine And Bushrod: The Rediscovery Of A Lost American Classic" **Jeremy Richey**, Dr. Ted Hovet\*

11:40- "Fantasy Sport Fans Identification" **Alana O'Bryan**, Timothy Hill, JR. and Hayley Reddington coauthors, Frederick Grieve\*

### **Room 163A**

10:25- "Bicycle Built for Two: A Democratized Sport's Craze Spinning Standards of Sexuality and the Woman's Sphere" **Lydia Nelson**, Dr. Anthony Harkins\*

10:40- "Personal Growth Through Art" **Lauren White**, Yvonne Petkus\*

10:55- "What the Hack?" **Laura Huff**, Jeff Fearnside\*

11:10- "p-Cresol metabolism of Rhodopseudomonas palustris A8211" **Julia Freeman**, Kinchel Doerner\*

11:25- "Pour Cup Orientation Assurance System" **Joshua McCombs**, Stuart Cook, Jason Birkhead, DJ Thompson coauthors, Dr. Chris Byrne\*, Joel Lenoir\*

11:40- "Conifer Decline at Baker Arboretum. " **Kristin Goodin**, Jennie Danks, Martin Stone\*

### **Room 163C**

10:25- "Preliminary Evaluation of Baby Corn at Bowling Green, Kentucky in 2007." **Laramie Stone**, Martin Stone\*, Elmer Gray, Todd Willian coauthors

10:40- "Exploring Causes of Active Galaxies" **James Phelps**, Dr. Richard Gelderman\* coauthor

10:55- "A historical interpretation of the Supreme Court under the leadership of Chief Justice John Marshall" **Mattea Carver**, Dr. Patricia Minter\*

11:10- "Understanding the Variability of Blazars Across the Electromagnetic Spectrum" **Kyle Cook**, Dr. Mike Carini\*

11:25- "CORE Freedom Rides" **Michelle Reynolds**, Dr. Patricia Minter\*

11:40- "Design of Electroencephalogram and Electrocardiogram Technology Including Wireless Integration for Use in Polysomnography" **Kyle Moss**, Phillip C. Womble\*, Jon Paschal, Ryan Moore Jr., Randall Haupt coauthors

### **1:00 PM Session**

#### **Room 163B Graduate Presentations**

1:00- "Raccoons and opossums as potential reservoir hosts for tick-borne zoonoses in Kentucky." **Kristina Tackett**, Megan Bowling, Chad Groce, and Cheryl Davis\* coauthors

1:15- "Collaborative Filtering Recommender System" **Kunal Gosar**, Samatha Kalyani Chindam Anjaneyulu coauthors, Dr.Huanjing Wang\*

1:30- "Before the Park: Analysis of Mammoth Cave area communities circa 1920" **Matthew Brunt**, Dr. Katie Algeo\*

1:45- "Modeling Mis-folded Lysozyme Aggregates" **Pongsathorn Chotikasemsri**, Dr. Claire Rinehart\*

2:00- "How to Involve Parents in School Based Health Promotion Programs" **Rahul Gandhi**, Pavankumar Patel, M.B;B.S, Hariprakash Hadial, M.B;B.S, Bhagirath Palla, M.B;B.S coauthors, Dr. Christine Nagy\*

2:15- "Role of "animal-like cryptochrome" in Chlamydomonas

reinhardtii" **Shobha Lavanya Silparasetty**, Dr. Sigrid Jacobshagen\*

### **Room 163C Graduate Presentations**

1:00- "Managing and Scheduling Observations on the Robotically Controlled Telescope" **Silpa Reddy Yaramala**, Louis-Gregory Strolger\*

1:15- "Stress and Hair loss among International Graduate Students at Western Kentucky University" **Srinivasa Gokarakonda**, Dr. Thomas Nicholson\*, Dr. John White\*, Dr. David Duncan\*

1:30- "Culture Shock in International Students" **Thomas Reece**, Dr. Phil Pegg\*

1:45- "Effective Grain Yield Loss Due to Variation of In Row Spacing of Corn" **Todd Ballard**, Todd Willian\*, Elmer Gray\*, Martin Stone\*, Marvin Russell coauthors

2:00- "Proposed Route to Cyclopenta[c]thiophenes via Activated Methylene" **Vineet Karambelkar**, Dr. Chad A. Snyder\*

### **Room 112**

1:00- "Nitric oxide induced apoptosis of pulmonary myofibroblasts" **Lauren Parsons**, Nancy Rice\*

1:15- "Countdown to the White House: An analysis of the stages of the 2008 U.S. Presidential campaign" **Ashley Payne**, Katie Beard, Kaylee Carnahan, Daniel Cline, Emilee Duvall, Rebecca Elrod, Alan Hudson, Thomas Jaggars, Amanda Kidd, Adam Koestel, Andre Lewis, Kathleen Salyers, Shelby Simmons, Lyndsey Whitaker, Antony Wong coauthors, Dr. Jenifer Lewis\*

1:30- "Examining Climate Variability and Land Management in Chile Using Remote Sensing" **Lisa Heartsill**, John All\*

1:45- "The use of God in Rene Descartes' Meditations" **Rory Padgett**, Dr. Jan Garrett\*

2:00- "Contact Eclipsing System 44i Bootis: O-C Diagram Provides Evidence of Third Companion" **Lisa Taylor**, Richard Gelderman\*

2:15- "The Gashlycrumb Tinies" **Robert Anderson III**, Scott Stroot\*

### **Room 113**

1:00- "From Print to Projection: An Analysis of Shakesperian Film Adaptation" **Samantha Mudd**, Dr. Karen Schneider\*

1:15- "Design of a Trailer for Unexploded Ordnance Remediation"

Mike Simpson, Phillip C. Womble\*, Jon Paschal, Joseph Howard, Matthew Lodmell coauthors  
1:30- "In the Land of Cotton: White Student Reaction to Integration at the University of Mississippi, Fall 1962 - Spring 1963" **Skylar Jordan**, Dr. Patricia Minter\*  
1:45- "Isolation of a 3-Methylindole-Producing Bacterium From Hog Waste Lagoon" **Michelle Fusting**, Donna Kridelbaugh coauthor, Kinchel Doerner\*  
2:00- "Design of a New Control System for an Electronic Neutron Generator" **Matthew Lodmell**, Phillip C. Womble\*, Doug Harper, Jon Paschal, Joseph Howard, and Mike Simpson coauthors  
2:15- "Buddhism and Emotions" **Sarah Kapley**, Jeffrey Samuels\*

### **Room 163A**

1:00- "Evidence of Galactic Cannibalism in Edge-On Disk Galaxies" **Courtney Horton**, Richard Gelderman\*  
1:15- "Good Vibrations: Developing an Accurate Model for Hearing Loss in Fishes" **Ronald Gilley**, Michael E. Smith\* coauthor  
1:30- "Correction of Doppler Broadening in Gamma Ray Spectra for Light Nuclei" **Jason Musser**, Phillip C. Womble\*, Alexander Barzilov\* coauthors  
1:45- "External Morphology of Geodes" **Ronson Elrod**, Andrew Wulff\*  
2:00- "Hog Waste Lagoon Enrichments for p-ethylphenol Production" **Savannah Hughes**, Donna Kridelbaugh, Kinchel Doerner\* coauthors

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## **Student Abstracts**

### **Graduate Poster Abstracts**

#### **"Is Conscientiousness Related To Performance Rating Accuracy and Perceived Difficulty In Rating?"**

Inaccurate ratings of job performance can have severe consequences for many organizations and the individuals in them. The present study examined conscientiousness and its relationship to performance rating accuracy and perceived difficulty in providing a rating. Rating accuracy was assessed based upon deviations from true scores, while personality and perceptions of difficulty were acquired via self-report. Additionally, the relationship between perceptions of rating difficulty and the amount of information available for rating instrument items was investigated. The first two hypotheses were not supported, but the third (i.e., rating difficulty and information available) resulted as hypothesized: the relationship was negative



and significant. Implications toward future performance appraisal research are discussed.

**Jeremy Alexander** Mentor(s): Anthony Paquin

Poster Number: G005

#### **Transport of the Pesticide Atrazine within the Logsdon River, Mammoth Cave, Kentucky**

Understanding the potential for karst aquifer contamination by sediment-sorbed pesticides is important for cave conservation efforts in agricultural landscapes. Research was conducted to test the hypothesis that storm-period transport of sediment-sorbed atrazine through conduit-flow karst aquifers depends on the magnitude and characteristics (particularly grain size) of surface-derived fine sediment inputs. In addition, the use of commonly measured water quality parameters (turbidity and specific conductivity) to provide an easily measured proxy for the likelihood of atrazine contamination during the pesticide application season was evaluated.

Flow rate, water quality parameters and suspended sediment concentrations were measured in Logsdon River, a 10km karst conduit within the Turnhole Spring Basin of Mammoth Cave National Park. Analysis of several flow events demonstrated that the Logsdon River reacts rapidly to precipitation events, with an initial flow of cleaner water and a secondary phase of more turbid water. Changes in specific conductivity and turbidity reflect the inputs of meteoric water and surface-derived sediment, as well as the mobilization of in-cave sediment. Levels of pesticide contamination can be correlated with these changes in water quality parameters, with adsorption to surface-derived sediment as a primary influence on the measured atrazine concentrations in samples.

**Julie Schenck Brown** Co-Authors: Dr. Stephen T. Kenworthy

Mentor(s): Dr. Stephen T. Kenworthy

Poster Number: G006

#### **Real-time Visual Motion Detection System**

Closed Circuit Television (CCTV) is the use of video camera to transmit signal to a specific, limited set of monitors[3]. CCTV is often used for surveillance in areas which need monitoring, such as banks, airport, military installations and convenience stores, while Closed Circuit Digital Photography (CCDP) is the use of megapixel digital still cameras that can take pixel resolution images of the camera scene either on a time lapse or motion detection basis[3]. Most of CCDP suffers from cost where the cost of the hardware and software is relatively high cost. To provide feasible and cheap CCDP system is the main challenge faced the research last decade. A significant amount of research has been performed for motion detection and surveillance.

A real-time system for motion detection surveillance with limited computational resources and inexpensive cost introduced commercially since 2000. Most of the commercial surveillance system at home or at office used computer system and webcam with software that convert the computer system to VCR. Motion is change in a scene image, the change can occurred in any of the following parameters: motion of the object, illumination changes, change in the size, or change of the shape of an object. The basic idea behind any motion detection system is detecting the moving parts of the scene. Most of the motion detection techniques are based on the detection of changes in the frame sequence. The changes in the frame sequence can be preformed through calculate the difference pictures. The difference technique is based on point by point determination of significant changes in image intensity and can be obtained by subtracting one image frame from the other

**Gyuchoon Cho** Mentor(s): Dr. Ahmed Emam

Poster Number: G002

### **Variation in Reported Human Sex Ratios**

Flux of the human population is of major concern worldwide. The sex ratio is both part and partial to the human population. Objectives of the present study were:

1) To analyze sex ratios for world countries overall and by different age groups; birth, under 15 years, 15-65 years, and over 65 years; and 2) To characterize sex ratios for outlier countries having the lowest and highest overall ratios. Sex ratios based upon 2006 data were obtained from Central Intelligence Agency World Fact Book (ISSN 1553-8133) for 209 countries. The average overall ratio indicated slightly larger number of males than females (1.004 to 1.000). For the age groups, ratios of males to females were: 1.049 at birth, 1.041 for under 15, 1.021 for 15-65, and 0.812 for over 65. Overall sex ratios were used to identify approximately 10% of countries with lowest (0.77 to 0.93) and 10% with highest (1.06 to 1.87) ratios. Within these outlier groups, chi-square and linear correlation were used to compare homogeneity and relationships of sex ratio distributions across age groups. In general, sex ratios across countries indicated more males at birth, but the margin decreased over successive stages until the over 65 stage where the ratios shifted to more females. Although differential mortality reduced the number of males more rapidly than the number of females over the time periods, the overall ratio for the world population indicated slightly more males than females.

**Pramod Gupta** Mentor(s): Elmer Gray

Poster Number: G007

### **Synthesis of pure hydrogen titanasilicate for the determination of the strontium ion exchange mechanism**

A great deal of research has been done in the last several decades to discover and design highly selective inorganic ion exchange materials for the removal of radioactive species from nuclear waste solutions. A titanasilicate has been synthesized in the Crystal Chemistry Lab of Western's Geography and Geology Department, with the ideal formula  $\text{Na}_2\text{Ti}_2\text{O}_3\text{SiO}_4 \cdot 2\text{H}_2\text{O}$  to characterize exactly this process. This material is tetragonal in symmetry and can be found naturally as the mineral sitinakite, with open channels running parallel to the c-axis. It has been previously determined to be highly selective for the cesium and strontium ions even in very basic and saline solutions. The purpose of this research is to determine the exchange mechanism of strontium into the hydrogen phase of the titanasilicate.

The material is synthesized and then analyzed by x-ray diffraction at the Materials Characterization Center, WKU. The diffraction pattern was then compared to published results to verify its structure.

Work is commencing to exchange the titanasilicate with strontium successfully before future analyses are completed in situ at the National Synchrotron Light Source at Brookhaven National Laboratory.

**Samantha Kramer** Mentor(s): Aaron Celestian

Poster Number: G004

### **Conversion of Traditional Taxonomy-Centered Botany Labs to Case-Based Inquiry Learning**

"Tell me and I forget, show me and I remember, involve me and I understand." - Chinese Proverb. Involvement in learning implies possessing skills and attitudes that permit students

to seek resolutions to questions and issues while constructing new knowledge. Taxonomy-centered botany has been taught in a traditional way for biology majors at our university for many years. Traditional teaching methods include viewing prepared slides of plant sections, viewing live plant samples, and memorization of botanical terminology and illustrations. Our goal is to convert these existing traditional labs to case-based inquiry labs without compromising the amount of material covered. Each lab is being reshaped around a central question. Technology will be incorporated into the experiments, such as the use of polymerase chain reaction and gel electrophoresis. We expect these changes to increase student learning and retention levels. Moreover, we predict that a hands-on approach will encourage larger numbers of students to take this elective sophomore-level course for majors and further their study in plant biology. In this session we will discuss our plans for revamping the labs, methods of assessment, and the issues involved in bringing taxonomy-centered labs into the twenty-first century.

**Hajara Mahmood** Mentor(s): Dr. Heather Johnson  
Poster Number: G009

#### **Prostate Cancer Screening and Mortality in Blacks and Whites: Results from a Hospital-based Case Control Study**

**Objectives:** Despite recent declines in prostate cancer incidences and mortality, early detection is still controversial. We assessed whether screening with the prostate specific antigen (PSA) and digital rectal examination (DRE) reduce prostate cancer mortality.

**Methods:** We completed a case-control study of black and white men. Cases contained prostate cancer deaths between 1998 and 2001, and hospital controls were age and race frequency-matched to cases. Logistic regression tested the association between screening and prostate cancer deaths controlling for confounders.

**Results:** Cases had fewer PSA tests (1.73 vs. 3.98,  $p < 0.001$ ). There was no difference in PSA testing among blacks. White controls had more PSA tests than cases. Mean number of co-morbidities was 10.3 in cases and 2.63 in controls. Odds ratios illustrated that prostate cancer mortality was 55-57% lower among the screened persons. The logistic regression showed cases were less likely to receive PSA testing (OR=0.65; 95 CI 0.56-0.75). Having a greater number of co-morbidities increased the odds of prostate cancer deaths.

**Conclusion:** Odds of dying from prostate cancer were lower among persons receiving screening tests and having fewer co-morbidities. Although more research is required to establish screening effectiveness, our findings indicate that regular screening may reduce deaths associated with prostate cancer.

**Heather Owens** Co-Author: Laura Stephens  
Mentor(s): William Mkanta  
Poster Number: G008

#### **Numerical approximation method for a seven-step radioactive decay sequence using Excel**

A visual approximation method for the seven-step radioactive alpha decay chain of Xe144 to Nd144 will be presented. Using Excel, approximation of the species levels with respect to time is quickly generated using a step-wise approximation approach. This approach assumes that only the parent species is present initially and assumes a small initial lag in starting each consecutive step. Other required assumptions will be discussed. Conditions under which the approximation approach is not appropriate will

also be presented. In this numerical method, using the known half-lives, only two equations are actually needed to determine all of the daughter concentrations. The data is then plotted to show classic rise and fall reaction sequence curves. This approach is particularly useful in presenting sequential reaction series in an algebra-based physical chemistry course allowing students to easily visualize and manipulate complex sequential reaction problems. This can be quickly adapted to any number of sequential steps, unlike the analytic solutions which is unintuitive past a two-step sequence. Direct comparison of the numerical and analytic solution for the seven step radioactive decay sequence will be presented.

**Brian Peyton** Mentor(s): Webb, Dr. Cathleen Joyce  
Poster Number: G010

#### **Synthesis of Organic and Organometallic Compounds for Semiconductor Research**

Organic semiconductors are organic materials possessing semiconductor properties as a result of aromaticity, doping, and other properties. These semiconductors have an electrical conductivity that lies between typical metals and insulating compounds. Thiophenes, furans, and pentacene are serve as examples as successful organic semiconductors that have been studied. These semiconductors can come in two different classes; oligomers that are short chains that repeat and polymers, which are long chains that repeat. Conjugated systems are ideally the best suited compounds for organic semiconductor due to resonance. Cyclopenta [c]thiophenes, a derivative of thiophene, are also conjugated compounds having potential semiconductor properties. My research illustrates the steps taken to synthesize and characterize cyclopenta[c]thiophene and their organometallic analogs.

**Joseph Scott** Mentor(s): Chad A. Snyder, Ph.D.  
Poster Number: G001

#### **Social Skills Deficits and Causal Reasoning in Children with Autism Spectrum Disorder**

Observations of children with autism suggest that they may not understand the effects of their behaviors on others. One way to conceive of this is that autistic children may not understand the cause of people's reactions. Although there is substantial literature to suggest that children with autism may have considerable difficulty with aspects of the social domain, these findings do not rule out the possibility that children with autism spectrum disorder may demonstrate a domain general deficit in reasoning about causes. This study will investigate the relationships between children's social skills, their understanding of the determinants of other's behaviors (Theory of Mind) and their reasoning about causes in the physical domain. Twenty children ages seven to twelve will be tested. These ages were chosen to test for development and to avoid floor and ceiling effects.

The Vineland-II will be used to assess a greater measure of social skills and to ensure that language abilities do not inhibit performance on the tasks. Theory of mind will be assessed using Wimmer and Perner's first order belief task the Smarties Task (1983) and to assess development in theory of mind Chandler and LaLonde's Restricted View Task will be used. Causal reasoning will be assessed with an adaptation of the "blicket detector" (Gopnik & Sobel). Social reasoning will be tested by physical domain conditions include a control task (simple cause and effect), a test of relevant versus irrelevant features, and a contradiction-belief change test.

Regression analysis will be used to determine degree of association between theory of mind understanding, social skills ratings, and physical domain causal reasoning. It is hypothesized

that a domain general causal reasoning deficit will predict increased social skills and theory of mind deficits.

**Kyla Surdyka** Mentor(s): Carrie Pritchard  
Poster Number: G003

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### Undergraduate Poster Abstracts

#### Abraham Lincoln: Monumental Man

My art piece on Abraham Lincoln expresses the monumental feeling you get as you walk up the Lincoln Memorial's front stairs and his face emerges between two columns. His size at the memorial can be compared to his importance and devotion to this country. This piece was created on drawing paper using charcoal pencil. The use of charcoal plays with the story of Lincoln and his devotion to learning. In the firelight, he would do math problems on the back of a wooden shovel with a piece of charcoal from the fireplace. Once the shovel was filled, he would shave away the charcoal and start over. The white matting resembles the effect of the white columns that frame his face as you walk up the stairs of the memorial. In my project, it was important to represent his likeness as accurate as I could. I used a picture from his mid-late presidency, which was easiest to recognize when you try to imagine Lincoln's face. His tie and formal attire gives him a sense of formality and sophistication.

**Benjamin Berry** Mentor(s): Kim Chalmers  
Poster Number: U013

#### Gerewol Dance, Wodaabe

The main objective of my research project is to create effective visual communication using traditional collage techniques to develop a theme that centers on a non-western culture that is significantly different from my own. I chose to focus my research and the resulting report and collage on the Gerewol Beauty Dance. This dance is as old as the people's culture who practice it, the Wodaabe.

The Wodaabe are a people from west Africa, a subgroup of the Fulani tribe located in northern Nigeria and southwestern Niger. With their elaborate attire and rich cultural ceremonies, it's surprising to find that the word Wodaabe itself means "people of the taboo." Although their culture emphasizes modesty and loyalty, the Wodaabe are a sexually liberal people. Unmarried women can have sex with anyone whenever they wish up until the time of the Cure Salee festival. Clans of different lineage come together at the festival in hopes of finding a wife or husband.

The Cure Salee festival celebrates the end of the rain season and is, for the Wodaabe, the traditional time for courtship and marriage. During the festival, Wodaabe men perform the gerewol dance in order to entice women from other clans. The men dance vigorously for seven full nights, showing off their health and endurance. Towards the end of the week-long ceremony, men line up to display their beauty and charm to young women in hopes of being selected as the most alluring.

To be the most alluring and attractive Wodaabe male, one enhances his white eyes and white teeth by applying black kohl, a fine powder used cosmetically. The men also use a yellow powder to lighten their faces and wear a turban twice their height. Exaggerated smiles with fluttering cheeks and the widening and rolling of one's eyes is also considered to be very beautiful and attractive during the dance.

There are many designs painted on the men's faces symbolizing their femininity, fertility and wealth. The Wodaabe women are equally attracted to the men's femininity as they are their brawn nature of taking control of the household demands. Red and white dots painted on the men's foreheads represent how many houses they own. Black mascara above and below the eyes and lipstick are also used. Cowrie shells are added to elongate and thicken their

hair to show prestige. The ostrich feather, placed in their turbans, is the male sexual symbol. The Wodaabe also wear colorful beads and strands of jewelry, often made from everyday items not deemed precious in our society, such as safety pins.

