WKU A Leading American University with International Reach

39th Annual

Western Kentucky University

Student Research Conference

Saturday, February 21, 2009

Carroll Knicely Conference Center

Bowling Green, Kentucky

CUR™

Western Kentucky University
is an institutional member of the
Council on Undergraduate Research
Learning Through Research

Schedule of Events

7:30-8:00 am	Registration Conference Center Lobby *Refreshments Provided*
8:00-8:30am	Welcome and Plenary Session Room 163B *Remarks by President Gary Ransdell*
8:30-10:10 am	Concurrent Paper Session Number 1 Rooms 112, 113, 138