**Summer Bolton** Mentor(s): Matthew Tullis

Poster Number: U016

#### **Population structure of buckeye butterflies (genus *Junonia*) in Texas based on Cytochrome Oxidase II DNA sequences.**

There are four forms of buckeye butterflies found in Texas: the common buckeye, *Junonia coenia*; the tropical buckeye, *Junonia genoveva*; the dark buckeye, *Junonia sp. nigrosuffusa*; and the mangrove buckeye, *Junonia evarete*. The relationships among these forms and the degree to which they hybridize is unknown and is the topic of considerable speculation among those interested in this group. I have analyzed samples from three of the forms known from Texas (all but *J. evarete*). I amplified a portion of the Cytochrome Oxidase II gene from each sample by polymerase chain reaction (PCR) using the George and Phyllis primer pair. Successful PCR was determined by agarose gel electrophoresis, followed by visualization via ethidium bromide. PCR products were then sequenced using BigDye chemistry and analyzed with an ABI 3130 capillary sequencer. Sequences were compiled using Sequencher, aligned with CLUSTAL, and relationships were determined in PAUP\*. Examination of the DNA sequences from Texas, and the comparison with similar sequences from Florida *Junonia* reveal extensive hybridization among the named forms. It appears that *J. genoveva* and *J. sp. nigrosuffusa* form a clade with *J. coenia* as the sister taxon to this clade. *J. evarete* is the out-group to all of the other taxa.

**Jauan Burbage** Mentor(s): Jeffrey Marcus

Poster Number: U004

#### **San Fermin Festival**

The main objective of my research project is to create effective visual communication using traditional collage techniques to develop a theme that centers on a non-western culture that is significantly different from my own. I chose to focus my research and the resulting report and collage on bullfights that take place during the Festival of San Fermin in Pamplona, Spain.

At 6:30pm on each day of the Festival of San Fermin the bullfight takes place. The bullfight is not the most well known or celebrated part of the festival but it is a staple of Spanish culture and the bullfights that take place during the festival are unlike any other. In order to capture the San Fermin bullfights I chose to focus on the matador and the significance of the sun and shade. I represented the matador with a deep red velvet material as the background of my piece, signifying the matador's cape. The matador is further embodied in the colorful and bejeweled shoulder piece. The javelins which are used during the fight by the matador are shown in my piece and I have used them and their bright colors to represent the movement of the fight. The arena is represented with white glitter and tiny specks of red. The light represents the sun where the social clubs sit and entertain themselves and if the matador does poorly this side will quickly turn into a party much like the festival taking place outside the ring. Most the time it is simply an accident if this side of the ring sees the bullfight at all. The dark side represents the shade where only the serious bullfighting fans sit. The main colors in my piece were chosen to represent the Spanish culture as a whole but also the statue of San Fermin.

**Holle Cannon** Mentor(s): Matt Tullis

Poster Number: U033

### Floating Elements

My artwork is a visual exploration of many different questions that I have posed myself for this series of digital prints. In this body of work, thematically, I have attempted to consider certain aspects of childhood and nostalgia. I want to explore the difference between memories and imagination and if there is any. What constitutes a memory? Is it accumulation or creation?

Compositionally and formally I have attempted to experiment with triads and triangles. I am also fascinated with the effect large masses have on one another, more specifically large masses of air and water and how elements float within them. I like to discover what occurs when these elements are transposed and placed amiss similar to what happens when memories and imaginations are confused.

**Larisa Chavarria** Mentor(s): Laurin Notheisen

Poster Number: U003

### Alkoxyamine Polymers: Versatile Materials For Surface Ligation Applications

The ease with which alkoxyamines (RONH<sub>2</sub>) condense with ketones or aldehydes has prompted their widespread use in labelling liposome, bacterial and mammalian cell surfaces as well as chemoselectively ligating small molecule 'recognition elements' onto polyfunctional substrates. These condensation reactions proceed in aqueous media to afford the robust oxime ethers in near quantitative yields, making these conjugations ideal for a variety of applications. Furthermore, the oxime ether functionality is prevalent in various pharmaceutical drugs (i.e., antibiotic, anti-cancer). Of particular note, the presence of an oxime ether moiety is known to increase antibiotic activity of penicillin derivatives.

The present project seeks to explore the utility of the alkoxyamine functional group in new materials. Alkoxyamines are installed on polymer side chains as 'molecular anchors'. The resultant alkoxyamine polymer surfaces can be used to tether a variety of compounds through covalent bonds (e.g., oxime ether linkages) to the polymer backbone. The choice of compound to be tethered will depend on the application. For example, an antibiotic drug 'anchored' to a polymer through an oxime ether linkage is expected to provide a sterile coating that does not require repeated sterilization. Furthermore, the alkoxyamine polymer surfaces can be used to scavenge carbonyl compounds from organic and aqueous media with potential applications such as remediation of aldehyde/ketone pollutants. Our synthetic efforts towards these novel alkoxyamine polymers will be discussed.

**David Dahl** Co-Authors: Jessica Moore; Belinda Lady; Hasan Palandoken

Mentor(s): Hasan Palandoken

Poster Number: U045

### The Effect of Endothelin-1 and Fluorouracil on Wound Healing of Bovine Corneal Endothelial Cells

Bovine corneal endothelial cells (BCEC) have been shown previously in our lab to synthesize and secrete endothelin-1 (ET-1), bind ET-1 specifically to ETA receptors and subsequently elevate intracellular calcium and tritiated thymidine incorporation. Fluorouracil (5-FU) acts as a thymidylate synthase inhibitor, thus interrupting the action of this enzyme blocks synthesis of the pyrimidine thymidine, which is a nucleotide required for DNA replication. Healing of corneal endothelial wounds depends on both cell proliferation and cell migration. This investigation explores the effects of a promoter of cell proliferation (ET-1) and an inhibitor of cell proliferation (5-FU) on corneal endothelial wound healing in vitro. Wound healing in the presence of 5-FU assesses the contribution of cell migration to wound healing.

BCEC were isolated from bovine eyes and grown in cell culture using DMEM-10% serum. Wound healing was examined in confluent, quiescent BCEC grown in 12-well plates after an approximate 0.75mm wide wound was manually scribed using a silicon rubber tipped

spatula. Cultures were treated with 20 nM ET-1 in serum free medium, alone (control), or 10 $\mu$ M 5-FU in serum free medium. Cultures were photographed immediately after wounding and 24 and 48 hours post-wound using a Nikon 100 phase contrast microscope. Wound area ( $\mu$ m<sup>2</sup>) of the each culture was analyzed using Simagis image analysis software. Percent wound healed (area repopulated compared to time zero) was calculated for each culture. Cells treated with 20 nM ET-1 heal more quickly than those not treated (serum-free). In contrast, the cells treated with 5-FU healed more slowly than control. At 24 hours, control wounds had healed 18.2 % whereas ET-1 treated were 38.4 % healed and 5-FU treated were 16.8% healed. At 48 hours, the difference was 48.3 %, 61.7 % and 38.5 %, respectively. 5-FU inhibited wound healing by 20%, suggesting that approximately 80% of wound healing under these conditions is due to cell migration. The results supported the hypothesis that stimulation of cell proliferation by ET-1 leads to enhanced wound healing in BCEC, and blockage of cell proliferation by 5-FU hinders wound healing.

**Angela Dao** Co-Authors: James Lutz

Mentor(s): Kenneth Crawford

Poster Number: U029

#### **Experimental and theoretical studies of cyclophane-PAH interactions**

Host-guest interactions between a novel cyclophane (host) and polycyclic aromatic hydrocarbons (PAHs) and various benzene derivatives (guest) have been the topic of investigation. Previous studies have been carried out using absorption, fluorescence, and NMR techniques. These techniques have shown to favor the host-guest interaction in a 1:1 complexation. The binding constants between guest molecules and cyclophane have been measured. We are using molecular modeling for predicting the most stable conformation of the complex. PC Model calculations have been done with each of the guest molecules and cyclophane to determine which guest molecule is best "fit" within the cyclophane molecule's cavity.

**Christopher Davies** Co-Authors: Thandi Buthelezi

Mentor(s): Thandi Buthelezi

Poster Number: U022

#### **South Korea: Past & Present**

The main objective of my research project is to create an effective visual form of communication using traditional collage techniques, in order to develop a theme that centers on a non-western culture that is significantly different from my own. I chose to focus my research, the resulting report, and collage on Korean folk art.

Bright colors and movement with that pastel background, while the morning turned the hilltops pink against the deep shadows of velvety black. Now, what comes to mind after hearing such vivid, descriptive words? I visualize a carefully crafted Korean folk art painting. Folk art is a comprehensive term for all forms of artistic talents of the common people. Characteristics of folk arts include its rich, local color and transmission through generations. Though much of it had a religious origin, the folk arts of Korea had a stronger reflection of the social system and its customs. Paintings created during the Yi Dynasty are a prime example of this display of social awareness.

In Korea, the status of folk paintings as part of traditional art was obscure up until the 20th century. Most early Yi Dynasty folk paintings were created in the homes of ordinary people. These paintings were usually created for various occasions, such as festivals. This was an important part in the life of the universal population because they vividly portray the simple beauty of the common people, as well as expressed faith filled aspirations, intertwined with optimism. These folk paintings also showed an undeniable yearning for rich humor and satire. They signified the desire to chase away evil spirits and to enjoy a long life blessed with good health and prosperity. Often painted on scrolls or folding screens, the bold



compositions, dynamic brushwork, and intense colors assisted in the display of strong will and courage of a society, who endured class warfare and foreign invasions. Therefore, these paintings manifested the considerable mental strength of the Korean people who were able to wisely overcome difficulties.

Another key aspect of Korean folk paintings is their individuality. This distinctiveness is characterized by the imagination, boldness, and humor of the painter. Yi Dynasty painters commonly created scenes showcasing the perspective of deep mountains, valleys, and close-up views as well. They held pure and sincere attitudes toward nature. These paintings also displayed scenes of men, animals, mystic-like scenery, and delicate flowers, in which was created with such clarity. For example, scholars were commonly painted with monochromatic robes, traditional stove-pie hats, or other types of hats that signified rank. They were typically at rest in tea houses near mountains or at mountain lodges. Another popular motif of Korean folk painting is the tiger. In this particular art form, a distinctive attribute of the tiger is it is rarely portrayed as a fierce beast, but rather as a docile animal and companion, sometimes even portrayed as humorous and dim-witted. These images of tranquility embody a great sense of freedom and a devotion to sincerity.

From a religious standpoint, some paintings were adorned with kings' palaces, one-classroom village schools, and Buddhist temples. Often having Korean facial features and sitting in a resting position, the images of the Buddhas were adorned with abundant shades of gold accompanying light colors, but placed within a simple composition. The attention to detail is impeccable because the facial details appeared to be real, and showed humanity and age.

The college process has enabled me to effectively communicate the essence of the Korean culture, more specifically the history of Korean folk painting. Colors evoking emotions, the ruff surface of bamboo, a legend of a wise scholar, as well as a tale of prosperity are only a few of the varying components combined in my college to tell a story of the strength of working class people in the Korean society expressed through folk art. The series of images and other collected materials will showcase the beauty of the Korean society and art. I want the viewer to connect with my college in a manner where they are able to make an emotional and mental connection. So, the presence of reflective mirror-like pieces represent the reflection into the past and thoughts of the viewer, as comprehension of what they are viewing occurs.

**Michelle Graham** Mentor(s): Matthew Tullis

Poster Number: U032

#### **Olds-mobility: Do older drivers tell the truth?**

Numerous studies have investigated the driving habits and crash involvement of older adults. Older adults drive fewer miles per year, restrict where they drive and have more crashes per mile driven than any other age group. However, evaluating crash frequency is problematic. Some studies have used self reported crashes while others used state reported crashes. Discrepancies have been found between self-reported and state reported incidents of crashes by some (e.g., McGwin et al., 1998) but not by others (e.g., Maritelli et al., 1997). The purpose of this study is to further examine the relationship between self-reported and state reported crashes. Data from a sample of older drivers participating in the Maryland Older Driver Study (NIA: 5 R01 AG021958-09) were evaluated. Information about driving habits was obtained through yearly telephone interviews of 867 adults, aged 65 and older, over a 5 year period. Yearly updates of state crash records were also obtained. Analyses were conducted to assess the level of agreement between self-reported and police reported crash involvement. Additional analyses examined the degree of concordance between the two sources of data by sex of the participant. Reasons for discrepancies between the current results and those reported in the literature are discussed.

**Whitney Greenwell** Co-Authors: Jennifer A. Chapman

Mentor(s): Dan Roenker Poster Number: U031

### **"A popular man"**

This piece is a drawing that has been edited digitally. The image of Lincoln is bold and graphic. This is a representation of the iconic status that Abraham Lincoln has gained for his great leadership and efforts toward our nation. The repetition of the images of Lincoln's head is also a representation of his iconic status. The bright yellow background against the black images represents the caution that should be used in dealing with current political matters. The main influence for this piece is the "Marilyn Diptych" by Andy Warhol. The piece by Warhol had a religious overtone, which was a commentary on the way people in America view a person with celebrity status. Lincoln has risen in popularity due to his heritage bringing positive effects to our state. Pixelation has been used on the background and on some of the images of Lincoln.

This represents that even though Lincoln's face has been circulated on currency there is still much that many of us do not know about him. To shed some light on Lincoln's past to those of whom it may be blurry, is the purpose of this celebration of the rich past

**Brandon Hagan** Mentor(s): Kim Chalmers

Poster Number: U028

### **Thermal Analysis of the Denaturation Temperature of BSA Using Fluorescence Spectroscopy**

The determination of the denaturation temperature of BSA using fluorescence spectrophotometric techniques is measured. The fluorescence of BSA is due to tryptophan residues. This fluorescence emission is highly sensitive to the local environment and consequently changes as the protein denatures. While excitation occurred at 295 nm, a blue shift in spectral related intensity was observed over a temperature range between 30 C and 80 C. The denaturation point was graphically estimated to be at 61.5 C.

**Katie Harwood** Mentor(s): Dr. Webb

Poster Number: U035

### **Pyridazyl Complexes via 1,2-Diacylcyclopentadienes**

This research shown will focus on the organometallic synthesis of pyridazines from 1,2-diacylfulvenes and rhenium carbonyl bromide. The scope of this project involves the unique organometallic complexes made from a variety of fulvenes. These complexes have potential use in the field of semiconductors and dehydrodesulfurization chemistry.

**Daniel Hinson** Mentor(s): Chad A. Snyder, Ph.D.

Poster Number: U042

### **A Novel Pervious Cement Reaction Barrier (PCRB) In Situ Arsenic Remediation System**

Remediation of Superfund hazardous wastes sites with contaminated groundwater is a key research area. The sheer complexity of the subsurface environment, coupled with the unique characteristics and challenges of each site make it advisable to tailor remediation technologies to site-specific remediation needs. We examined a pervious cement reactive barrier system (PCRB) in which the modifier is incorporated directly into the matrix pervious cement barrier. As the groundwater flows through the barrier, contaminants will be trapped and/or modified, thereby reducing the contaminant plume and the necessity for further treatment. Such a system will require little or no active maintenance; furthermore, characterization of contaminants at the site would allow the PCRB to be "tailored" to specific characteristics. Our primary contaminants of interest are arsenic and mercury. This project used batch, column, and adsorption experiments to evaluate and model the adsorptive capacity of the PCRB for arsenic and mercury uptake. The total adsorptive capacity of a PCRB was determined from the breakthrough of arsenic and mercury from column adsorption. This will form the basis for

future studies, wherein we can scale the process up to assess construction and engineering constraints and to determine whether it is feasible in the field.

**Morgan Jones** Mentor(s): Dr. Cathleen Webb  
Poster Number: U043

### **Comparative and Equivalent**

President Lincoln states, "A house divided against itself cannot stand. I believe this government cannot endure permanently, half slave and half free..." He asserted equal rights to all people, released the slaves, and fought for African American's rights. Martin Luther King Jr. was also a man who strived for African American's civil rights, the equality of freedom, and a peace movement. Having the same believes in common, they inspired me to complete this drawing.

The idea behind these two men sharing only one eye parallels their same perspective on fighting for equal rights. Drawing MLK behind President Lincoln portrays the support of the one man to other. And their interaction in two different history periods was to represent the length of time it takes to accomplish equality and freedom for all people.

I have intended to capture Lincoln's facial features and character through a regionalist painter, Thomas Hart Benton whose high contrast work emphasis as the power and durability of the characters' concept and theme.

Originally, the drawing was done with charcoal, which represents the issue of black and white contracts and equal rights. As going through the process, I scanned it into the computer to emphasis the muscularity of Thomas Hart Benton's style. I changed the color to brown to give the piece an antique taste.

**I-Ping Kuan** Mentor(s): Kim Chalmers  
Poster Number: U025

### **The Mass Games**

When I was originally assigned this project, I was having trouble wit finding an interesting culture that wasn't my own. I thought about what culture of people I would like to visit the most, where I would go, and what kind of people would be there. Students were deciding on their topics quickly and were taking action. Then I thought what kind of people have been in the news lately and would be relevant to today? Then it hit me... North Korea!

North Korea is a secretive society run by communist leader Kim Jong-il in East Asia. Through my research of this totalitarian state, I discovered the Mass Games. Today, the Mass Games are only performed in North Korea where thousands of performers take part in a choreographed celebration. Celebrations includes Kim Jong-il's birthday (April 15), and the Arirang Festival. Mass Games takes places for two months straight. Inside a large stadium (Rungrado May Day) in Pyongyang, North Korea. Thousands of gymnasts, children and adults take part in the ceremonies. Gymnasts perform on the field while in the stands children turn cards quickly producing large political images to the crowd.

My collage is one that explains the culture of North Korea as well as the Mass Games while maintaining the colorful appearance using the tiles in the background. Kim Jong-il is depicted large because he is the leader of the state. The large words describe the obvious thoughts about North Korea. Through extensive research I learned that even a secretive society can have a positive output.

**Jarvaun Lindsay** Mentor(s): Matt Tullis  
Poster Number: U015

### **Reaction of cisplatin analogs with selenomethionine**

Analogs of the platinum anticancer compound cisplatin have been reacted with the nonstandard amino acid selenomethionine (SeMet) and characterized by NMR spectroscopy.

SeMet was found to react faster than methionine (Met) with a representative analog platinum complex (Pt(dien)) containing only one coordination site; however, over time, equal amounts of the SeMet and Met products were observed. Thus, both SeMet and Met products have similar thermodynamic stabilities, but SeMet is kinetically faster to react. Platinum complexes with two available coordination sites have also been studied, since these complexes more closely resemble cisplatin. Three different types of products have been observed, although the size and shape of the other ligands on the platinum atom can limit which of these complexes form.

**Rebekkah Lively** Co-Authors: Stephen C. Chmely

Mentor(s): Kevin M. Williams

Poster Number: U012

### **Samoa Festival (World FireKnife Competition)**

The main objective of my research project is to create an effective visual communication using traditional collage techniques to develop a theme that centers on a non-western culture that is significantly different from my own. I chose to focus my research and the resulting report and collage on The World FireKnife competition. This event is held at the Polynesian Cultural Center, where the History of the FireKnife is a warrior tradition. The Director of Cultural Islands, Pulefano Galea'I was the originator of the Center's Samoan World Fire Knife Dance Competition and accompanying cultural arts festival. He explains the Samoan fireknife dance ('ailao afi) as a relatively modern innovation on ancient gestures of victory in battle that used a hand-held wooden weapon, the nifo oti or "deadly tooth."

"Old Samoan traditions say warriors would use the relatively lightweight nifo oti like a hacking sword," Galea'i says, noting that some of these wooden swords or clubs had boar tusks or shark teeth attached, while others had sharp "teeth" carved into the edges that could do serious damage to an enemy in close combat. Also, Old Samoan traditions indicate the 'ailao or knife dance was originally done to rhythmic chants or songs, but today vigorous drumming on a variety of ancient and modern instruments accompanies each Samoan fire knife dance and adds to the overall excitement.

In more modern times after village, tribal and interisland warfare faded into history, the nifo oti has become an important element in the Samoan ta'alolo or gift-giving procession that honors special visitors: Custom now demands in the most formal occasions that the ornately decorated manaia or "prince" and taupo or "princess," each carrying and twirling nifo oti, should lead ta'alolo processions.

Siva Afi is Samoan for "fire dance", this entertainment is purely Samoan and it began with Paramount Chief Letuli Olo Misilagi or also known as "Freddie Letuli". He passed away in 2003, but will always be known as the "Father of the Fire Knife Dance". In 1946 at the Golden State Park in San Francisco, "Freddie Letuli", started the Fireknife dance of Samoa. He was intrigued by a Hindu fire-eater and a young girl who was twirling her baton fitted with light bulbs, which were on either end. All of them were rehearsing their particular talents to perform for the Shriner's Convention. He asked the Hindu man for some of his white gas, and he wrapped a towel around the blade of his knife. While not perfect, the Flaming Sword of Samoa became a reality.

Some cultural touches that the dancers use as costume is such as various types of headbands made from flowers or shells and shredded leaves tied around the lower legs, and sometimes the waist and arms, which accentuate fireknife dance movement. In my collage I tried to capture the movement and the culture behind the Fireknife Competition. I included items such as burnt metal and burnt paper/wood. I used floral patterns and bright colors, such like what they might wear during performances. I used greenery and any other nature-like objects that would give it a more feel for the Polynesian culture. So, hopefully I can communicate and

share this newfound knowledge behind The World FireKnife competition through this one page written report and the traditional art collage.

**Alaina Matthews** Mentor(s): Matt Tullis  
Poster Number: U039

#### **Apparent Surface pKas of Mercaptocarboxylic Acid Self-Assembled Monolayers on Polycrystalline Gold**

We have measured the apparent surface pKa values of self-assembled monolayers (SAMs) formed from 3-mercaptopropionic acid (3-MPA) and thioctic acid (TA) on evaporated gold film electrodes with a range of average surface roughness from 1.4 nm to 6.8 nm as measured by AC mode atomic force microscopy. The surface roughness is induced and controlled with electrochemical etching via multiple potential cycles between 0.2 and 1.5 V (versus Ag/AgCl/1.0 M KCl) in 100 mM sulfuric acid with potassium chloride concentrations ranging from 0.10 to 10 mM. The pKas are measured by determining the capacitance of the surface using electrochemical impedance spectroscopy in a range of controlled ionic strength ( $\mu = 0.25$  M) buffer solutions. The results for 3-MPA are striking, exhibiting a strong logarithmic correlation ( $R$ -squared = 0.988) between the chloride concentration used in the electrochemical etching solutions and the apparent surface pKa. Over the range of KCl concentrations, the surface pKa of 3-MPA shifts from 6.5 to 8.4. However, the relationship between the KCl concentrations in the electrochemical etching solutions and the apparent surface pKa of TA is flat at  $7.3 \pm 0.2$  with an  $R$ -squared value of less than 0.3 for both linear and logarithmic relationships.

**Winston Maupin** Co-Authors: Yi Zhou, Andrew Ebelhar, Michael Daugherty  
Mentor(s): Stuart Burris  
Poster Number: U019

#### **Baylisascaris procyonis infection in raccoons trapped from Warren and Barren Counties of Kentucky**

The large raccoon roundworm, *Baylisascaris procyonis*, has recently emerged as a potential zoonotic pathogen of humans. The incidence of human infection with this dangerous parasite is expected to increase as raccoon populations continue to expand into peridomestic habitats. The purpose of our study was to determine the prevalence of *B. procyonis* infection in raccoons trapped from Warren and Barren counties of Kentucky. Raccoons were live-trapped between June 2007 and January 2008. Following inhalant anesthesia with isoflurane, fresh fecal samples were removed and placed into specimen bags. An overdose of isoflurane was then given to ensure death, and intestines were removed and examined for the presence of intestinal parasites. Helminths were removed with forceps and placed into vials containing 70% ethanol. In the laboratory, parasite eggs were separated from fecal matter using a sodium nitrate fecal flotation method. Parasite eggs were observed, identified, and photographed using an Olympus BX51 microscope. *B. procyonis* infections were observed in raccoons from both Warren and Barren counties. Partial Support from NIH Grant 2 P20 RR-16481 from the National Center for Research Resources is gratefully acknowledged.

**Alyssa Mavi** Co-Authors: Chad Groce and Cheryl Davis  
Mentor (s): Cheryl Davis  
Poster Number: U037

#### **A Collection of Planets and Other Things**

I am a storyteller and a collector. My work explores the retention of memories, thoughts, and feelings, and puts them on display as a collection. My planets are individual worlds that suggest the concept of "story" without explaining overtly what that story is. This invites the viewer to think up their own story based on their own experiences. These worlds are

animistic; everything is sentient of its own purpose in relation to the rest of its environment, even if that purpose is just "to be a road" or "to sit beside that sign." My work is primarily comprised of small parts that fit together to form one whole collection -- this echoes the importance of the individual in the larger, communal whole.

**Elisa McCabe** Mentor(s): Yvonne Petkus

Poster Number: U030

#### **Chasms in care: Implications of a disparate system on childhood overweight**

According to the Institute of Medicine, "improving health is a shared responsibility of health care providers, public health officials, and a variety of other actors in the community who can contribute to the well-being of individuals and populations." To be most effective, the roles of each actor should come from the same script. This is often not the case, as illustrated by the chasm that exists between public health and personal health care in addressing childhood overweight. Public health efforts to reduce or flatten the rising prevalence of childhood overweight have focused on preventive strategies modifying behavioral and environmental risk and protective factors. For children who are already overweight, these strategies are not enough. At present, there isn't a coordinated system of health care to address the treatment of overweight in children. What programs do exist are typically fee-for-service and is disconnected from the child's medical home. Using childhood overweight as the platform, this presentation examines the ethics and implications of the chasm that exists between the actors who share responsibility for improving the health of our nation, including widening health disparities.

**Sara Miller** Mentor(s): Marilyn Gardner

Poster Number: U046

#### **Aids in Africa**

AIDS kills 6,600 people everyday in Africa. Accounting for 11% of the world population, countries located within its boundaries are home to 60-65% of the total world population living with the disease. Nine million people must be saved urgently. A large contributing factor to this epidemic is the apathy of populations in powerful countries, who could otherwise make a difference. We call on the college students of Western Kentucky University, as our base constituents, to take an active role in improving the world we live in; to be empathetic, seek information for themselves, spread knowledge to others, and finally to take action. Through the presentation of a film series showing documentaries on the AIDS crisis in Africa, the production of an online forum to educate students through facebook.com, and a poster-campaign offering information and statistics on the problem, we hope to use our power of information and access to thousands of others in order to mobilize the students of Western Kentucky University to act.

**Danielle Moore** Co-Authors: Meredith Moore, Tharpam Chamjock

Mentor(s): Sandra Ardrey

Poster Number: U034

#### **Bowen ratio computations and its relation to surface fluxes of malodors at a swine lagoon in Logan County, Kentucky during summer and winter seasons.**

Lagoons are responsible for emissions of numerous atmospheric pollutants. CO<sub>2</sub>, NH<sub>3</sub>, water vapor, and skatoles are most prominent and controlled by interactions of the atmosphere alongside biochemical and physical processes occurring at lagoon interfaces. One interactive aspect was investigated by correlating emissions of swine lagoon operations with partitions of energy heat fluxes at the surface calculated by the Bowen ratio.

A series of meteorological and gas measurements, indicated above, during summer and winter 2007 were conducted for a lagoon (20m x 30m; 1.5m depth) at a swine farm operation

housing approximately 100 hogs in Logan County, Kentucky. Meteorological measurements included wind, temperature, relative humidity, and precipitation from a weather station 10m away from the lagoon bank and at two heights (.5m and 1.5m) above the lagoon center.

Preliminary results showed temperatures at .5m were consistently larger than at 1.5m, which were reversed for relative humidity. The surrounding air exhibited less time variability in wind speed than at the center of the lagoon (.5m) suggesting a more moist and turbulent atmosphere near the lagoon center than the surrounding air. The objective is to determine whether the Bowen ratio and associated energy fluxes are correlated with gas fluxes from the lagoon.

**Monica Motley** Co-Authors: Arturo Quintanar, John Loughrin, Nanh Lovanh  
Rezaul Mahmood Mentor(s): Rezaul Mahmood  
Poster Number: U018

#### **School Bus Safety Program for Bristow Elementary School**

Each year, over 400,000 school buses transport approximately 25 million children to and from school and school-related activities. It is estimated that 85% of these buses carry more than 16 passengers. Parents save time and money when their children ride school buses. In addition, studies have shown that school buses are safer compared to other forms of transportation. Regardless, school buses have been associated with crashes some of which resulted in injuries and deaths. Since 1996, 1,536 fatal motor-vehicle crashes have been classified as school-transportation related. On the average, about 20 school-age children die in school-related transportation each year as occupants or pedestrians. Behavioral programs such as student education have shown to help reduce or prevent some of the injuries and deaths associated with school buses. The purpose of this project is to plan, implement and evaluate a school bus safety program for Bristow Elementary School.

**Amanda Mounce** Co-Authors: Meredith Hall, Janelle Ward, Mackenzie Francis  
Mentor(s): Grace Lartey  
Poster Number: U008

#### **Pedestrian Safety Program for Dishman-McGinnis Elementary School**

Pedestrian injury is the second leading cause of unintentional injury-related deaths among children between 5 and 14 years old. Nearly one third of all pedestrian injuries are sustained by children under the age of 14. Of all children between the ages 5 and 9 killed in motor vehicle accidents in the United States in 2000, approximately 23% of them were pedestrians. In 2002, about 43,300 children ages 14 and under visited emergency rooms with pedestrian-related injuries. Studies have revealed that 60-70% of pedestrian injuries to children under 10 years old and younger are due to the child walking across intersections improperly or darting out in the street between intersections. These days, children are walking and playing outside less than ever before because of the dangers that moving vehicles pose. At the same time, childhood obesity is increasing in our society. It is important to educate young children on the need for outdoor activities, including walking, and how to be safe as they are performing these activities. The purpose of this project is to plan, implement and evaluate a pedestrian safety program for Dishman-McGinnis Elementary School in Bowling Green, KY.

**Elizabeth Murray** Co-Authors: Mahsa Kariman, Karie Starkey, Kayla Clausen, Antoinette Danridge Mentor(s): Grace Lartey, PhD  
Poster Number: U010

#### **PWNED: Leadership and Videogames**

Often videogames are perceived as detrimental to individual and social development. However, the rise of internet-based gaming has allowed individuals to interact with one another in real time to accomplish common in-game goals. This opens opportunities for group



leadership development.

This presentation examines the aspects of leadership in the two most popular videogaming genres at the moment—first person shooters (FPSs) and Massively Multiplayer Online Role Playing Games (MMORPGs). The hypothesis that we test is that individuals in MMORPGs will have higher scores on our leadership measures than FPS players, controlling for things like playing ability and age. To test this hypothesis, we surveyed 236 MMORPG and FPS players using an online questionnaire. The results of this study will have implications for both videogame design and for leadership development research and practice.

**Kalu Njoku** Co-Authors: William Ritson

Mentor(s): Douglas Smith

Poster Number: U024

### **Abraham**

Abraham Lincoln has been celebrated throughout recent American history as an icon of the American ideal. His belief in equality and unity steered his decisions as president and commander and chief of the union armies of the civil war. This representation of Lincoln is meant to evoke the ideas he stood for as well as unite his memory with modern American iconography. The clean lined style of this portrait has a specifically modern appeal while the content evokes hindsight to a time when wisdom helped defeat war and unite our country. The background patterning is time period appropriate while its use appeals to the current era.

Practical applications of this easily recognizable, highly visible graphic include; outdoor display, printed event materials, interactive, apparel, as well as numerous commemorative applications. Applying event specific typography will allow this graphic to function as a 'brand' for the bicentennial celebration.

**Stephen Ogden** Mentor(s): Kim Chalmers

Poster Number: U005

### **Coital Connotations**

My work is mostly the result of my thoughts on sexuality, gender identity, and blending what is traditionally beautiful with what is grotesque. I am interested in unsettling people so that they are confronted by their own introversions. By this I mean that it is my attempt to present something that is beautiful, but also challenging in the sense that it reminds us of the ambiguity of our sexuality and relations to others. I try to achieve this by combining abstracted genitalia and non-biologic materials that are punning of body parts which are present in my work. In this instance I will sometimes slip cast objects like pipes to elicit puns such as: "the plumbing down there." Themes of war and politics also find their way into my work. Much of what I make resembles growing things, such as a surface treatment that reflects skin, wood, or other biologic materials. Often I invent a motif by patterning marks/sculpting areas to look like the texture I have chosen and researched from nature.

**Galen Olmsted** Mentor(s): Tom Bartel

Poster Number: U001

### **Mercury Concentrations of Blue Sucker and Freshwater Drum in the Green River**

Mercury (Hg) concentrations were determined in Blue Sucker (*Cyprinus elongatus*) and Freshwater Drum (*Aplodinotus grunniens*) collected from the Green River. Highest Hg levels were found in the Freshwater Drum with an overall maximum of 980ppb. The amount considered by the Food & Drug Administration (FDA) to be potentially harmful for human ingestion is 1000ppb. Samples collected from different sites along the river show no significant variations in Hg levels between similar fish types. Females of both types contained higher Hg levels than males, and as the fish weight increased, the mercury amount also increased. Liver and tissue Hg concentrations in Freshwater Drum were significantly greater than that of Blue



Sucker. The mean Hg concentrations were all lower than the FDA's maximum allowable concentration. However, bioaccumulation of Hg does obviously occur. Data from the EPA's toxic release inventory reflects the release of mercury into the environment, including near the Green River, by Kentucky industries. This research establishes a baseline of Hg concentration in Green River fish, leading to a better understanding of future impacts from mercury in the environment.

**Trisha Parsons** Mentor(s): Cathleen Webb  
Poster Number: U027

#### **1,2-Diacyclopentadiene Synthesis: Starting Materials for Thienyl and Pyridazyl Complexes**

This research focuses on the synthesis of a family of fulvenes. The synthesis involves the 1,2-disubstitution of cyclopentadiene to form compounds suitable for organometallic research. These compounds will have a variety of applications such as semiconductor research and dehydrodesulfurization chemistry.

**Chad Phillips** Mentor(s): Chad A. Snyder, Ph.D.  
Poster Number: U041

#### **Flash Flood Climatology of the Appalachian Region (1978-2005)**

Flash Flood is a major natural hazard in the United States. To better understand its seasonality and inter-annual variations, we have built a flash flood climatology for the whole Appalachian region. This presentation shows the FF climatology for the Appalachian region for the years 1978-2005. Our primary source of data has been the National Climatic Data Center (NCDC). We used their electronic records (1993-2005), which can be accessed through the World Wide Web, as well as their hard copy version of Storm Data (1978-1992). The analysis of data shows variations in the frequency of FFs during different years, seasons, and months. The study finds that summer season experienced most of the flash floods while winter the least. In addition, month of June experienced most of the flash floods while month of October the least. This work is currently being expanded to include possible causes for FFs, including rain amounts retrieved from NWS Radar.

**William Rodgers** Co-Authors: Rezaul Mahmood, Ph.D.  
Mentor(s): Rezaul Mahmood, Ph.D.  
Poster Number: U011

#### **Application of the Agresti-Coull's interval estimation on Quality Control Data**

We begin this paper by looking at Shewhart's and Deming's control charts and the methods used to produce them. In particular, we are interested in the Binomial proportion  $p$  and explore the advantages of using Agresti and Coull's Confidence Interval in lieu of the Wald-Type Confidence Interval. Mathematical derivations from the Bayesian standpoint, small sample studies, and numerical examples using engineering and quality control data sets will be presented.

\*Mr. Rusnock is a B.A. Mathematics Student and Dr. Quiton is an Assistant Professor at the Department of Mathematics, Western Kentucky University. The authors would like to acknowledge research support by the Kentucky EPSCoR Research Startup Fund RSF-031-06.

**Adam Rusnock** Co-Authors: Dr. Jonathan Quiton  
Mentor(s): Dr. Jonathan Quiton  
Poster Number: U023

#### **Spectroscopic characterization of over the counter medication**

Absorbance, emission, infrared, and Raman spectroscopy have been used to characterize expired and unexpired over the counter (OTC) medication. In addition studies of bound and

unbound cyclodextrin molecules have been conducted. All spectra are measured with conventional instrumentation. However, fluorescence studies are conducted with a portable hand-held OceanOptics spectrofluorometer. And samples are excited with light emitting diodes, a green (532 nm) or deep red (670 nm) laser pointer. Temperature-dependent studies are employed to determine the shelf-life of OTC medication. Comparisons of spectral data and summary of our results are presented.

**Sabina Salkic** Co-Authors: Michelle Perry and Thandi Buthelezi

Mentor(s): Thandi Buthelezi

Poster Number: U021

#### **Powers of "Five"**

The visual concept of my work is "the beginnings of life." It is interesting to think about life in terms of size; starting out small, nameless and without identity. The idea of something so infinitesimal developing into a complex adult person is mind boggling. Conceptually these pieces have developed into a statement about the fragility of existence and the fine balance between life and death. The film "Powers of Ten" was an influence because this concept of size relation is incredibly intriguing to me and I think that it is something other people can also relate to.

I wanted to create a delicate feel to my work by combining a group of fragile objects. Images came to mind: breakable light bulbs, vulnerable fetuses and wispy, sparkling light that in a moment could be lost to the vast surrounding darkness. I thought about the image of a fetus and how it is typically thought of in only a limited number of ways. I wanted this image to be viewed them in a different sense, a world in which it is not typically seen. Some may see my work as social or ethical statements, but this series is completely open to interpretation.

**Kelly Scheurich** Mentor(s): Laurin Notheisen

Poster Number: U002

#### **Nanoscale Colloid Displacement Lithography**

We have expanded gold colloid particle manipulation techniques using a scanned probe microscope into a nanolithography platform. We have utilized 5- and 10-nm gold colloid particles adsorbed on poly(diallyldimethylammonium chloride) to consistently pattern and create uniform features on the order of 200 nm and smaller. The gold colloid particles were manipulated with a silicon cantilever having a force constant of about 3 N/m and a resonant frequency of approximately 70 kHz. We have also achieved two-dimensional aspect ratios approaching 50:1 in repeat patterns covering 25 square microns. We have further employed electroless deposition to fuse the colloid particles together in anticipation of creating working interdigitated arrays. While the electroless deposition causes an increase in the final dimension of the features, the increases is predictable enough that we are able to pattern appropriately to achieve the desired final dimensions. We will describe the methods used to accomplish these ends and discuss the challenges associated with creating intricate patterns using this technique.

**Christopher Snyder** Mentor(s): Stuart Burriss

Poster Number: U020

#### **Conditioning of *Otocinclus affinis* using conspecific sounds**

Catfishes of the family Loricariidae have bi-lobed swim bladders that are adjacent to their ears. We hypothesize this anatomical design assists these fishes in sound localization. To test this, we trained *Otocinclus affinis* to come to a sound on one side of a 200-L aquarium. Three types of experiments were performed- training, test-1 and test-2. During training trials (N=3), food and a conspecific sound stimulus were presented simultaneously. During the test-1 trials (N=3), only the conspecific sound-stimulus was presented. During the test-2 trials (N=3), only a 500-Hz sound-stimulus was presented. For each trial, behavior was videotaped

15-min before, during, and after the sound stimulus. The 1-sec stimulus was played every 15-sec for 15-min. The videos were analyzed at the end of every 3-min of each 15-min recording period. At each frame, fish were counted in each column of a grid on the back of the aquarium. *O. affinis* were attracted to the sound in both training and test-1 trials, with 60-80% of the fish remaining on the speaker side of the tank during the stimulus. In summary, *O. affinis* are able to localize a sound source and were trained via classical conditioning to come towards a conspecific sound. Future studies will test the acuity of this sound localization.

**Patrick Stewart** Co-Authors: Michael E. Smith

Mentor(s): Michael E. Smith

Poster Number: U047

#### **Removal of Cationic Reactive Dye from Water Using Anion Exchange Membrane with Immobilized Surfactant**

Commercial SB6407 (Pall, East Hills, NY, USA) anion exchange membranes with quaternary ammonium functional group, made of polyethersulfone copolymer with Cl<sup>-</sup> counter ion and with anionic surfactant attached were employed for the removal of reactive cationic dye from water. Anionic surfactant, C11 – COOH (Lauric acid), was immobilized onto SB6407 membrane to form a stationary phase for hydrophobic solid phase extraction. Prior to immobilization, the membrane was preconditioned with 0.1 M NaOH solution to put the membrane in hydroxide form. Lauric acid was then introduced and attached to the membranes electrostatically after an acid-base reaction. For the adsorption and desorption step, a flow system was employed. The system consisted of a membrane holder, a pump with flow rate of 1 ml / min, UV-vis detector (wavelength 617 nm), and a computer with integration software. In the flow experiment 10 ml of 0.1 ppm Malachite green hydrochloride, 85% dye content was ran through the immobilized SB6407 membrane. Subsequently, in the desorption step 1 M NaCl in 50 % ethanol was used to desorb the dye from membrane. The results showed total adsorption of the cationic dye. Complete analyte recovery was achieved in the solid phase extraction process.

**Dino Sulejmanovic** Co-Authors: Siao Jhen Chen

Mentor(s): Eric Conte

Poster Number: U006

#### **Historical ranking of 2007 drought and summer heat wave for the Mid-South**

The 2007 summer drought and heat wave that scorched Kentucky and Tennessee affected stakeholders in the agriculture, tourism, and water supply industries, among others. The drought and heat wave also generated large amounts of media coverage and was touted as being among the worst in history. But how does the 2007 summer drought and heat wave that affected the Mid-South rank compared to the notable droughts in the 1930s, 1940s, and 1950s? Using climate division data and state composite data for Kentucky and Tennessee, we performed a statistical analysis that allowed us to place the 2007 summer drought and heat wave into proper historical perspective. We found that while the 2007 event was among the worst ever for Tennessee, there have been several more notable drought periods in Kentucky.

**James Thompson** Co-Authors: Stanley D Wingard, Kylie Batson

Mentor(s): Greg Goodrich

Poster Number: U026

#### **Progress towards cariporide analogs for sodium-proton exchange inhibition**

More than 200,000 people in the United States are diagnosed with a primary or metastatic brain tumor annually. The life expectancy for these individuals is approximately 9-12 months from the time of diagnosis. This poor prognosis is due to the ineffectiveness of existing therapies (e.g., chemotherapy and radiotherapy) against brain cancer, where the problem is the

inability to differentiate cancer cells from healthy cells. Currently, there is no curative therapy for brain cancer. Thus, the field is in great need for cancer cell-selective therapies. Relative to healthy brain tissue, the heightened metabolism of brain cancer cells (e.g., malignant gliomas) increases their reliance on the ion transport proteins, specifically sodium-proton (NHE) and sodium-calcium (NCX) exchangers. The inhibition of these cell surface proteins disrupts the intricate pH and ion balances within cancer cells to a much greater extent than in normal cells, and this leads to glioma cell death. Consequently, NHE and NCX are excellent molecular targets for brain cancer therapy. Although potent NHE/NCX inhibitor drugs are known, the delivery of these compounds to poorly vascularized tissues such as the necrotic center of a brain tumor remains to be a fundamental impediment. Currently, we are exploring a prodrug approach to address the delivery challenges. Preliminary studies towards our prodrug approach to inhibit cell surface ion exchange as a selective brain cancer therapy will be discussed.

**Jacob Vervynckt** Co-Authors: Jessica Moore; Mark Graves, II; William Harley; Fredric Gorin; Hasan Palandoken  
Mentor(s): Hasan Palandoken  
Poster Number: U044

#### **Surfactant-Immobilized Cationic Exchange Membranes as SPE Adsorbents**

In this study, surfactant-immobilized cationic exchange membranes were evaluated as solid phase extraction adsorbents (SPE) to determine their effectiveness. Surfactants with varying chain lengths were immobilized onto membranes and analyzed by EA and HPLC. Then three different phenols were used as analytes for hydrophobic and hydrophilic SPE. Both batch absorption and a flow system were used as methods for determining the effectiveness of the absorption of the membranes.

**Sarah Vied** Co-Authors: Chao-Chang Hsu, Guan-Lian Chen, Shing-Yi Suen, Eric Conte  
Mentor(s): Dr. Eric D. Conte  
Poster Number: U040

#### **Kunapipi Rituals of Aboriginal Australians**

The main objective of my research project is to create effective visual communication using traditional collage techniques to develop a theme that centers on a non-western culture that is significantly different from my own. I chose to focus my research and the resulting report and collage on the Kunapipi rituals of the Aboriginal Australians.

Ceremonies hold extreme importance to the Aboriginal Australians. Initiation ceremonies of the Aboriginal Australians have various parts, involving many different "ritual operations." According to The Australian Aborigines author A.P. Elkin, a "novice" of a tribe, the one being initiated, will go through certain stages such as tooth-avulsion, circumcision, and attaching bird feather down with blood from the arm to the body (Elkin). Elkin states that "arm-blood is sacred, and . . . gives strength to the young fellows so that they will be able to bear the sight of the sacred symbols and rites which are to be revealed" (Elkin, 174). Kunapipi has a dual significance, representing the Fertility Mother and the great Rainbow Serpent. The rituals take place on a triangle-shaped ground which is sacred, symbolizing the body of the great snake Julunggul.

As said by Mircea Eliade, author of Rites and Symbols of Initiation, "ritual swallowing by the snake is also to be interpreted as a return to the womb – on the one hand, because the snake is often described as female, on the other, because entering the belly of a monster also carries a symbolism of return to the embryonic state . . . it represents a complete regeneration of the initiate through his gestation and birth by the Great Mother."

My intent in the collage project is to focus on the Kunapipi ritual. Many aspects will aid in the creation of the collage, including highly-detailed headdresses worn in ceremony. The headdress includes various parts, such as grass, human hair, feathers, and blood. Synthetic

materials will be used in place of the originals in most cases. The incorporation of cotton and fake blood will symbolize the feather down attire on their bodies. The inclusion of a snake is important also, as it is a key element in the ceremony.

**Jenni West** Mentor(s): Matt Tullis

Poster Number: U017

#### **A Deeper Insight to Hg Bioaccumulation in the Bat Population in Kentucky and Tennessee**

Mercury (Hg) is a persistent neurotoxin that is easily transported through karst aquifer systems; for example, the South Central Kentucky Karst (SCKK) ecosystem, which includes the Mammoth Cave National Park (MCNP) area. The largest source of mercury to MCNP is atmospheric deposition, largely produced by coal-fired power plants. Hg from the atmosphere deposits in rivers, sediments, and organisms through rain, wind, and bioaccumulation. Over 350 individual bat hair samples have been analyzed for Hg from MCNP with a wide variety of species diversity. Our project will expand throughout the year to three national parks in Kentucky and Tennessee including Abraham Lincoln, Cumberland Gap, and Big South Fork National Parks. Hg levels in hair of different bat species, including federally listed endangered species have been determined and found to range between 1-13 parts per million (ppm). In addition to bat hair, initial data from approximately 15 bat guano samples have been analyzed for Hg and found to range from 0.0030 ppm to 0.9470 ppm. Further analysis will be performed on insects to gain additional information regarding how bats bioaccumulate Hg through the food chain. Quality analysis and quality control tests were done using human hair reference standards. This multiyear project began in late summer 2002 and will continue through the end of 2008.

**Erika Whitehouse** Co-Authors: Lindsey Clark

Mentor(s): Cathleen Webb

Poster Number: U038

#### **Bicycle Safety Program for Safe-T-City Bowling Green**

Bicycling is a popular form of recreation among people of all ages. It is estimated 33 million children ride bicycles each year which translates to approximately 10 billion riding hours. Bicycling is a form of physical activity, provides children the opportunity to have fun/recreation, and it is a faster means of transportation versus walking. Bicycling can be fun at the same time, it could be dangerous. Bicycle-related injuries cause significant morbidity and mortality. Children between 5 and 14 years of age account for nearly half of all bicycle-related injuries and approximately 21% of all bicycle-related deaths. In 2002, nearly 288,900 children ages 14 and under visited hospital emergency rooms with bicycle-related injuries. Safety measures must be put in place to reduce and prevent some of these injuries. Bicycle safety interventions have proven to reduce the risk of bicycle-related injuries and deaths. The purpose of this project is to plan, implement and evaluate a bicycle safety program for Safe-T-City Bowling Green.

**Daryl Williams** Co-Authors: Jillian Bracewell, Kuol Deng, Katie Bittel

Mentor(s): Grace Lartey

Poster Number: U009

#### **Skateboarding Safety Program for Parker Bennett Curry Elementary School**

Skateboarding has become a very popular sport over the past few years among children and teenagers', especially young males. Skateboarding is an activity requiring quick movement over a surface. Skateboarding can be a very positive hobby in a young person's life. This recreational activity (sport) provides ways for children and teenagers to exercise their bodies and keeps them out of trouble. However, skateboarding can be a dangerous sport when

proper safety equipment is not used and safety guidelines are not followed. Skateboarding injuries can range from a minor cuts or bruises to severe head injuries. In the U.S., skateboard injuries are responsible for about 50,000 emergency room visits each year. Approximately, 60% of skateboarding injuries involve children under the age of 15. If the children are educated about the proper skateboarding safety measures, their risk to injuries will reduce. Health education should target children, teenagers, adolescents and adults on skateboard safety (rules of skateboarding, the right places to skateboard, safety equipment, and the proper times for skateboarding). The purpose of this project is to plan, implement, and evaluate a skateboarding safety program for 3rd, 4th, and 5th graders at the Parker Bennett Curry Elementary School in Bowling Green, Kentucky.

**Nan Willoughby** Co-Authors: Randa Johnson, Lisa Meeks, Conrad Meeks  
Mentor(s): Grace Lartey, PhD  
Poster Number: U007

#### **January 29-30th Squall Line Impact on Kentucky Mesonet Sites**

On the evening of January 29th, 2008, a squall line developed ahead of a powerful cold front, sweeping through the Ohio Valley. This damaging line of storms brought over 100 reports of wind damage to the state of Kentucky alone. This project will look at the synoptic and mesoscale conditions that led to the formation of the squall line and why the storms produced straight line wind damage and not a major tornado outbreak. Data collected by the Kentucky Mesonet will be used to study the meteorological effects of the squall line as it moved across Kentucky. There are six Mesonet sites that recorded data for this event. Combined with traditional observation platforms such as ASOS stations, upper air soundings, radar, and satellite, the Mesonet data allows a higher spatial and temporal study of the meteorological effects recorded across the Commonwealth. The goal of this study is to use the data from the Mesonet to better understand weather phenomena that commonly impacts Kentucky.

**Joseph Wilson** Co-Authors: Jane Marie Wix  
Mentor(s): Stuart Foster  
Poster Number: U014

#### **Mehni**

The main objective of my research project is to create an effective visual communication using traditional collage techniques to develop a theme that centers on a non-western culture that is significantly different from my own. I chose to focus my research and the resulting report and collage on the traditional customs of Indian celebrations and the decorative elements incorporated into these celebrations.

Mehndi, also known as henna, is one of the most important decorative elements of an Indian celebration. Ground up from the dried leaves of the dwarf shrub, lawsonia inermis, tomato paste is added to thicken the mixture for easier application to the skin. Depending on the event, a specific design is painted on the body, usually on the hands and feet. These delicate and intricate marks signify many things such as good luck and prosperity.

As well as the mehndi designs, beautiful fabrics are as much a part of an Indian celebration. Traditionally vibrant and rich colors were used to create the beautiful saris that the women wore. Detailed stitching is incorporated into the design to create a one of a kind piece. Rich gold's and deep earthy reds and oranges were a common color palette. Silk, delicate shear fabric, and the most sensitive and intricate embroidering created elegant breathtaking pieces.

The combination of these many beautiful elements relating to the traditional Indian celebrations creates a very striking collage. Looking closely at this collage you will have a small glance into this elegant and beautiful Indian culture through my imagination

**Briana Worle** Mentor(s): Matt Tullis Poster Number: U036

### **Graduate Presentation Abstracts**

**Elizabeth Alewine** Co-Authors: Martin Stone

Mentor(s): Martin Stone

**Room: 163 B Time: 09:45 AM**

#### **Landscape Construction at the Felts Log Cabin**

The Felts Log Cabin is located on the campus of Western Kentucky University. Built in the early 1800's by Archibald Felts, the cabin was occupied by his descendants until 1968. The dogtrot floor plan, V-notched logs, and stone chimneys are some of the historical architectural features of the cabin. It was donated to the Kentucky Library and Museum at WKU in 1980, and now serves as an on-site exhibit of early frontier life in Kentucky. The new landscape design for the cabin includes a kitchen garden with period-appropriate plants and outdoor demonstration areas. The inventories and journals of the Shaker community in South Union provided the basis for the vegetables used in the kitchen garden, including 'Late Flat Dutch' cabbage and 'Long Scarlet' radish. Dye plants, such as Bloodroot and Virginia Creeper, are included in the kitchen garden, and the front of the cabin will be used to display examples of field crops, including 'Stowell's Evergreen' corn. An area close to the cabin has been designed for a native plants display.

Construction of these gardens in the spring of 2008 will involve the removal of grass around the cabin in keeping with historical accuracy. Combined with the cabin's location on campus, this will increase the potential for soil erosion. A fence and plants that are intended to act as vegetative filters are included in the design to help slow water runoff, and the use of raised planting beds and mulch to cover the bare soil will minimize soil loss. The native plant garden is intended to act as an introduction to the cabin, and will provide a selection of plants native to the forests of Kentucky. Many plants are not typically seen outside of wild woodland settings, such as Strawberrybush (*Euonymus americanus*), several Trillium, Bird's-Foot Violet (*Viola pedata*), and Rattlesnake Orchid (*Goodyera pubescens*), and should increase visitors' enjoyment of the entire display. A path will connect the native garden to the cabin exhibit, and an informational pamphlet about both the cabin and native gardens will be provided for visitors.

**Todd Ballard** Co-Authors: Todd Willian, Elmer Gray, Martin Stone, Marvin Russell

Mentor(s): Todd Willian, Elmer Gray, Martin Stone

**Room: 163 C Time: 01:45 PM**

#### **Effective Grain Yield loss Due to Variation of In Row Spacing of Corn**

It is commonly agreed upon that uneven spacing in corn rows effects grain yield negatively. To what extent and why this occurs is not known. A linear model of loss for  $>2$  inches has been proposed as  $y = a + by_0$  with  $b$  varying from 2.5 bushels per acre to 5 bushels per acre depending on genotype and environment. By measuring the distance between each plant and the grain weight each plant produced we observed losses which occurred in ten producer managed plots on four farms as well as on twenty seven researcher managed plots at WKU. Results were then considered for either the linear model or as a corollary to Duncan's grain yield model.

**Matthew Brunt**

Mentor(s): Dr. Katie Algeo

**Room: 163 B Time: 01:30 PM**

#### **Before the Park: Analysis of Mammoth Cave area communities circa 1920**

Before Mammoth Cave National Park became what it is today, this area was littered with communities. After land was acquired by the United States government, in the early 1900s, the people living within these communities were forced from their homes and made to relocate to the surrounding areas. Experiences surrounding this forced 1920s relocation,



along with the cultural impact of such a relocation, are of great importance to this project. With the use of the 1920 Census of Population and Housing, the researcher will be able to create a picture of the area's demographics before the relocation. Today, geography is starting to rely heavily on the use of Geographic Information Systems (GIS) as a tool to collect and analyze data while providing a means for accurate and efficient visual representations. Using a Historical GIS (HGIS), the researcher will be able to take the data from the manuscript census and precisely map this data at the household level. This will create a framework for other data, such as historical photographs, to be registered to build a multi-media digital representation of this community before the 1920s relocation.

**Pongsathorn Chotikasemsri** Co-Author: Dr. Claire Rinhart

Mentor(s): Dr. Claire Rinehart

**Room: 163 B Time: 01:45 PM**

#### **Modeling Mis-folded Lysozyme Aggregates**

Mis-folded proteins and associated aggregates are a contributing factor in some human diseases. In this study we used the protein lysozyme as a model because of its small size and defined aggregation structures under denaturing conditions. Author and Author (year, reference) observed conditions where heat denatured lysozyme formed fibril structures that were observed to be around ten to twenty nanometers under electron microscope. Even though the crystal structure of lysozyme is known, the denatured form of this protein is still unknown. Therefore, we used Rosetta++ protein folding and blind docking software to create in silico models of the protein at denaturing temperatures and subsequently docked them into aggregates. Here we compare those structures and select forms consistent with the fibril structure. We hope that models of the fibrillar forms of denatured lysozyme will help us understand how to block fibril formation and model interactions with heat shock proteins during the disaggregation process.

We acknowledge funding from BISC (Bioinformatics and Information Science Center) and Biotechnology Center of Western Kentucky University.

**Rahul Gandhi** Co-Authors: Pavankumar Patel, M.B;B.S, Hariprakash Hadial, M.B;B.S, Bhagirath Palla, M.B;B.S.

Mentor(s): M. Christine Nagy, PhD

**Room: 163 B Time: 02:00 PM**

#### **How to Involve Parents in School Based Health Promotion Programs**

**Purpose of Study:** Children's declining physical activity has attracted attention from those concerned with the health and well-being of the young. The purpose of the present study was to identify ways to inform and involve parents in the Safe Routes to School program. This program was designed to increase walking and biking to school and was to be implemented by the health department in local schools.

**Methods:** An 8-item questionnaire designed to identify parents' perception regarding their involvement in the walking and biking program, preferred types of educational materials and location where they could obtain information regarding the program was distributed to parents during a Bike Rodeo, held at a local park in the community in April 2007. Data was obtained from 57 parents.

**Results:** An analysis of the data revealed that 91% of the parents believed that parental involvement in the program was very important and 89% considered that physical activity was important for their children. Newsletter was found to be the preferred way to receive information and the child's school was the place chosen to conduct educational session.

**Conclusion:** For effective implementation of the Safe Routes to School program, parental involvement is vital. Insights obtained from the study were used to prepare tailored educational materials for increasing parental participation in the program.



**Felix Gill**

Mentor(s): Dr. Ahmed Emam

**Room: 163 B Time: 10:25 AM****Forecasting Financial Time Series On NYSE**

"The average man doesn't wish to be told that it is a bull or bear market. What he desires is to be told specifically which particular stock to buy or sell. He wants to get something for nothing. He does not wish to work. He doesn't even wish to have to think." ~Jesse Livermore.

Indeed deriving a relationship that allows the ability to predict future time series is challenging, especially when the information it is based against is non-linear. Due to its irregularity, financial time series forecasting is regarded as a complex practice with a market that is dynamic and highly volatile. In recent years neural networks have become a tool for analysis and pattern recognition. In this application we attempt to harness this power and fully apply its potential to the Stock market and Forex markets. Building on a paper by Medhat Louis Seliem, "Foreign exchange forecasting using Neural Network and data mining", I attempt to recreate his work with the Forex market. I hope to introduce new and unique vectors to the component list used to in the training process and finally to illustrate the ability to overcome the accuracy decline in models as time increases from initial training period.

**Srinivasa Gokarakonda**

Mentor(s): Dr. Thomas Nicholson, Dr John White, Dr. David Duncan

**Room: 163 C Time: 01:15 PM****Stress and Hair loss among International Graduate Students at Western Kentucky University**

Several studies conducted across American Universities revealed that international students experience psychological stress, culture shock and problems with acculturation. The aim of the study is to understand the role of psychological stress in the onset of self reported hair loss among these students. The survey consisted of a demographic profile, General Well Being Schedule, and the Holmes-Rahe scale of recent life experiences. International graduate students completed an online survey. The survey was completed by 56 males and 41 females from 18 countries. Some or very much hair loss before coming to the US was reported by 30 students and after coming to the US by 49. High levels of stress with studies before coming to the US were reported by 23 students and high levels after coming to the US by 40. The mean stress as assessed by the GWBS was 74.7 (SD = 10.03). The Holmes-Rahe scale score for stress from recent life experiences was 178.49 (SD = 102.86). The results showed a significant correlation of .258 between self-reported levels of stress with studies and hair loss after coming to the US but not before. A correlation of .244 ( $P < 0.05$ ) was found between recent life experiences and self reported hair loss. Although this study shows an association between stress due to recent life experiences and hair loss, it is limited by the use of self report measures, particularly for the construct of hair loss.

**Kunal Gosar** Co-Authors: Samatha Kalyani Chindam Anjaneyulu

Mentor(s): Dr. Huanjing Wang

**Room: 163 B Time: 01:15 PM****Collaborative Filtering Recommender System**

Recommender systems apply data mining techniques to the problem of helping users find the items they would like to purchase by producing a predicted likeliness score or a list of top recommended items for a given user. Different methods can be used for recommending an item. One of the widely used methods is collaborative filtering, which suggests new items or predicts the utility of a certain item for a particular user based on the user's previous likings and the opinions of other like-minded users. Collaborative filtering algorithms are divided

into two main categories – memory based (user-based) and model based (item-based) algorithms. The memory based algorithm finds neighbors with similar interests and the model based algorithm develops a model of user's previous ratings. The research focuses on using these algorithms to develop a model to recommend items. The model is developed using several data mining algorithms.

**Chad Groce** Co-Authors: Cheryl Davis

Mentor(s): Cheryl Davis

**Room: 163 B Time: 09:15 AM**

**First report of *Trypanosoma cruzi* infection in raccoons and opossums from Kentucky**

Only 6 autochthonous cases of human Chagas' disease have been documented in the U.S. However, as many as 50/1000 immigrants may be infected with the etiologic agent, *Trypanosoma cruzi*, a parasite also common in mammals indigenous to the southern U.S. The goal of our study was to determine if the sylvatic cycle of *T. cruzi* infection occurs in Kentucky, and if present, to assess the prevalence of infection in Warren and Barren counties. Raccoons and opossums were live-trapped between June and December, 2007. Animals were anesthetized with isoflurane, and blood samples were collected using a vacutainer system. Sera were frozen at -80oC for subsequent analysis, and whole blood samples were inoculated, in duplicate, into liver infusion tryptose (LIT) medium and cultured at 27oC. To date, eighteen *T. cruzi* isolates from raccoons have been positively identified by hemoculture. A total of 18/46 raccoon samples and 15/49 opossum sera were judged to be seropositive by immunofluorescence antibody test (IFAT). We are currently determining the antibody titers of positive samples using ELISA. To our knowledge, this is the first report of *T. cruzi* from the state of Kentucky. NIH Grant 2 P20 RR-16481 from the National Center for Research Resources is gratefully acknowledged.

**Jake Henderson**

Mentor(s): Dr. Andrew Wulff

**Room: 163 B Time: 11:10 AM**

**Correlating Top Soil Chemistry and Mineralogy to Bedrock**

This project involves a study of various topsoils with regards to agricultural quality. Geochemical data was compared to the original bedrock from which each soil weathered. Variables include; prior agricultural use (e.g. fertilizers, tillage, increased drainage, residual organic matter, etc.) and relationship to local geomorphological features (e.g. topography, streams, drainages, etc.). Two different sample sets were extracted from different locations at the WKU farm, and from locations in Simpson County. These sample sets include both tilled and non-tilled areas. Soil chemistry was compared with mapped soil types (using NRCS Web Soil Survey). Soil types include: Type A which was characterized by PbA- Pembroke silt loam- 0-2% grade; Type B-D which were characterized by CrB- Cinder silt loam- 2-6% grade; and Type E which was characterized by MoB- Mountainview silt- 2-6% grade. Chemical analyses reveal compositional differences, some of which were directly correlated with residual fertilizer, and some were correlated with mineralogy. Samples were imaged and semi-quantitative compositional analyses of various mineral phases were obtained using the WKU Scanning Electron Microscope.

**Hoa Ho**

Mentor(s): Dr. Narasimhan

**Room: 163 B Time: 10:55 AM**

**Implementation of The Foundational Three Layers of OSA-CBM**

This paper describes the implementation of a powerful information exploitation system based

on OSA-CBM Standard for aerospace applications. The technologies that underpin this framework encompasses research in such areas as, information extraction, data mining, decision support, information integration, and distributed software systems engineering, besides the management of domain knowledge in aeronautics. The system permits just-in-time vehicle operational data to be automatically collected, and to be processed either on-board or off-board in order to determine the health or state of any equipment. The resulting and supporting data sets are sent to an integrated ground system for further processing and/or as maintenance system input. The system also improves the prediction and prevention of serious problems in vehicles by reporting on their health details using the collected data. Further, the system proactively offers suggestions on replacement components, when necessary. The technologies that encompass the system can be applied to not only aerospace applications, but also many other condition-based maintenance systems including such areas as, oil and gas industries and rotating machinery management in shipping industry.

**Vineet Karambelkar**

Mentor(s): Chad A. Snyder, Ph.D.

**Room: 163 C Time: 02:00 PM**

**Proposed Route to Cyclopenta[c]thiophenes via Activated Methylene**

The research presented will show the conversion of 3,4-bis(chloromethyl)-2,5-dimethylthiophene to a 5,5'-fused membered ring. The synthetic route presented will show novel conversion of a thiophene derivative to a 5,5'-fused ring system in two steps as compared to four steps previously reported in the literature. This valuable intermediate currently made, and proven by characterization, is one synthetic step away from a substituted cyclopenta[c]thiophene.

**Ganesh Latta**

Mentor(s): Wei-Ping Pan

**Room: 163 B Time: 10:40 AM**

**Thermal analysis of corn oil based biofuel**

The corn oil based biodiesel was synthesized by transesterification reaction. Thermogravimetry analysis (TGA) was used to study the thermal decomposition of petroleum diesel and biodiesel. The thermal decomposition decreases with increasing petroleum-diesel content in biodiesel. The exposure of biodiesel to air may cause the oxidation, which may degrade the fuel and affect the viscosity, acid value and peroxide value. The oxidation resistance and effect of antioxidant concentration was done by Pressure-DSC. The effect of BHT (antioxidant) concentration was observed in terms of increasing oxidation induction time (OIT). The OIT of biodiesel (B100) increases with increasing BHT content. DSC was used to study the effect of increasing petroleum diesel concentration on low temperature properties of biodiesel. The melting point of biodiesel decreases with addition of petroleum diesel. The moisture absorption and desorption was studied by using Sorption Analysis instrument. The moisture absorption of biodiesel increases with increasing humidity and it decreases with decreasing humidity. The biodiesel (B100) absorbed 0.09736% of moisture during increasing the humidity from 20% to 80% and desorbed 0.10187% on decreasing the humidity from 80% to 20%. The calorific value petroleum diesel and biodiesel was obtained from bomb calorimeter. The linear increase in calorific value was observed with increasing petroleum diesel content in biodiesel.

**Kali Pickering** Co-Authors: Wesley Cartwright, Eric Conte, Shing-Yi Suen

Mentor(s): Dr. Eric Conte

**Room: 163 B Time: 11:25 AM**

**Solid-Phase Extraction of Indicators Using Surfactant-Immobilized**

### **Glass Fiber Membranes**

Many dyes are used in large quantities in different industries, 10-15% of which are discharged into wastewater streams, which can cause environmental problems. We have investigated a technique for solid-phase extraction of pH indicators from aqueous solution. Hexadecyltrimethylammonium hydroxide surfactant is immobilized onto glass fiber membranes, which are cation-exchange membranes. Surfactant immobilization can be quantified by determining the change in carbon content on the membrane by CHN analysis. TGA analysis is used to determine the nature of the bonds between the surfactant and the membrane surface. Indicators are adsorbed onto the surfactant-treated membranes, which is quantified by UV-VIS analysis of the post-adsorption aqueous phenolphthalein solutions. Phenolphthalein is concentrated by eluting from the membrane using a small volume of an appropriate desorption solution.

**Kishore Polireddy**

Mentor(s): Dr. Nancy Rice

**Room: 163 B Time: 11:40 AM**

### **Searching for binding partners for the novel**

#### **PHKG1 variant, PhK $\gamma$ -181**

Phosphorylase kinase (PhK) is a hexadecameric holoenzyme made up of four different subunits in the arrangement ( $\alpha\beta\gamma\delta$ )<sub>4</sub> and has total molecular mass of 1.3MDa. Alpha and  $\beta$  are regulatory subunits,  $\gamma$  is catalytic, and  $\delta$  is an intrinsic molecule of calmodulin. PhK is a serine threonine kinase with glycogenolytic regulatory functions. Our lab has recently discovered that the  $\gamma$  subunit can be alternatively processed to produce a truncated form of 181 residues ( $\gamma$ -181). This variant of  $\gamma$  contains a phosphorylation site for PK-C, and its activity is influenced by this phosphorylation. We are using a LexA based yeast two hybrid system to identify potential binding partners for  $\gamma$ -181. In the present study we are cloning the human  $\gamma$ -181 in to a Lex-A DNA binding domain vector to use as "bait" for screening a human brain c-DNA library. Interaction between  $\gamma$ -181 and the brain c-DNA library proteins will be monitored using LacZ and LEU2 as reporter genes. Library plasmids isolated from the clones that show positive results on the yeast two hybrid screen will be sequenced to identify novel binding partners for  $\gamma$ -181.

**Thomas Reece**

Mentor(s): Dr. Phil Pegg

**Room: 163 C Time: 01:30 PM**

### **Culture Shock in International Students**

This presentation is a review of the extant literature on what is commonly referred to as "culture shock" specifically as it manifests itself in the international student population. The topics to be discussed are a brief overview of the course of acculturation, risk signs for culture shock, the unique problems faced by international students studying in the United States and what symptoms are commonly associated with culture shock. Finally, suggestions on how to help international students, with a focus on prevention, will be discussed.

**Shobha Lavanya Silparasetty**

Mentor(s): Dr. Sigrid Jacobshagen

**Room: 163 B Time: 02:15 PM**

### **Role of "animal-like cryptochrome" in *Chlamydomonas reinhardtii***

*Chlamydomonas reinhardtii*, a unicellular green alga, is a model organism to study the circadian clock. Cryptochromes are the blue light photoreceptors that entrain the clock in some organisms. The CPH1 protein of *C. reinhardtii* resembles the cryptochromes of the plant

model *Arabidopsis* but whether CPH1 entrains the circadian clock in *C.reinhardtii* is not known. Recent reports have suggested the existence of one more cryptochrome in *C.reinhardtii*, which resembles the cryptochromes of animals. However, the amino acid sequence of this protein shows even higher sequence similarity with the DNA photolyase of *Arabidopsis*. DNA photolyases are involved in the repair of UV light-induced DNA damage using the energy of blue light. An experimental design will be presented to isolate the protein and test its potential DNA photolyase activity. The results of this research will finally determine whether the so-called "animal-like cryptochrome" is actually a DNA photolyase.

**Daniel Starnes**

Mentor(s): Shivendra V. Sahi

**Room: 163 B Time: 09:30 AM**

**Biological synthesis of gold nanoparticles**

In this century the leading edge of technology is going to be on the exceedingly small scale of nanotech. Of particular interest are products made of gold nanoparticles, these nanoparticles have unique chemical and optical properties that could have a wide spectrum of applications. The commercial and or industrial production of gold nanoparticles would generate large amounts of toxic waste products. Therefore there is a need for "Green" synthesis of these nanomaterials. We have been screening various species in varying concentrations of chloroaurate (0-200mg/l) to determine their potential for plant synthesized gold nanoparticles. It has been found that Alfalfa (*Medicago sativa*) has the capacity to extract up to 40 mg per kg dry weight in gold form chloroaurate, currently the nanoparticle production qualities of Alfalfa are being investigated.

**Kristina Tackett** Co-Authors: Megan Bowling, Chad Groce, and Cheryl Davis

Mentor(s): Cheryl Davis

**Room: 163 B Time: 01:00 PM**

**Raccoons and opossums as potential reservoir hosts for tick-borne zoonoses in Kentucky.**

The incidence of tick-borne zoonoses such as Ehrlichiosis, Rocky Mountain Spotted Fever, and Lyme Disease has steadily increased in the southeastern U.S. in recent years. The goal of our study was to evaluate the potential for raccoons and opossums to serve as reservoir hosts for these diseases in Kentucky. Animals were trapped in Barren and Warren counties of Kentucky between June 2007 and January 2008. Four tick species were obtained from raccoons; *Dermacentor variabilis*, *Hyalomma* sp., *Amblyomma* sp., and *Ixodes* sp. *Dermacentor variabilis* was the only tick species found on opossums. Although *Ixodes scapularis* is the most commonly recognized vector for *Borrelia burgdorferi*, *Dermacentor variabilis* has also been shown to be a viable host for this pathogen. *Amblyomma americanum*, is the common vector for *Ehrlichia chaffeensis*. Tick numbers were high in the summer months but declined dramatically in the fall, and no ticks were recovered from October through December. To determine if the ticks were infected with zoonotic agents such as *Ehrlichia chaffeensis*, *Rickettsia rickettsiae*, and *Borrelia burgdorferi*, DNA will be isolated using Qiagen mini kits and PCR based detection methods will be employed. NIH Grant 2 P20 RR-16481 from the National Center for Research Resources is gratefully acknowledged.

**Anil Vinjamuri** Co-Authors: Dr. Darwin B. Dahl, Dr. Stuart Burris

Mentor(s): Dr. Darwin B. Dahl, Dr. Stuart Burris

**Room: 163 B Time: 08:45 AM**

**A selective study on the use of caffeine and theobromine imprinted polypyrrole surface electrodes**

Nanotechnology is a rapidly evolving field that demands new combinations of techniques

and methods that can aid in resolving challenging chemical issues. Solving complex analytical challenges require at a minimum, techniques that possess specificity, stability and sensitivity. Molecularly imprinted polymers (MIP) are proving to be very effective in the development of synthetic recognition systems.

This study examines the selectivity of a previously reported caffeine imprinted polypyrrole electrode using pulsed amperometric detection (PAD). The selectivity was examined using theobromine as a competitive analyte. A theobromine MIP was also constructed to investigate the ability to determine theobromine in the presence of caffeine. An alternative detection technique using impedance measurements was also investigated and will be reported as a potential improvement over PAD detection. The recognition sites of the respective MIP's appear to possess sufficient binding affinities to enable quantitative determination up to equimolar amounts of competitive analyte

**Ashley Wint**

Mentor(s): Lawrence Alice

**Room: 163 B Time: 09:00 AM**

**Genetics Diversity of Invasive Wine Raspberry**

Invasives are not only an economic expense, costing Americans billions of dollars annually; they are also an increasing threat to biodiversity. It is believed that invasive species are a leading cause of recent species extinctions globally. Most invasive plants have reproductive systems which aid in rapid spread of the species. Therefore, it is important to understand the reproductive systems of these species as well as their genetic diversity, in order to determine how to control them. To study the occurrence of plant invasiveness, *Rubus* was selected because this genus includes several native and invasive species. *Rubus phoenicolasius* (invasive) and *Rubus occidentalis* (native) were chosen to determine the genetic diversity of an invasive and native species. These species are very closely related, with similar chromosome numbers and reproduction modes. Samples of these species were collected across the eastern United States. DNA was extracted from these samples to be used in Randomly Amplified Fingerprints (RAF) analysis. The genetic differences found in this analysis will be quantified by determining the amount of the polymorphisms present in the species. The results of this analysis will be presented. It is expected that invasive *Rubus phoenicolasius* will have less genetic diversity than native *Rubus occidentalis* due to the founder effect.

**Silpa Reddy Yaramala**

Mentor(s): Louis-Gregory Strolger

**Room: 163 C Time: 01:00 PM**

**Managing and Scheduling Observations on the Robotically Controlled Telescope**

Robotically Controlled Telescope is the 1.3 meter (50 inch) telescope at Kitt Peak, AZ that is now an autonomous robot, designed to act as the "best-trained observer", efficiently scheduling and executing observations of various targets under various astronomical and mechanical constraints. My work has been in developing an underlying database to manage targets, requests, and constraints. I have also contributed to developing two interfaces for RCT partners to post observing requests to the telescope database, the first an intuitive php form, and the second, an extensible markup language-based interface called RcTML. I will present the details of how the interfaces and database are used to schedule time on the telescope, and describe work in progress in extending the scheduling from its current night-by-night limitation to weekly and monthly calendars.

**Aaron Young**

Mentor(s): David Zimmer

**Room: 163 B Time: 08:30 AM**

### **The Demand for Long-Term Care Insurance**

Long-term care insurance was introduced about twenty years ago to insure against rising nursing home costs. The product has evolved over the years attracting new enrollees and also the attention of the United States Government. In 1996, with the passage of the Health Insurance Portability and Accountability Act (HIPAA), long-term care insurance became partially tax-deductible positively affecting demand. To explore these trends I used the Medical Expenditure Panel Survey. Some of my results corroborate findings from previous studies, while some of my conclusions offer new insights. One of the most interesting trends I find is the importance of demographic characteristics, especially race. The paper proceeds as follows. In section I, I will discuss long-term care insurance; explain definitions, and general concepts. Section II will explore some of the previous conclusions that were met on the topic. In Section III I will describe my data and empirical findings. The last section offers the concluding remarks.

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### **Undergraduate Presentation Abstracts**

**Leslie Abell** Co-Author: Dr. Jerry Daday

Mentor(s): Dr. Jerry Daday

**Room: 113 Time: 11:25 AM**

#### **The Effects of Gender on Small Businesses in Kasigau**

Small businesses are seen as an agent of economic growth in developing countries. Recently, the idea of micro-lending has received increased attention due to its promising effects on employment and personal economic growth in rural developing areas. However, we lack an in depth understanding of how male and female business owners differ.

In the summer of 2007, our research group from Western Kentucky University spent three and a half weeks in a small rural area of Kenya, Africa. This area called Kasigau was situated at the base of Mount Kasigau in eastern Kenya. During our time there, we surveyed the different villages around the base of the mountain and collected data on small businesses in the villages. The results from this data will be presented and discussed.

**Amber Adams** Co-Author: Brandon Colvin

Mentor(s): Dr. Nathan Phelps

**Room: 138 Time: 09:00 AM**

#### **Efficacy: Individuals can change the world**

In the next few years, the face of the planet is slated to change dramatically. Seven interconnected global revolutions define major areas that will both experience and exert stress in upcoming years. Much of the change that will ultimately result from these seven revolutions will be determined by how individuals, cities, nations, and even the global community choose to respond. This presentation will address how individuals acting alone or in groups can have a positive effect in shaping the future.

Engaging ourselves in efficacious activities begins on a local level, where the difficult task of dealing with the impacts of the seven revolutions affects us most directly. For most of us, Western Kentucky University, as an educational institution, provides access and connectivity to the rest of the world. WKU can be used as a conduit to turn our local attempts at efficacy into practical realities, while also enabling us to expand the reach of our activism past Bowling Green, Kentucky.

**Jake Adams**

Mentor(s): Dr. Ted Hovet

**Room: 163 C Time: 09:00 AM**

#### **Impossible Itself**

My senior project has been 8 years in the making. I am finally bringing to completion a

documentary that I shot over a 5 year period about the November 19th, 1957 performance of *Waiting For Godot* at the San Quentin Prison. It's become a legendary performance for college drama textbooks in particular.

**Robert Anderson III**

Mentor(s): Scott Stroot

**Room: 112 Time: 02:15 PM**

**"The Gashlycrumb Tinies" By Edward Gorey.**

I directed, adapted, and wrote the script along with the help of my cast as we turned the short story into an original production. The production debuted as a part of the 2008 Student Play Festival at Gordon Wilson Lab Theatre from February 14-19. I have an archived video tape of the production that would be shown during the presentation along with my directing prompt book/script that was created during the rehearsal project. I have various pictures and sketches that would be presented as I discuss the workshop/rehearsal process. A review of the production was printed in the College Heights Herald on February 19th. Reviewer Eric Isbell was quoted as saying the following, "The plot centered around children whose names corresponded with letters of the alphabet, and the untimely demise that met them. I was officially nervous through this performance. The aura that surrounded the act was eerie at the best definition, superbly macabre at the worst..."

**Lacey Blankenship**

Mentor(s): Dr. Joseph Trafton

**Room: 113 Time: 10:25 AM**

**The Fallen Formula**

"The Fallen Formula" seeks to address the largely discussed theme of pride in the works of the writer C.S. Lewis. The paper addresses, in detail, the essential variables that lead to the ultimate sin of pride by examining Lewis', *The Great Divorce*, *The Screwtape Letters*, *The Problem of Pain*, *The Chronicles of Narnia: The Lion the Witch and the Wardrobe*, and *Mere Christianity*. This exploration presents the nature of the vice as a common indulgence of self-will—an indulgence that Lewis relates to the fall of man which initially separates man from God. Pride, as made clear by Lewis, is a very difficult vice to escape being it is the most universal and most basic sin of all. Humans often increase pride by seeking its seemingly opposite virtue, humility, only to encounter an increase in the vice itself. The paper searches and cites many of Lewis' characters and stories that deal with this struggle. Ultimately the paper concludes that the only way of escaping pride is to completely deny the self and cling to God.

**Brian Bloss** Co-Authors: Ed Rogers, John Cox

Mentor(s): Nathan Phelps

**Room: 163 C Time: 10:40 AM**

**The Revolutionary Final Frontiers**

This is a presentation examines the Seven Global Revolutions through the lenses of space and identity. We will present space, the final frontier, through issues related to natural resources and population, showing how they intertwine with knowledge and revolutions in technology, opening up worlds that used to be considered only science fiction. Additionally, we will examine how space has become the new battlefield of the 21st century, creating a unique lens for us to consider the implications of conflicts that may emerge as a result of the contested use of space. Finally, we will consider how a future immersed in 'star wars' can potentially be avoided through addressing issues of global governance. We will then examine the evolution of identity and identity crises that occurs among the changes that show to be progressing into the future. We will expand on the relationship between science and religion as well as the ethical conflict and moral questions that occur between them as technological advancements



progress. We will discuss the issues of artificial intelligence, stem cell research and genetic alteration in relation to the progress of mankind and the ethical concern that make up mankind's identity.

**Jonathon Blum**

Mentor(s): John Cipolla

**Room: 138 Time: 11:10 AM**

**Analysis of Debussy's Rapsodie pour Orchestre et Saxophone**

Claude Debussy's Rapsodie for Saxophone and Orchestra is a staple in the repertoire of the saxophone. This paper provides a brief historical background of the composer, explains how the Rapsodie came into existence, a broad overview of the theory behind the piece, and specific aspects about the performance of the work. This paper was written to fulfill the capstone requirement for all music majors at Western Kentucky University. This work was composed in 1904 and is considered an Impressionist composition, utilizing polytonality and melodic cells containing the interval of a third. The work was written for Elise Hall, an amateur saxophonist from Boston. Debussy used the melodic calls of street vendors that he heard in Paris to craft much of the melodic material, which gives the piece its Rhapsodic quality. The composer uses whole-tone scales extensively, which was the result of his thorough study of plain chant. Though the work is not technically challenging, the performer must pay close attention to the style and phrasing in order to maintain the piece's character. The significance of this work is in the way that Debussy created a way of taking "raw" unpolished urban folk music and using it to create a complex artwork.

**Vince Bonetti** Co-Authors: Katie Beard, Mattea Carver, Kyle Payne, Blake Garner, Don Burton, Jason Boeck, Kendra Howard, Matthew Jones, Adam Heugel, Lance Coulter

Mentor(s): Dr. Sandra Ardrey

**Room: 163 A Time: 09:45 AM**

**Kentucky's Budget Crisis and its Effects on Postsecondary Education**

In this presentation we will argue that the Kentucky state budget crisis will have a detrimental effect on postsecondary education. The current 3% reduction in funding for universities has already placed an undue burden on students and families alike at Western Kentucky University and across the Commonwealth. It is the case that Kentucky's proposed additional 12% cut to postsecondary education, which is equivocal to a 9.9 million dollar yearly reduction compared to 2007's annual state funding at Western Kentucky University, will reduce state funding to postsecondary education levels present ten years ago. Through engaging Western Kentucky University students and faculty alike, this presentation will demonstrate that political efficacy can and will make the difference needed to change the seemingly bleak future of Kentucky's postsecondary education to that of a state where "Education Pays."

**Chelsea Brunner** Co-Authors: Heather Monohan, Samantha Kramer, Andrew Wulff

Mentor(s): Andrew Wulff

**Room: 163 A Time: 08:30 AM**

**Diamond Caverns Drip Water Analysis; Preliminary Results**

This study focuses on spatial and temporal variations in the chemistry of cave drip waters collected from Diamond Caverns, KY. Samples were collected from fifteen sample sites extending approximately 0.5 miles from the mouth of the cave. A base chemical composition for drip waters was established, and outlier compositions compared with external and interior environmental variables. Spatial parameters include CO<sub>2</sub> levels and electrical conductivity measured in the caverns, groundwater flow, and external environmental conditions such as proximity to pavement and agricultural areas. Temporal parameters include seasonal

fluctuations (e.g. precipitation, temperature) and the impacts of seasonal tourism on cave environment. Sample collections were scheduled approximately every 2-3 weeks, with the majority of drips off the end of speleothems. Samples were preserved with nitric acid and refrigerated to prevent microbial growth. Titrations were performed to determine alkalinity, which demonstrates the capacity of the sample to neutralize acid by way of carbonate content. After every 8-10 collections, archived samples are analyzed at the ERTL facility at the University of Kentucky, using OES-ICP-MS. Compositional data was examined for each site over time, from front to back of the cave, and as a consequence of rain events relative to the drought conditions of 2007.

**Jason Burnett**

Mentor(s): Tom Bartel

**Room: 163 C Time: 08:30 AM**

**Sweet Dysfunctions**

I am intrigued by the implication of sugar coating, and the lengths people will go to “sweeten up” that which we find hard to embody, for example same sex marriage, abortion, and broken families.

My current work is an exploration of identity influenced by gender, time, and domestic objects. I incorporate all of these through research regarding suburban imagery and materials. Suburbia is more than a structural layout of homes; it is a network of interpersonal relationships. The home has always been symbolized as a functional system that thrives off of the dysfunctional material inside. It’s these dysfunctions that provide a foundation to the people we become.

My art practice using the ceramic sculpture refers to my lifestyle and struggles of social acceptance. Handbuilding and image transfers are many of the chosen techniques I use. I’m inspired by the satirical ceramic sculptures of Mark Burn’s as well as the content and form of David East. Other inspiration comes from Libby Rowe’s use of mixed media of gender charged objects.

Through all the above, I am constantly re-defining who I am. I use my discoveries and “sweeten them up” in order for viewers to digest what they may find unnerving.

**Greg Capillo**

Mentor(s): Nathan Phelps

**Room: 112 Time: 08:30 AM**

**Food and Corporations**

Everybody needs to eat. Every body has needed to eat. Every body will need to eat. That is why food provides a very powerful lens through which to view the 7 Global Revolutions our class will examine. In this segment of the presentation, we will examine how these 7 Revolutions of population, resource management, technology, information, economic integration, conflict, and governance will affect how we feed ourselves.

In our segment of this discussion we will focus on the role of multinational corporations on how we get our food, from where, and at what cost. We intend to show the incredibly complex potential this interaction has for our ability to feed the hungry.

In our presentation, we hope to show how fundamentally these revolutions will change the way human beings live on the planet by focusing on one of the necessities for life, food. We hope to show that a can of pineapple and the decision to consume it have far reaching implications way beyond calories and vitamins, using the immediacy and the commonality of the matter at hand to make the discussion of the whole presentation more relevant and tangible.

**Mattea Carver**

Mentor(s): Dr. Patricia Minter

**Room: 163 C Time: 10:55 AM**

**A historical interpretation of the Supreme Court under the leadership of  
Chief Justice John Marshall**

The culmination of this particular research will analyze U.S. Supreme Court Chief Justice John Marshall's judicial opinions with economical and historical perspectives. Special emphasis is placed upon Marshall's motives for promoting the interests of the national government over the interests of the individual states and their respective governments. Overall, it can be successfully argued that Marshall's influence was not to promote the individual branch of the federal judiciary, but rather promote the necessity of a strong national government based upon an equally strong constitution. The research utilizes primary and secondary sources including Marshall's judicial opinions, his personal correspondence, and his autobiography. The overall purpose of the research seeks to achieve a sense of Marshall as a historical actor rather than the American iconic figure one generally associates Marshall as being.

**Joseph Colvin** Co-Authors: Christy Beyke, Bradley Morgan  
Mentor(s): Prof. Nathan Phelps

**Room: 112 Time: 11:10 AM**

**Introduction to the Seven Revolutions**

Within the next 25 years, computer manufacturers will have developed a computer with more processing power than the entire human race combined, and it will only cost \$1000. This may sound like science fiction, but according to the research of established futurologists, this nearly unfathomable feat will be realized within our lifetime. To address this and other equally astonishing and terrifying aspects of our future, we will introduce the Seven Revolutions analytical model – the structural basis for our Seven Revolutions Honors Colloquium class. The Seven Revolutions model examines potential difficulties and developments that the world will face in the next 25 years by approaching global issues from seven different interconnected areas: population, resource management, technology, information, economic integration, conflict, and governance.

We will present a video that will feature interviews with students, faculty, and staff at WKU, as well as graphics, facts, and other clips that will briefly explain each of the Seven Revolutions and how each revolution is important and intertwined with the others, familiarizing the audience with the Seven Revolutions format, while staying rooted in our local experience at WKU, in order to provide a context for the other presentations in this session.

**Kyle Cook**

Mentor(s): Dr. Mike Carini

**Room: 163 C Time: 11:10 AM**

**Understanding the Variability of Blazars Across the Electromagnetic Spectrum**

For the past 7 years Western Kentucky University has conducted research on the variability of approximately 50 members of a class of astronomical objects called Blazars. These objects are host to range of interesting phenomena that have proven difficult to explain. The formation of a large database, like that being assembled at WKU, will be an essential tool in developing a complete understanding of these objects. The collected data are also combined with that of an international team of corroborating partners working at other wavelengths to form an understanding of the variability of Blazars across the electromagnetic spectrum. My role in this research has been the collection of optical data regarding the long term (days to years) variability using a network of telescopes positioned at different locations on the globe. The collected data is then included in the main database for use by WKU and its partners in answering crucial questions, including the relationships between the variability in different portions of the electromagnetic spectrum.

**Brian Cooper** Co-Authors: Dr. Alex Barzilov, Dr. Ivan Novikov, Michael Simpson  
Mentor(s): Dr. Alex Barzilov, Dr. Ivan Novikov

**Room: 113 Time: 08:30 AM**

#### **Underwater Threat Detection Using Pulse Neutrons**

Explosives pose threats to the environment as well as to humans. They can be found all through out many different bodies of water. In order to detect these underwater threats neutrons will be used to irradiate the materials of a possible threat. A neutron generator will emit neutrons and irradiate any materials that are in question. Once being irradiated, the materials in question will emit gamma-rays of specific energies. Through spectral analysis of these gamma rays the materials of the threat in question will be determined. A main concern for this project is how the neutrons and gamma-rays will propagate through water. Due to the density and much higher cross-section of hydrogen and oxygen than that of air the neutrons and gamma-rays will be highly dampened and will not travel as far. We are utilizing Monte Carlo N-Particle code in order to first calculate if the neutrons will travel far enough underwater in order to irradiate the materials in question. Our calculations thus far indicated that within 0.5 meters from the target the neutron generator will be sufficient to irradiate the materials. Further simulation will be done in order to asses the propagation of gamma rays in water.

**Cody Curtsinger** Co-Authors: Ryan Simpson

Mentor(s): Dr. Kevin Schmaltz

**Room: 163 C Time: 09:45 AM**

#### **Green Energy Consulting**

Green Energy Consulting, a senior design team from Western Kentucky University, has been given the task of completing a project which will nclude designing and building a system to produce bio-diesel that meets ASTM specifications (ASTM D6751-07a) from waste vegetable oil from dining facilities on Western's campus for use by Western's Agriculture Department. The dining facilities at Western Kentucky University produce 1000 gallons of waste vegetable oil each month while school is in session, and the consumption rate of the Agriculture Department is expected to be around 9000 gallons per year. Major goals of the design include having enough bio-diesel production to satisfy the consumption needs of the agriculture department as well as having the capability to consume all of the used vegetable oil from Western Kentucky Universities dining services. By using waste vegetable oil to produce bio-diesel, there will be a reduction in the operating cost of the Agriculture department's diesel fleet, while at the same time the cost associated with disposal of used vegetable oil will be eliminated or greatly reduced. However, the major outcome of this project is to begin the transition at Western Kentucky University from fossil fuels to renewable sources for its energy needs.

**Christopher Davenport** Co-Authors: James Lodmell, Phillip C. Womble,  
Alexander Barzilov, Jon Paschal, Robert Hernandez, and Kyle T. Moss

Mentor(s): Phillip C. Womble

**Room: 163 A Time: 08:45 AM**

#### **Unmanned ground vehicles to defuze IED's**

Improvised explosive devices (IED's) are an important concern to coalition forces during the conflicts in the Middle East. These devices are responsible for nearly 2000 casualties, and injured more than 20000 American armed forces in the Middle East. There are no general guidelines for defuzing these devices since they are made out of items available to the designer. These explosive devices can be made from things such as standard military ammunition and fertilizer compounds. They can be detonated with common electronic devices such as cell phones, and garage door openers. There are currently solutions to combat this

problem in the Middle East and urban areas, but as we will discuss they can be very dangerous to our troops or are very expensive. There is a great need for a low cost solution to neutralize these IED's. At the Applied Physics Institute we are building a single function disrupter robot whose sole purpose is to neutralize these IED's, and do it at a cost that makes it relatively disposable. We are modifying the controls of a toy remote control car to control it wirelessly using WI-FI (IEEE 802.11), or tethering the vehicle with an Ethernet cable (IEEE 802.3). Also, the robot will be equipped with a high velocity fuze disrupter designed to defuse to IED without sending it into "high order" where it detonates. User software will also be available to allow for easy navigation through an onboard video camera and aiming of the disrupter using an onboard laser sight. This robot utilizes commercial-off-the-shelf (COTS) components which allow a relatively low cost. Currently, similar robot systems have been deployed in Iraq but their methods of operation are such that they are impractical to use in non-combat situations. We will discuss our design and possible deployment scenarios.

**Ronson Elrod**

Mentor(s): Andrew Wulff

**Room: 163 A Time: 01:45 PM**

**External Morphology of Geodes**

A suite of 89 geodes were collected from 4 sites in central Logan County, Kentucky. Three "sites" were traverses ranging in length from 100-250 meters, while one "site" was located on the floodplain of a small stream. The minerals observed in the geodes include: quartz (clear and smoky variety), chalcedony, and calcite. Several of the geodes have possible pseudomorphs of quartz after fluorite (or some cubic mineral), dusty coatings of cryptocrystalline quartz, both of which suggest late-stage alteration of primary mineral assemblages. The geodes collected are also characterized by different morphological characteristics. Many studies have been done on the mineralogy and textures of Kentucky geodes, but little has been published concerning the exterior morphological characteristics. In this study, three endmember external morphologies have been identified: (1) concentrically banded, (2) plated, where rounded disks are stacked next to each other, (3) and a pitted texture with angular edges. Intermediate morphologies lie between endmembers 1 and 2, and endmembers 2 and 3. It is hypothesized that the external morphology of these geodes is a function of either mineralogy, petrogenesis, or the amount of time the external surface has been weathered from the host rock and been exposed to the elements.

**Austin Fatkin**

Mentor(s): Richard Gelderman

**Room: 113 Time: 09:45 AM**

**What is responsible for activating Active Galaxies?**

We report on an observational investigation to determine the factors responsible for the existence of Active Galactic Nuclei (AGN), such as quasars, radio galaxies, blazars, or Seyfert galaxies. The ultimate energy source for AGN is the conversion of gravitational potential energy as material falls toward a supermassive black hole at the center of the host galaxy. Thus, an active galaxy differs from a normal galaxy in that there must be both a black hole and copious amounts of matter at the center of the host galaxy. We discuss the physical mechanisms by which a gravitational disturbance can cause sufficient amounts of gas to flow into a galaxy's center and become a potential fuel supply for AGN activity. Our study seeks to resolve the contradictory conclusions of previous investigations regarding the role of external versus internal processes as the cause of nuclear activity.

**Julia Freeman**

Mentor(s): Kinchel Doerner

**Room: 163 A Time: 11:10 AM**

**p-Cresol metabolism of *Rhodopseudomonas palustris* A8211**

Urban sprawl progression into rural areas is hindered by the fact distinct odors are produced from waste on livestock farms. Previous research, has found that the bacterium, *Rhodopseudomonas palustris*, could be the key to eliminating some of these odorants such as p-cresol and 3-methylindole, by degrading of such aromatic compounds. *Rhodopseudomonas palustris* A8211 was isolated using defined medium from Western Kentucky University's primary hog waste lagoon in the presence of 1mM p-cresol. Preliminary evidence suggest photosynthetic growth of this strain does not support p-cresol degradation. Growth curves were monitored on Sistrom's Minimal Media plus vitamins and minerals at 660 nm with addition of 1 mM of p-cresol or ethanol (as control) under aerobic dark conditions at 37°C. Cultures grew with doubling times of  $11.7 \pm 0.01$  and  $19.7 \pm 1.5$  hours and maximum growth yields of  $0.8 \pm 0.04$  and  $0.65 \pm 0.84$  A660, for ethanol and p-cresol cultures, respectively. Concentration of p-cresol was monitored by HPLC. Analysis of p-cresol medium concentrations is currently ongoing.

**Michelle Fusting** Co-Authors: Donna Kridelbaugh

Mentor(s): Kinchel Doerner

**Room: 113 Time: 01:45 PM**

**Isolation of a 3-Methylindole-Producing Bacterium From Hog Waste Lagoon**

With an increase in animal production closer to populated areas, animal odorants are becoming a rapidly rising concern. 3-Methylindole (3-MI) is an odorant produced by bacteria in animal waste. Isolation of a 3-MI producer would allow for research into the production of this malodorous compound. Preliminary evidence suggested addition of iron III to hog waste lagoon enrichments increases 3-MI production. A sediment sample was collected from WKU's primary hog waste lagoon, blended in a Waring blender for 5 minutes, and inoculated into both anaerobic tryptone-yeast extract and semi-defined media, each with and without iron III. Samples were serially diluted in each medium and transferred monthly. Samples were further enriched by treatment at 70C for 30 minutes. The presence of 3-MI production in samples was periodically tested by HPLC. Cultures positive for 3-MI were plated on solid growth media and to date, have resulted in successful growth of ten strains. Preliminary analysis shows the presence of 3-MI in five. Work is ongoing to verify 3-MI production and characterize the bacteria.

**Ronald Gilley** Co-Authors: Michael E. Smith

Mentor(s): Michael E. Smith

**Room: 163 A Time: 01:15 PM**

**Good Vibrations: Developing an Accurate Model for Hearing Loss in Fishes**

Recent work has documented a rise in the intensity of anthropogenic sound in aquatic environments, but data on the effects of such sounds on fish is currently severely limited. Any model that would assist in predicting the effects of sounds on species of fishes, particularly those that are endangered or threatened, would be beneficial for future noise-exposure policy decisions. The Equal Energy Hypothesis (EEH) states that the same magnitude of noise-induced hearing loss is expected from various sound sources as long as they have equivalent total energy. While the EEH has shown some predictive value in mammals, we proposed to test the validity of the EEH in fish using three species. Goldfish (*Carassius auratus*), channel catfish (*Ictalurus punctatus*), and rainbow trout (*Oncorhynchus mykiss*) were chosen as model species to test the EEH because they represent a range of fish hearing capabilities. Fish were exposed to tones at specific combinations of intensity and duration, but of equal total energy, and then hearing was quantified using the Auditory Evoked Potential (AEP) method. All noise exposures resulted in threshold shifts (TS) in all three species, with hearing loss being much greater in hearing specialists. TS was not consistent across all sound exposures, suggesting that the EEH may have limited value in fishes.

**Jacob Glover**

Mentor(s): Eric Reed

**Room: 163 A Time: 09:30 AM****A Lesson in International Propaganda: The 1936 Olympics**

The paper is a research paper written for a History of Sports (391) class. In it, I look at the role sports play in international propaganda by examining Hitler's use of the 1936 summer Olympics as a tool to galvanize nationalist sentiment among Germans, and also by how the two weeks were window dressing to deceive the western world about actual conditions in Germany. The main sources for the paper are articles drawn from both the New York Times and the London Times to give a flavor of the feeling among mainstream America and Britain. Other sources include diaries from correspondents working in Berlin at the time, and also various books that have been written on the subject. Ultimately, I claim that Hitler utilized the Olympics perfectly, and they were pivotal in buying him time to prepare Germany for World War II.

**Erin Goad**

Mentor(s): Michael Kallstrom, Michele Fiala

**Room: 113 Time: 08:45 AM****The Journey**

"The Journey" is a musical suite for oboe, clarinet, bassoon, and mixed percussion. Written for the composer's honors capstone project, "The Journey" describes stages of a mountain hike. Inspiration came from the composer's love of nature. Movement one, "Morning Sunrise", depicts preparations for the hike with a dawn valley scene. Eager preparation is shown musically by constant moving notes and a syncopated melody. This moves directly into "Sun-patterned Leaves", movement two. Conga drums and a march feel paint the brisk trek through the forest. Movement three, "Darkening Pathways", moves into the depths of an unexplored cave. Haunting melodies, repetitive woodblock motifs, and carefully structured texture changes create a dark atmosphere. "Beneath Dark Clouds", movement four, resumes the forest hike, this time during an afternoon rainstorm. Sweeping clarinet melodies represent wind-blown trees, and staccato motifs in the other instruments represent raindrops. "Mountaintop Sunset", the final movement, depicts the mountain's summit as the sun sinks below the horizon. A majestic climax depicts the sun's setting rays. Fading into silence on a warm chord, the musical journey is complete. "The Journey" was performed and recorded by the composer and three student musicians in November, 2007.

**Kristin Goodin** Co-Authors: Jennie Danks, Martin Stone

Mentor(s): Martin Stone

**Room: 163 A Time: 11:40 AM****Conifer Decline at Baker Arboretum.**

The Baker Arboretum is a fifteen acre private garden established over fifteen years ago near Bowling Green serves as a horticultural teaching and research facility by students and faculty at Western Kentucky University. The horticultural collections specialize in dwarf conifers, Asian maples, and American and Asian dogwoods and their hybrids. Over the past few years, an apparently non-pathogenic decline has been seen in the growth of some conifers. By noting the position of the terminal bud scar, textural, and morphological changes in the stem, the growth of thirty-three specimens from four genera were noted for the past four years. Growth of thirteen taxa were significantly reduced for the most recent years, 2006 and 2007, compared to the previous year's growth, 2004 and 2005. Tests revealed soil pH between 7.0 and 7.6 which was elevated for these acid-loving plants. Base saturation for soil calcium was excessive (up to 92%) compared to magnesium. Irrigation water was did not contain excessive calcium but was low in magnesium and may be a contributing factor. Further research

will continue and a complementary in-ground study is underway on site using *Chamaecyparis* and *Picea*.

**Andrew Gott** Co-Authors: Schuyler G. Wolff

Mentor(s): Louis-Gregory Strolger

**Room: 112 Time: 10:25 AM**

#### **Nearby Galaxies Supernova Search II: Transients, and UFOs**

The Nearby Galaxy Supernova Search set out to find and measure supernova in a 500 square degree field along the celestial equator. Due to the focus on supernovae for cosmological investigations, many other transient phenomena were overlooked. Many are known phenomena, including variable stars and Kuiper Belt objects (comets and Pluto-like objects), but at least one set of phenomena, dubbed SUMOs (Slow-moving Unidentified Migratory Objects), remain unclassified. I will present these transient events, and their potential use in astronomical catalogs.

**Lisa Heartsill**

Mentor(s): John All

**Room: 112 Time: 01:30 PM**

#### **Examining Climate Variability and Land Management in Chile Using Remote Sensing**

The purpose of this study was to evaluate climate variability and change in the Patagonia region of Chile from 2000 through 2008. Given its location, the region is strongly affected by climate cycles such as El Niño and some land uses are more affected by these cycles than others. Results of this analysis can help inhabitants in the region reduce the negative social and ecological impact a predicted climate pattern can have, ensuring a better economic base and environmental protection. The data used was extracted from subsets of the region created from NASA's Moderate-resolution Imaging Spectroradiometer (MODIS) sensor. Vegetation indices were created for the images and compared on the basis of chlorophyll production and biomass. These subsets of different land uses were then compared to the average climate occurring at the time to find if there was a correlation between the vegetation growth, land management, and the climate cycles. Results showed that climate cycles had an impact on the vegetation growth in the region and different land uses impacted the magnitude of these impacts. This study can help societies prepare for future climate variability and change by illustrating the ecological impact of land use decision.

**Courtney Horton**

Mentor(s): Richard Gelderman

**Room: 163 A Time: 01:00 PM**

#### **Evidence of Galactic Cannibalism in Edge-On Disk Galaxies**

Galaxies change through time as the mutual gravitational attraction within clusters of galaxies causes the galaxies to interact with each other. The most extreme interactions are the mergers of two or more galaxies. We present the current observational findings and debates concerning disruptions of large edge-on disc galaxies due to gravitational interactions with satellite galaxies. Images of the gas and stars in the galaxy suggest that the degree of warping and asymmetry of the disk is due to the presence of nearby galaxies. The detection of streams of red, high-velocity stars may be attributed to the stripping of stars from nearby galaxies.

**Laura Huff**

Mentor(s): Jeff Fearnside

**Room: 163 A Time: 10:55 AM**

**What the Hack?**



The whole day I told myself it was just a car. They weren't after me again. They had no reason to be after me again.

That didn't stop me from being extra watchful on the way home, though. Sure enough, the car sat in the driveway of an empty house a few doors down.

Crouching down as low as I could, I made my way to the back of the car. I pulled out my stupid \$5 school-mandated planner, pulled off a smiley sticker from the sticker page and stuck it on the corner of the license plate.

That's when I saw it: another tiny smiley face, etched deep into the paint on the other side of the license plate.

I knew this car.

I also knew the only two people who could conceivably be in this car.

I crawled back the same way and took the straight path home so they would see me. No movement came from inside the car as I passed.

As soon I got inside the house, I collapsed onto the floor. Maybe I was paranoid. But if you had been arrested two years ago by the CIA for hacking, wouldn't you be?

**Savannah Hughes** Co-Authors: Donna Kridelbaugh. Kinchel Doerner

Mentor(s): Kinchel Doerner

**Room: 163 A Time: 02:00 PM**

#### **Hog Waste Lagoon Enrichments for p-ethylphenol Production**

Recently malodorants coming from animal production units have been the source of public complaint. While these compounds composing animal odors remain unidentified, p-ethylphenol has emerged as a potent odorant from both swine and beef productions. In an attempt to define conditions for growth of microbes capable of p-ethylphenol production, samples taken from WKU's primary hog waste lagoon were homogenized for 10 minutes in a Waring blender and inoculated in growth media containing potential precursors of p-ethylphenol. These precursors were (@1ml each): 10mM indole acetic acid, 10mM p-coumaric acid, 10mM ferulic acid, 1mM tryptophan, or 1mM tyrosine. Samples were drawn from each culture weekly for five weeks and then analyzed by GC/MS, HPLC, and DGGE. GC/MS analysis quantifies production of p-ethylphenol, phenol, 3-methyl indole, and 4-methylphenol. HPLC analysis quantifies fatty acids such as acetate, propionate, and butyrate. Denaturing gradient gel electrophoresis (DGGE) indicates the change in microbial populations. Initial pH of the lagoon sample was 7.79 and after 3 weeks of incubation all cultures are near neutral pH. By monitoring p-ethylphenol production we hope to gain insight to culture conditions, which allow growth of microbes producing this malodorant. Future work would include using these conditions for isolation of these strains.

**Lauren Jennings**

Mentor(s): Dr. Sharon Mutter

**Room: 112 Time: 11:25 AM**

#### **Associative and Rule-Based Processes in Younger and Older Adults Causal Learning**

This study used a concurrent patterning discrimination task to examine how age can have an impact on different types of casual learning. Specifically, we studied the influence on associative and rule-based processes. During our experiment, young adults and older adults simultaneously learned positive and negative patterning discriminations. Past research has concluded that some adaptive processes can account for simple discriminations. However, configural learning processes are essential to solve the patterning discriminations. With a subsequent generalization test, the subjects predicted the training and novel cues for the partial patterning problems. The patterning rule that a compound and its elements predict opposite outcomes is demonstrated in the predictions for novel cues that are opposite of the similar

training cues. This allowed us to infer that the process of configural and rule-based learning is not equal in older and younger adults. Based on the results, we categorized the young adults into two categories: high discrimination mastery group and medium mastery group. Young adults in the high discrimination sector often showed rapid configural learning, verbalized the patterning rule and used this to generate predictions. The medium mastery group achieved the configural learning but did not verbalize the patterning rule. Older adults were unable to use configural or rule-based processes to solve the patterning discriminations.

**Jeanne Johnson**

Mentor(s): Michelle Trawick, Alex Lebedinsky, Bill Davis

**Room: 138 Time: 08:30 AM**

**The Price Elasticity of Kentucky Universities**

The purpose of my research was to estimate the demand equation for tuition of higher education using econometrics. I estimated my regression with panel data collected from 2001-2005 and with the following variables: Enrollment, Per Capita State Appropriations, Per Capita Expenditures, Average Entering ACT scores, and Dummy variables for each KY public university. Using two-stage least squares regression I was able to not only calculate the demand equation for tuition, but also the price elasticity of Kentucky Universities.

**Alecia Johnson**

Mentor(s): Dr. Rick Grieve

**Room: 113 Time: 10:40 AM**

**Assessing Male Body Image**

The objective of the present study is to better understand how social desirability plays a part when completing the Muscle Dismorphia Inventory (MDI). By correlating the MDI with the Marlow Crowne Social Desirability Scale (MCSDS), the amount of social desirability in the participants can be compared with the importance of the ideal male body image. The participants will consist of college-age males who agree to take an online survey. In order to disguise the purpose of the study, the survey will consist of the items from the MCSDS randomly inserted into the items of the MDI. The results will be analyzed in order to determine the relationship between the need for social acceptance. The implications of the findings will be discussed.

**Skylar Jordan**

Mentor(s): Dr Patricia Minter

**Room: 113 Time: 01:30 PM**

**In the Land of Cotton: White Student Reaction to Integration at the University of Mississippi, Fall 1962 - Spring 1963**

In the fall of 1962 James Meredith made history by becoming the first African American student to register at the University of Mississippi. However, this was only half the story. My research sheds light on the white students of Ole Miss during the fall of '62 and spring of '63, highlighting their involvement in the violence of 29-30 September 1962, subversive organizations aimed at sabotaging and reversing the integration process, their treatment of Meredith himself, as well as student support for integration and their fears and worries - both racially based and academically based - of what integration would hold for the future of Ole Miss.

**Sarah Kapley**

Mentor(s): Jeffrey Samuels

**Room: 113 Time: 02:15 PM**

**Buddhism and Emotions**

Buddhism, as a religion, attempts to alleviate and eliminate individual suffering. While

Buddha teaches that overcoming attachment is central to achieving liberation from suffering and reincarnation, Buddhist doctrine also necessitates cultivating compassion in obtaining enlightenment. The emphasis on non-attachment along with possessing universal compassion creates a complex boundary between emotions that are necessary in obtaining enlightenment as opposed to emotions that cause suffering and hinder enlightenment. The Buddha remains central to this paradox with stories depicting a level non-attachment that allows him to abandon his family along with a level of compassion that motivated his teaching career of forty years. Focusing on the Buddhist materials written in Pali, I will attempt to analyze the paradoxical and conflicting relationships between emotions and the need for non-attachment in relation to suffering and obtaining enlightenment.

**Megan Kelley**

Mentor(s): Yvonne Petkus

**Room: 113 Time: 09:00 AM**

**90% Microbial Mass**

Just as our physical bodies bear the scars and stretches of growth, this body of paintings is no different. It can be measured in the fascinations of disease, catalogued through the frameworks of perception, and weighed with the obsession of human experience. "90% Microbial Mass" is an artist lecture examining the influences and investigations that further and lead to new work, and a glance into the 10% of human cells that create it.

**Matthew Lodmell** Co-Authors: Phillip C. Womble, Doug Harper, Jon Paschal, Joseph Howard, and Mike Simpson

Mentor(s): Phillip C. Womble

**Room: 113 Time: 02:00 PM**

**Design of a New Control System for an Electronic Neutron Generator**

Electronic neutron generators (ENG) have a wide variety of applications ranging from small applications such as oil-well characterization, bomb detection and environmental remediation to large power fusion power plants as the International Thermonuclear Experimental Reactor (ITER) project. An ENG works by having a filament containing deuterium (D) heat up to produce D<sub>2</sub> gas. This gas is then ionized and sent through a voltage potential to accelerate the deuterium towards a tritium target. The deuterium and tritium undergo fusion producing an alpha particle and a neutron. The ITER project uses this in order to generate heat and in turn, to generate electrical power.

The neutrons can penetrate through metals, and cause materials to give off radiation. For this reason, ENG's are great for the purposes of environmental remediation. The radiation that is emitted is characteristic of the material in which it originated. This information has been used in the PELAN project to determine the contents of unknown materials.

We are currently refurbishing ENG's which were built in 1997 and they use electrical components which are no longer available. For this reason the existing system will be updated to have a more flexible control system. The new system will incorporate Lab View as the control software for the device. We will also design an X-ray unit added to the setup in order to more accurately tell the contents of the unknown container. By using the neutron generator in cooperation with the x-ray machine, the new project will be able to more accurately detect the contents of an unknown container.

**Benjamin Lowery**

Mentor(s): Deborah Logan

**Room: 138 Time: 09:45 AM**

**Dialectics**

This essay explores the opinions expressed by the authors of ancient dialectical texts on the

natures of death and knowledge. Three texts are examined, including Plato's "Apology," Confucius's "Analects," and the "Bhagavad-Gita." The author concludes that while similarities exist in the respective works, they ultimately reach separate conclusions. Plato's "Apology" takes an ambiguous stance, Confucius's "Analects" places responsibility on the shoulders of the individual, and the "Bhagavad-Gita" plays the "God" card. If these pieces are accurate representations of their respective cultures, then their theories of death and knowledge tell us much about those cultures. The Greeks are moving from the supernatural to the secular, the Chinese seek only that which is natural, and the Indians are dependent on the supernatural to give meaning and resolution.

**Joseph Marquardt** Co-Author: Jeffrey Marcus

Mentor(s): Jeffrey Marcus

**Room: 113 Time: 11:40 AM**

**Randomly Amplified Fingerprints (RAF) and Their Applications to  
Butterfly Population Structure**

Randomly Amplified Fingerprints (RAF) is a technique for studying genetic variation that is related to Randomly Amplified Polymorphic DNA (RAPD), but is highly repeatable and easily scored on a fluorescent automated DNA sequencer. We first used this technique to study the population structure of three species of Junonia butterflies in Florida, USA. These three species include one mangrove-specialist (*J. evarete*), one specialist on a highly frost-sensitive plant (*J. genoveva*), and one habitat generalist (*J. coenia*), resulting in partially overlapping distributions. We found, using RAF, in combination with conventional DNA sequencing of mitochondrial and nuclear genes, that there has been extensive hybridization and introgression between these species. RAF is therefore very useful in identifying population structure and for finding evidence of gene flow. We are now implementing this technique in the Upper Green River Conservation Reserve Enhancement Program (CREP) district in South Central Kentucky, USA to look at the effects of habitat fragmentation and corridor restoration on gene flow in butterflies. Samples of several species of butterflies with different sensitivity to fragmentation are being collected from different locations in the watershed for analysis.

**Daniel McBride**

Mentor(s): Rick Grieve

**Room: 112 Time: 10:55 AM**

**Relationships Between IQ Test Scores and Scores on the  
Bender Gestalt Visual Motor Test**

This study seeks to examine possible correlations between IQ test scores and scores on the Bender Gestalt Visual Motor Test. This relationship will be explored using archival data of former clients from Dr. Frederick Grieve's private practice. Previous research by Koppitz (1958) and Breen et al. (1985) suggests that there is such a (positive) correlation between scores on the Bender Gestalt Visual Motor Test and certain subscales of the Wechsler Intelligence Scale for Children (WISC) and the Wechsler Intelligence Scale for Children—Revised (WISC-R) including PIQ, FSIQ, VIQ, Arithmetic, Picture Completion, Picture Arrangement, Block Design, and Object Assembly. Scores on the Bender Gestalt Visual Motor Test will be compared with scores on the Wechsler Adult Intelligence Scale (WAIS), the Wechsler Intelligence Scale for Children—Revised (WISC-R), and the Peabody Picture Vocabulary Test (PPVT), along with available subscales for each of these tests. Results and implications of the results will be discussed.

**Joshua McCombs** Co-Authors: Stuart Cook, Jason Birkhead, DJ Thompson

Mentor(s): Dr. Chris Byrne, Joel Lenoir

**Room: 163 A Time: 11:25 AM**

### **Pour Cup Orientation Assurance System**

The purpose of this senior project is to develop a series of systems that will aid in increasing the efficiency of the brakes drum manufacturing process. The Pour Cup Orientation Assurance System is actually 3 independent systems working together to achieve this goal. The first component is the Pour-Pot Mounting Fixture. This fixture will allow the operator to repetitively mount the pour-pots square with the robot adapter to within 1/16". The second component of this project is the Pour-Pot Positioning System. This provides a method of periodically measuring the position of the pour-pot relative to its beginning position. If the pour-pot is jarred from its initial position, the Positioning System will alert the operator to check the pot and possibly replace or modify it. The third component of this project is the Pour-Pot Scraper. This device provides a solid edge for the robot to scrape slag from the pour-lip. By increasing the precision when installing the pots, monitoring the pots position during operation, and decreasing the amount of slag on the pour-lip after each cycle, we hope to increase the overall efficiency of the spin casting process.

**Anthony Merriam** Co-Author: Joshua Chelf

Mentor(s): Dr. Collett

**Room: 112 Time: 09:15 AM**

### **Circuit and EM model integration for core loss calculations in transformers**

Conventional computer modeling of electric power transformers involves making an educated guess of the expected magnetic effects and integrating that guess into the model. While this technique is often reasonably successful, there is significant room for error, especially when dealing with an entirely new transformer design. Our project utilizes a recently introduced capability of computer models, the integration of a circuit and electromagnetic model, to entirely remove the need for this guess, allowing an accurate calculation of the core power losses in the transformer. We hope to apply this technique to a recently developed transformer concept that will increase efficiency and reduce material costs. This technique has been applied with great success to electromechanical systems; however, there are significant challenges in applying it to a power transformer, with elements that rely solely on magnetic effects which are not easily accounted for in a circuit model that functions on the principles of electric currents.

**Edgar Mills**

Mentor(s): Edward Yager

**Room: 163 A Time: 09:15 AM**

### **Marx's Historical Materialism and Rousseau's Radical Pessimism and Their Political Thought: A Study of Theories of History**

For one to distinctly grasp political philosophies, one must understand thoroughly the background and general beliefs that lead to the premises of the argument. It is often hard for concepts, especially one as abstract as theory, to be completely understood under only the cover of its own perspective. For this reason, I believe that comparative study of certain aspects of political theory is crucial for a succinct understanding. I will show how Rousseau's pessimistic view on history and development leads to revolution of a positive liberal state, that does not represent an end of history, while Marx's more optimistic Historical Materialism will lead to a positive post-liberal state, that is the culmination of all history that precedes.

**Kyle Moss** Co-Authors: Phillip C. Womble, Jon Paschal, Ryan Moore Jr., Randall Haupt

Mentor(s): Phillip C. Womble

**Room: 163 C Time: 11:40 AM**

**Design of Electroencephalogram and Electrocardiogram Technology  
Including Wireless Integration for Use in Polysomnography**

We are researching and developing a sleep study apparatus which can be used in the comfort of the patient's home. Traditional Polysomnography (PSG) monitors many body functions including brain activity (electroencephalography), eye movement (electroculography), muscle activity (electromyography), heart rhythm (electrocardiogram), and respiratory effort during sleep. As part of this project, we are developing new digitally controlled circuits to monitor both brain and heart activity, EEG and ECG respectively. These circuits will be connected to a digital signal processing, (DSP), chip which will control the amplification of the input leads as well as provide analysis of the output signals using digital filtering techniques. Wireless technology such as Bluetooth® (IEEE 802.15) and Wi-Fi (IEEE 802.11) will be integrated in addition to internet and cellular connections to provide near real-time data to the PSG professional. The design of the system is focused on the ease of use for the patient, comfort of the patient, and validation of the data.

**Samantha Mudd**

Mentor(s): Karen Schneider

Room: 113 Time: 01:00 PM

**From Print to Projection: An Analysis of Shakesperian Film Adaptation**

William Shakespeare is one of Western civilization's most recognizable names. His works evoke strong reactions--awe, inspiration, boredom, confusion--from nearly every student and scholar. While Elizabethan theatre was originally his primary artistic outlet, the cinema has become his modern stage. Oftentimes movie-goers and scholars alike feel the need to separate the two genres and turn them into rivals. However, is this rivalry between film and literature justified? Does adapting Shakespeare from written word to film hurt his legacy or increase the approachability of his work? These questions and other issues with literature-film adaptation will be explored in this essay by analysing three Shakespearian adaptations: Lawrence Olivier and Kenneth Branagh's *Henry V* and Richard Loncraine's *Richard III*.

**Jason Musser** Co-Authors: Phillip C. Womble, Alexander Barzilov

Mentor(s): Phillip C. Womble, Alexander Barzilov

Room: 163 A Time: 01:30 PM

**Correction of Doppler Broadening in Gamma Ray  
Spectra for Light Nuclei**

The utilization of reactions wherein high energy neutrons ( $E=14$  MeV) and alpha particles ( $E=5$  MeV) impinging on lighter nuclei such as H, C, O, and N have been recently studied. The resulting gamma ray spectra from these elements have shown evidence of Doppler-broadening (i.e. the energy of the gamma ray is changed due to the Doppler effect). Doppler broadening in gamma ray spectra occurs when the gamma ray is emitted from a nucleus that is in motion. The conditions for Doppler-broadening are: 1) high velocity for the recoiling nucleus and 2) a half-life of a given excited state must be shorter than the time it takes the nucleus to slow down. For C and N, the lifetimes of the nuclear excited states are shorter than the time it takes these nuclei to stop. As part of this project, we have calculated the velocity of C under two nuclear reactions:  ${}^9\text{Be}(\alpha, n){}^{12}\text{C}$  and  ${}^{12}\text{C}(n, n'){}^{12}\text{C}$ . A correlation between the lifetime of excited states and Doppler-broadening was found. We can now reliably predict which gamma rays will have Doppler-broadening. The knowledge of broadening parameters allows the correct measurement of the gamma ray intensity. This will lead to more accurate characterization of these elements.

**Lydia Nelson**

Mentor(s): Dr. Anthony Harkins

**Room: 163 A Time: 10:25 AM****Bicycle Built for Two: A Democratized Sport's Craze Spinning Standards of Sexuality and the Woman's Sphere**

The 1890s gave way to women's conspicuous work force emergence, shrinking masculine and feminine spheres, and suffragists' clamors for equality, despite scientists' and sexologists' discussions of innate feminine "frailty." Literally responsible for paving the "new" woman's way was the safety bicycle's universal acceptance and popularity. For the first time, sport was gender-neutral, transportation was democratized, and women were granted independence – both from oppressive fashion trends and traditional demur behavior. Discarded corsets and traditional courtship were replaced with bloomers and century clubs. While Theodore Roosevelt's "strenuous life" reflected masculine fears of a literally effeminate "Gay" Nineties, women also battled sexuality stigmas. Among other criticisms, they were accused of using bicycle saddles for arousal purposes and faced disapproval of the emergent athletic "mannish" woman's supposed abandonment of familial responsibilities. Ultimately, while women's trailblazing produced significant social and political gains, also emerging in the United States from the bicycling craze was a sexuality stigma for female athletes, demanding requisite yet seemingly contradictory athletic proficiency and explicit femininity.

**Alana O'Bryan** Co-Authors: Timothy Hill, JR. and Hayley Reddington

Mentor(s): Frederick Grieve

**Room: 138 Time: 11:40 AM****Fantasy Sport Fans Identification**

Sports fans identify with the teams they follow but how identified they are depends on many factors: how closely the team is followed, how many teams are followed, etc. With this study, we are looking at how identified people are with their favorite team and with their fantasy sport team. To assess how identified a person is with a team, they will complete online surveys that assess identification with their favorite team and identification with their fantasy sport team. Then at the end of each survey we ask the person to name as many players as possible for that team. We hypothesize that people will follow their fantasy team more closely than their favorite team, and that they will be able to name more people on their fantasy team than on their favorite team. Therefore, we hypothesize that people are more identified with their fantasy team than with their favorite team. The implications of the findings will be discussed.

**Evelyn Oregon**

Mentor(s): Dr. Bruce A. Larson

**Room: 113 Time: 09:30 AM****Flow and Sports: Gender Differences between Men's and Women's Soccer**

The purpose of this study was to investigate whether any differences in flow, as measured by the Flow State Scale-2 (FSS-2) (Jackson, S.A., & Eklund R.C., 2004), exist between men's and women's soccer at the intercollegiate level. Participants for this study consisted of a population of 45 undergraduate male and female varsity soccer student athletes who voluntarily choose to participate in the study. The final participants in the study included 14 women and 19 male soccer athletes ranging in ages between 18 and 22. The independent samples t-test was used to determine if any differences existed between the two groups. Alpha for the test was set at the .05 level. The data analysis demonstrated that significant differences existed between male and female soccer players in their overall total flow scores as well as the balance/skill and the autotelic flow dimensions.

**Lorie Owen**

Mentor(s): Dr. Michelle Trawick, Dr. Roy Howsen

Room: 112 Time: 09:30 AM

**The Economic Impact of the Kentucky Green River Conservation Reserve Enhancement Program (CREP)**

This study examines the impact of the Conservation Reserve Enhancement Program (CREP) on fourteen Kentucky counties. The CREP program is an advancement of the Conservation Reserve Program (CRP) which began nationally in 1985. The primary intention of both programs is to improve water quality and reduce soil erosion. Thus, in order to stimulate conservation efforts, farmers are given an opportunity to remove land from current production and still reap financial benefits. When CREP was introduced to Kentucky in 2002, the program provided far more lucrative incentives than the parent program. In 2007 CREP underwent an amendment process that broaden the definition of eligible land and enhanced financial benefits. Economic theory would suggest that, holding everything else constant, increasing financial benefits and initiating incentives should increase the acreage enrollment. My specific goal is to determine if the enhanced program has had the theoretically and statistically predicted affect on acreage enrollment. Preliminary results suggest that in fact there was a statistically significant increase in the mean number of acres enrolled in conservation programs in Kentucky after 2002. A complete economic analysis includes both costs and benefits, thus water quality and erosion data are needed. These data are not accessible because of the newness of the program.

**Rory Padgett**

Mentor(s): Dr. Jan Garrett

Room: 112 Time: 01:45 PM

**The use of God in Rene Descartes' Meditations**

Thesis: René Descartes' use of the idea of God in his Meditations to verify extended objects outside of the mind is a rationally untenable position which, like every ontological proof for God, begs the question of God's existence.

Abstract: In this paper the ontological proof for God as set forth by Descartes to verify extended objects outside the mind, and indeed the very notion of an ontological proof for God, will be presented as a fallacious. The assertion that existence is an inherent part of perfection will be addressed as incorrect as well so as to further show the unreliability of the ontological proof of God. The implication based upon the classical theistic definition of God that He is not a deceiver will fall apart without this proof, leaving Descartes' theory of knowledge without a crucial leg needed for it to stand and allow the lack of an explanation as to where ideas come from to be presented as a major flaw in Descartes' Meditations.

**Lauren Parsons**

Mentor(s): Nancy Rice

Room: 112 Time: 01:00 PM

**Nitric oxide induced apoptosis of pulmonary myofibroblasts**

Idiopathic pulmonary fibrosis is an incurable disorder that originates from antiapoptotic or continuously proliferating myofibroblasts in the lung. Studies have shown that nitric oxide (NO) mediated mechanisms are involved in regulating pulmonary myofibroblasts. NO is a free radical gas which is produced from a group of proteins known as NO synthases (NOSs). Previously our lab has shown that treatment of pulmonary myofibroblasts with the NO donor S nitroso-N-acetylpenicillamine (SNAP) prevents proliferation of these cells. Therefore, the objective of this study is to determine whether the down regulation in growth is due to an induction of apoptosis or a transition into G0 state. To answer this question, myofibroblasts were cultured and treated with various concentrations of SNAP to see at which concentration,



if any, apoptosis is induced. A fluorometric TUNEL assay was then used to monitor the cells. Our preliminary results indicate that indeed even at low concentrations of SNAP, NO can induce apoptosis of pulmonary myofibroblasts suggesting modulation of NO as a potential therapeutic pathway for the treatment of pulmonary fibrosis.

**Ashley Payne** Co-Authors: Katie Beard, Kaylee Carnahan, Daniel Cline, Emilee Duvall, Rebecca Elrod, Alan Hudson, Thomas Jagers, Amanda Kidd, Adam Koestel, Andre Lewis, Kathleen Salyers, Shelby Simmons, Lyndsey Whitaker, Antony Wong  
Mentor(s): Dr. Jenifer Lewis (Communication)

**Room: 138 Time: 08:45 AM**

#### **Countdown to the White House: An analysis of the stages of the 2008 U.S. Presidential campaign**

The 2008 Presidential campaign has been historical in many ways. The campaign is the first in which viable female and African-American candidates are running. The campaign is also unique in that there is not an incumbent or sitting Vice President as a candidate for the first time in decades. As a result, the students in Seminar in Political Communication have worked together to create a timeline of the 2008 Presidential Campaign as a way of capturing the unique dynamics of this long process. The timeline itself is wall-sized and has been displayed during the semester in a main classroom in the Communication department to serve as a way to engage other students by keeping them updated on the progress of this stage of the campaign. This group presentation will display and review the timeline and will also discuss the events of the campaign as they relate to Trent & Friedenberg's (2007) Stages of Political Campaigns. The presentation will also review and analyze different strategies of communication between Democratic and Republican candidates for President. Finally, the presentation will examine the media coverage and framing of events in the campaign and of the political candidates.

**Emily Peeler**

Mentor(s): Michael Carini

**Room: 163 C Time: 09:15 AM**

#### **Variability of the High Redshift Blazar Q0906+6930**

At the heart of every galaxy lives a supermassive blackhole. In some galaxies, called active galaxies, material is spiraling into the black hole, and jets of material moving at the speed of light are being emitted perpendicular to the black hole. When one of these objects is oriented such that the relativistic jet is pointed directly at us, we see an object called a Blazar. Blazars are highly variable, and for the most part at low redshifts ( $z < 2$ )

Recently, a Blazar has been found at a very high redshift ( $z = 5.47$ ). Using the Robotically Controlled Telescope (RCT), I have undertaken a study of this object. This study is designed to identify and study the amplitudes and timescales of its variability at optical wavelengths and to compare them to the variability timescales and amplitudes of low redshift blazars.

**James Phelps** Co-Authors: Dr. Richard Gelderman

Mentor(s): Dr. Richard Gelderman

**Room: 112 Time: 11:40 AM**

#### **Exploring Causes of Active Galaxies**

Active galaxies produce enormous amounts of radiation from within concentrated area in the galactic nucleus, it is widely believed that this is a result of accretion onto a super massive black hole in the center of the galaxy. Previous studies have provided evidence for a direct relationship between active galaxies and the presence of visible gravitational disturbances of the host galaxy. Approximately 20% of these galaxies, however, seem to exhibit no cause of internal or external perturbation. We have created a modern sample of active galaxies using

data from the Sloan Digital Sky Survey; defining active galaxies according to placement on a BPT diagnostic diagram. By re-examining the statistical relationship between nuclear activity and gravitational disturbance we hope to develop a better understanding of the cause or causes of galactic activation.

**Brian Phillips**

Mentor(s): Dr. Jan Garrett

**Room: 138 Time: 09:15 AM**

**Becoming the Beast: The Moral Criticisms of the British Area-Bombing Campaign Against Germany in World War II**

World War II was the war to rid the world of dictatorial regimes that had no use for morality, both in regards to its own people and the people its armed forces conquered. Whereas the Nazi and Italy used whatever means necessary to subjugate their own people and the people under their control, the Allies were thought to have taken a moral high ground in their war-waging. However, this idea is being reexamined. Many scholars, such as A. C. Grayling, Jörg Friedrich and others, are starting to realize that the foundation for the British bombing campaign was on shaky moral ground. This paper will look briefly at the British area-bombing campaign against Germany. Next, this paper will examine Britain's actions against three major moral theories. The first theory of this paper is the Just War Theory attributed to St. Thomas Aquinas, and will specifically look at the sections on proportionality and non-combatants. Secondly, this paper applies Immanuel Kant's idea of the Categorical Imperative to the British bombing campaign. The third major theory, Utilitarianism, will also be applied to the campaign. Finally, this paper will look at the bombing campaign as cultural genocide.

**James Polcer** Co-Authors: Jonathan Quiton

Mentor(s): Jonathan Quiton

**Room: 138 Time: 10:40 AM**

**Confidence Intervals for the Ratio of Two Exponential Means**

In this talk, we consider the problem of statistical quality control based on the ratio of two population means. We restrict the discussion for two exponential rates, which are commonly used for modeling failure times of components, machines, or systems. Closed form expressions via the moment generation function (MGF) technique will be presented, and numerical examples will be shown using engineering data sets.

\*Mr. Polcer is a B.S. Mathematics Student and Dr. Quiton is an Assistant Professor at the Department of Mathematics, Western Kentucky University. The authors would like to acknowledge research support by the Kentucky EPSCoR Research Startup Fund RSF-031-06.

**Cole Puterbaugh**

Mentor(s): Joseph Trafton

**Room: 112 Time: 09:00 AM**

**C. S. Lewis: A Panentheist?**

This paper deals with the possibility that C. S. Lewis was a panentheist -- one who believes that all (pan) things are in (en) God (Theos). Through his books it seems that Lewis was a panentheist, and he expressed this through the salvific action of Christ, which man takes part in through deification. First, an aside is given, stating that Lewis may or may not agree with the terminology, but the evidence points overwhelmingly towards the supposed direction. Next, the words panentheism and deification are defined. The paper then follows a Biblio-historical chronology, tracking Lewis' words on the state of nature and man before the fall, after the fall, then after death. Often referenced is the language employed by Lewis, which convicts readers that he had a panentheistic worldview. Finally, the paper concludes by pulling the evidence together and wrapping it up with a brief speculative notion that C. S. Lewis

was familiar with the Church Fathers and drew from their theology, which would explain his pantheistic worldview and his understanding of salvation as the process known as deification (or theosis).

**Michelle Reynolds**

Mentor(s): Dr. Patricia Minter

**Room: 163 C Time: 11:25 AM**

**CORE Freedom Rides**

This paper was written for History of the Civil Rights Movement. It details the basis of the 1961 CORE Freedom Rides- the court cases of *Boynton v. Virginia* and *Morgan v. Virginia* which overturned segregation during interstate travel. The paper focuses on the ride that went from Virginia to Alabama and how that group of rides encountered the worst of the south in the form of Alabama's Police Chief, Eugene "Bull" Connor.

**Jeremy Richey**

Mentor(s): Dr. Ted Hovet

**Room: 138 Time: 11:25 AM**

**Thomasine And Bushrod: The Rediscovery Of A Lost American Classic**

Thomasine & Bushrod is a 1974 feature film from two key African American artists from the seventies, namely the late director Gordon Parks Jr. and writer and actor Max Julien. The film, a major studio production, has virtually vanished from circulation since its release in the mid seventies but deserves recognition as a multi-faceted work that questions not only the genres it's working in, the Western and Exploitation film, but also pre-conceived notions on race, class and gender.

The film is an important historical landmark in African American cinema and remains one of the great missing in action features from a key period in American filmmaking. My presentation will look at the history behind the film and the reasons why I think it is an important work dealing with race, gender and class.

**Rebekah Russell**

Mentor(s): Dr. Kelly Reames

**Room: 112 Time: 01:15 PM**

**Not as They Seem: Gender Blurring in Margaret Atwood's *Oryx and Crake* and Colson Whitehead's *The Intuitionist***

Many post-modern texts question the solidity of gender roles. Many characters blur traditional gender boundaries: male characters present strikingly female characteristics or vice versa. Both Margaret Atwood's *Oryx and Crake* and Colson Whitehead's *The Intuitionist* feature protagonists whose behavior violates gender norms. Jimmy (Atwood's protagonist) is neither strongly male or female: he is feminized in his interaction with other dominant characters, but remains masculine in his rebellion against a society that requires conformity. Lila Mae, the hero of Whitehead, is a lone female in an all male industry. In order to survive, she "becomes one of the boys," but manages to remain feminine in her use of the fictional school of Intuitionism. In this paper I use Judith Butler's theory of gender as performance to analyze the gender blurring in these two late-twentieth century novels and characters. I argue that the characters' violation of gender norms is necessary for them to counter the homogeneity of their cultures.

**Laina Seay**

Mentor(s): Tom Bartel

**Room: 113 Time: 10:55 AM**

**Defining Space**

My work addresses multi-layered, mixed media inspired by modern architecture, the affects of time on surface, and the interfacing of both natural and built environments. Currently I am departing from traditional systems of display like pedestals and moving into dividing physical space. Architecture is basically a defining of different spaces. Every day we move within these spaces, adjusting to our unique spatial situations. I hope to mimic these daily 'dances' by engaging the audience to interact with the art; thus, becoming living parts reacting on their own sensitivities to spaces often neglected. I am constantly aware of the affects that time and environments have physically on architecture as well as processes of building and tearing down structure. These indeterminate stages between nothing and something are the reason I often use suspension. Ground to sky relationships and the tension they create allows me to explore my interest in connecting insects burrowed into the ground and towing skyscrapers. Construction and demolition becomes a metaphor for dualities that exist in nature and humanity. I create my work to provoke these physical and emotional reactions in my audience; thus, each piece is a new elaboration in my effort to communicate my ideas with the world.

**Brooke Shafar**

Mentor(s): Dr. Ted Hovet

**Room: 112 Time: 09:45 AM**

**Hirokazu Kore-Eda: Blending Documentary and Fiction in Filmmaking**

This paper explores the work of contemporary film director Hirokazu Kore-Eda, who has made a mark in the Japanese film industry because of the blend of film techniques his films include. He utilizes some of the conventions of documentary cinema and "blends" them with the techniques of more traditional fiction film making in the feature films he has made. In doing this, he departs from many of the traditions of Japanese cinema, and adopts a style that is nearly the opposite thereof. This paper addresses three of his feature films chronologically, and traces the development of this style of film making from its beginning to some of his most current work, and establishes the general progression from a more exclusively "documentary-like" style to a more complete blending of documentary and fiction film techniques. Ultimately, Kore-Eda is able to show the "real life" of his characters through a blend of fiction and seemingly non-fiction film.

**Mike Simpson** Co-Authors: Phillip C. Womble, Jon Paschal, Joseph Howard, Matthew Lodmell

Mentor(s): Phillip C. Womble

**Room: 113 Time: 01:15 PM**

**Design of a Trailer for Unexploded Ordnance Remediation**

Unexploded ordnance (UXO) pose a risk to people and the environment. In the US, these munitions are primarily found in former military bases and firing ranges. The detection of live high explosive (HE) material is vital for the safety of those personnel working with and around an UXO. Previously, our group has utilized pulsed neutrons to create energy signatures in order to determine whether the material is HE or not. The interrogation takes approximately six minutes to complete with the detection apparatus being moved to each UXO. This process is inefficient; surveying only five or six UXO's an hour.

We have designed a trailer which would then create a centralized area for the interrogation process. Suspect UXO can then be moved to the trailer for detection, decreasing the time between each examination, thus increasing the efficiency. A requirement of the design of the trailer is to accept 500 lb. bombs and be able to move the bombs over a short distance, from the load point to the detection device. The designs have been created in SolidWorks, a 3D design program. We will present our current design along with other design requirements such as radiation protection.

**Kathleen Smallwood** Co-Authors: none  
Mentor(s): Dr. Joseph Trafton, Dr. Amy Cappiccie  
**Room: 112 Time: 10:40 AM**

#### **Guatemalan Intercountry Adoption Policy**

The current increase in intercountry adoptions between the United States and Guatemala has created more accusations of corruption. As a result, policies have been created in an attempt to decrease corrupt practices. The current policy pending ratification by the United States is the Hague Convention on Intercountry Adoption, which makes strides toward improving the situation, but at a cost. The anticipated ratification of the Hague in 2008 has led to a reduction in the number of adoptions between the United States and Guatemala and the possibility that the system will shut down completely once the U.S. implements the convention. As a result, policy makers in the United States must encourage Guatemalan compliance and find ways to work with Guatemala in order to directly punish corrupt lawyers, runners, and "jaladoras." For policy makers in Guatemala, steps must be taken for the system in Guatemala to comply with the Hague and punish offenders within their nation.

**Corey Smith**  
Mentor(s): Dr. Arvin Vos  
**Room: 113 Time: 09:15 AM**

#### **An Analysis of the Third Objection to the Forms in Plato's "Parmenides"**

Epistemology in the tradition of Western philosophy is marked by a tendency to understand knowledge as "seeing the truth." This metaphor of "knowledge as sight" traces its root to the epistemological program of Plato. In Plato's metaphysics, true reality exists in the transcendent realm of the perfect, intelligible forms. The world as perceived by the senses is an imperfect, defective realm constantly in flux of which there can never be knowledge. For the soul to attain knowledge, it must transcend the corporeal world and merely "look" at the perfect forms. In this presentation, I will use the third critique of the forms in the Parmenides to demonstrate how Plato's use of the "knowledge as sight" metaphor implicates his epistemology in an insurmountable logical difficulty. Next, I will show how a solution to this logical difficulty is evidenced in numerous passages in his dialogues, but is never developed because it would necessitate an abandonment of his theory of forms. Finally, I will end my presentation by analyzing this solution's development in the epistemology of the 20th century Thomist Bernard F. Lonergan.

**Cierra Smith**  
Mentor(s): Dr. Ardrey  
**Room: 163 C Time: 09:30 AM**

#### **Voter Participation**

Young voters are the key to the future strength of our democratic system. As students in the political science department senior seminar course we feel strongly about increasing the representation of young voters across America. The purpose of this research was to develop and implement a series of political engagement activities to attract potential voters in the age bracket of 18-29 and encourage them to express themselves through voting. Our research team began by brainstorming new innovative ways to reach our target population. Many of these innovative ideas included social networking sites and popular media as well as face to face communication. After selecting our strategies we moved on to implementation. We focused on three core areas as we implemented our plans which were the internet, high schools, and college campuses. Our presentation will analyze the role of political participation in a democratic political system and give an extensive summary of the projects we completed in our areas of focus. We will present relevant data pertaining to the number of people

we reached. Concluding our presentation we will discuss the success rates of our research and offer personal as well as group reactions to the process.

**Jason Smith** Co-Authors: Phillip C. Womble, Doug Harper, Joseph Howard, Brian N. Cooper, Chris McGrath, James Phelps

Mentor(s): Phillip C. Womble

**Room: 113 Time: 11:10 AM**

#### **Modeling Results For Environmental Acoustic Pressure Obstructions**

In order to benchmark results using the COMSOL acoustic module, we have devised a simple experiment and modeled it accordingly. In this experiment, a Brüel & Kjær (Type 2669) microphone was used to receive a set of pure tones ranging from 100Hz to 10,000Hz created from a speaker 3.75m away. Between the source and the microphone is an obstruction made of high-density sound absorbing foam. The experiment is designed such that one can graphically analyze how wall obstructions can affect the Fresnel zones of low frequency waves from source to receiver. These results would also evaluate COMSOL's ability to provide a useful and reliable tool in evaluating more complicated hypothetical situations, without having to afford the time and resources to create them. Analysis of the experiment with COMSOL resulted in good agreement with the analysis of the data collected. Other results worth noting is that when using an oversized wall to encompass the signal and block the microphone, the diffusing sound pressure levels calculated in COMSOL reflected the results of a second, completely obstructed, situation. After setting up several other experiments, COMSOL produced very accurate results every time, and furthermore, provided to be an excellent tool in evaluating experimental procedure validity as well.

This work is supported in part by the Applied Research and Technology Program of Western Kentucky University.

**Gwen Son**

Mentor(s): Dr. Sandra Hughes

**Room: 163 A Time: 09:00 AM**

#### **Moral Ambiguity in Hawthorne's Short Stories in Light of American Romantic Transcendentalism**

A trademark characteristic of Nathaniel Hawthorne's writing is ambiguity. One of the most interesting ways in which his writing is ambiguous is morally. When reading Hawthorne it is difficult to conceptualize morality as a clearly defined theme because Hawthorne imposes no obvious moral judgment on his characters or their actions. Furthermore, his stories do not impress upon the reader a clear theme of moral justice. Because the idea of morality is so ambiguous, interpreting stories such as "Roger Malvin's Burial," "Rappaccini's Daughter," "Young Goodman Brown," and "The Birthmark" with this theme in mind is complicated.

In the Romantic period of American literature, common thought, especially transcendental thought, equated morality with truth, God, and nature. Specifically, transcendentalists believed optimistically in the individual's ability to capture truth through introspection and nature. Moral actions would have been actions in line with God and nature and moral justice would have been naturally present in the course of human existence because human nature was inherently moral, and truth-seeking.

Hawthorne doesn't necessarily disagree with this definition of morality. Neither his narrators nor characters explicitly define morality. However, he does paint a different picture in terms of its inherent existence in human nature.

**Sarah Spiker** Co-Author: Kelcy Hathaway

Mentor(s): Jeffery Osgood

**Room: 163 C Time: 08:45 AM**

**Rhetorical Impacts in the Political Sphere: A Semiotic Analysis of Language  
During the World War II Era**

Despite the overwhelming literature on World War II, there is little rhetorical analysis of leaders during that time period. While there has been much said concerning the oratorical skills of Adolf Hitler, little investigation has been provided as to the underlying functions of communication used by Franklin Roosevelt. Absent the moral implications, this paper attempts to breakdown language at its core in order to understand connotative implications in the political sphere by 1) gaining perspective of the power of language, 2) specifically looking at an early translated speech of Hitler as a representative anecdote for the entirety of his message, and 3) focusing on the strategies employed in a sampling of Roosevelt's speeches to unite the American people against a common enemy. Through this analysis, one can more thoroughly understand how collections of words and phrases translate into broad political support in difficult times. This study attempts to not only identify great oratorical skills, but also to deconstruct them in the attempt to understand the power of speech.

**Laramie Stone** Co-Authors: Martin Stone, Elmer Gray, Todd Willian

Mentor(s): Martin Stone

**Room: 163 C Time: 10:25 AM**

**Preliminary Evaluation of Baby Corn at  
Bowling Green, Kentucky in 2007.**

Laramie Baby corn is the edible, young, unfertilized ears of corn and is usually consumed fresh or canned. A field trial was conducted during the 2007 growing season at the Western Kentucky University research farm. Three cultivars of field corn with varying degrees of genetic flex, DeKalb 65-47 (low), DeKalb 63-46 (medium), and DeKalb 64-78 (high) were planted on 30 inch rows. Plots were four rows wide, thirty feet long, and data was taken on the center two rows only. Three plant population densities of each flex cultivar were planted at 36,000, 46,000, and 57,000 plants per acre. Baby corn was hand harvested on 3 to 4 day intervals beginning at 60 DAP (days after planting) and continued for ten harvests through 92 DAP. The highest population densities produced the greatest cumulative production. The highest flex cultivars produced the greatest cumulative production followed by medium and then low flex cultivars. However, for much of the season, the average ear size was too great to meet market specifications. Later in the season when the average ear size was acceptable, the ears were cosmetically unmarketable. Field corn appears to be a viable specialty crop for Kentucky producers but more refinement is required in cultivar and plant density selection.

**Lisa Taylor**

Mentor(s): Richard Gelderman

**Room: 112 Time: 02:00 PM**

**Contact Eclipsing System 44i Bootis: O-C Diagram Provides  
Evidence of Third Companion**

An eclipsing binary system comprises two stars rotating around one another whose orbital plane is positioned such that, to the observer, the brightness of the total system fluctuates as one star eclipses the other. When these stars get close enough, the gravity of one star pulls away the surface mass of the other and they become a contact eclipsing binary system. An example of this is 44i Bootis. Since each star's orbital path and brightness do not vary, one would predict that a graph of total system brightness over time would reveal a predictable periodic relationship. This, however, is not the case. There are deviations between the calculated eclipse times and when they are actually observed to occur. The difference between

these times is plotted on an O-C (Observed minus Calculated) diagram, where the O-C value is plotted against time. We present a combination of previously acquired data and new observations obtained by using ephemerides from historical papers which show the O-C diagram is not linear. Tests show this variance in eclipse timings is due to orbital light-time effects caused by the presence of a third body in the system.

**Ena Viteskic** Co-Author: Monique Braun

Mentor(s): Dr. Saundra Ardrey

**Room: 138 Time: 10:55 AM**

#### **Ending Dating Violence in Kentucky**

Although various laws have been passed in order to eliminate domestic violence, some women are still unable to receive the adequate protection from the law. For instance, eleven states do not allow victims of dating violence to obtain protective orders against their partner. These protective orders are essential in preventing further dating violence; however, Kentucky is among the states not allowing the attainment of protective orders. Thus, our goal is to lobby for the passage of House Bill 161 and Senate Bill 108. If passed, these bills will allow persons in an abusive dating relationship to obtain protective orders. We have gathered research, conducted surveys, written letters to Kentucky legislators, and increased the awareness of this problem within the WKU community. As with any political endeavor, we have encountered our share of challenges while trying to achieve our goal. In the presentation, we will document and display the process of our efforts to lobby and pass these essential pieces of potential legislation in the Commonwealth of Kentucky. From what history tells us, we are aware that change does not happen overnight; however, we are confident that our political engagement thus far will have a positive impact for young women in Kentucky.

**Amanda Webb**

Mentor(s): Dr. Michael Smith

**Room: 138 Time: 09:30 AM**

#### **Comparison of conspecific click sound production between O. affinis and P. gibbiceps.**

Pectoral spine stridulation and/or swim bladder compression using sonic muscles linked to the swimbladder are common methods of sound production among many families of catfish. Sound production capabilities and characteristics have not been well examined in the catfish family Loricariidae. Scanning electron microscopy was used to examine the dorsal process of the base of the pectoral spines from two species of loricariid catfishes, *Otocinclus affinis* and *Pterygoplichthys gibbiceps*. Interridge distances of *O. affinis* and *P. gibbiceps* were approximately 50 and 160 microns, respectively. Sound is produced in both species as the ridges of the pectoral spine slides past the channel of the pectoral girdle, resulting in broadband clicks. These click sounds were recorded and analyzed in terms of frequency and duration. A comparison and contrast of the characteristics of the sounds of both species will be discussed. We thank John Andersland for SEM assistance.

**Lauren White**

Mentor(s): Yvonne Petkus

**Room: 163 A Time: 10:40 AM**

#### **Personal Growth Through Art**

It is my belief that as an artist, and more importantly, as a college student majoring in art, one should experiment with as many mediums as possible. Whether the medium is charcoal, graphite, oil paints, acrylic paints, clay, etc., it is important to know the basic skills needed to implement different mediums. Further, it is important to experiment with as many processes as possible, whether the process is painting, drawing, sculpture, ceramics, printmaking, etc.



By experiencing these different artistic processes, I have been able to focus my concentration on what interests me the most- painting and drawing.

My growth in painting and drawing are my goals- whether my growth is personal or technical. I believe that growth is the purpose of my art, because as the adage goes, "It never takes too long to get to where you've been". Therefore, I can only grow as an artist if I experiment with my chosen mediums and challenge myself to try new things that I am not yet comfortable with. It is important for me to push myself as an artist, because I believe that reaching my full potential is an unattainable, yet alluring, goal. Throughout my lifetime I can work as diligently as possible, but will never reach my full potential, because there is always more that I can do to be a better artist. Therefore, pushing myself to get to my full potential is what drives me- it is the challenge that I have put upon myself.

With regard to the content of my art, I often try to transform the mundane in to the extraordinary. I also focus on personal religious beliefs in many of my drawings and paintings. Recently, I have begun to focus on the disfigurement of the human condition via paintings of imagined sideshow freaks. The inspiration for my "freak" paintings is my belief that we, as human beings, are all freakish in some way, whether our anomaly is exterior, interior, or only in our imaginations. If you look close enough, you will find that "freak" element about yourself. This idea is certainly frightening, but I feel that it is something that I need to address as an artist and my most recent work reflects this.

**Schuyler Wolff** Co-Author: Andrew M. Gott

Mentor(s): Louis-Gregory Strolger

**Room: 112 Time: 08:45 AM**

#### **Nearby Galaxy Supernova Search I: Fuzzy Exploding Stars on a Computer Screen**

In this talk I am going to present on the Nearby Galaxy Supernova Search project designed to find objects across the celestial equator, covering 500 square degrees making it one of the largest surveys to date. We are attempting to re-measure properties of supernovae discovered in these surveys, and uncover events that may have been missed in order to reassess the rate of supernovae in the low redshift ( $z < 0.1$ ) universe. We are also attempting to find a small calibration set of low redshift supernovae (specifically type Ia supernovae) for use in high redshift cosmological investigations.

**James Wood**

Mentor(s): Richard Gelderman, Louis-Gregory Strolger, Michael Carini

**Room: 138 Time: 10:25 AM**

#### **Developing Control Systems for the Robotically Controlled Telescope**

The 1.3-meter Robotically Controlled Telescope (RCT) at Kitt Peak, Arizona is an autonomous astronomical observatory designed to act as the "best-trained observer" to effectively and efficiently collect images. The RCT is used by astronomers and students at WKU, as well as by RCT Consortium partners across the nation. The goals for the software control system are to efficiently schedule and obtain observations of various targets under various astronomical, mechanical, and organizational constraints. Interfaces have been developed to allow the observatory's users to post observing requests to the telescope and download the acquired data through a searchable archive. I will present details of how the interfaces and networking systems have been designed and optimized.



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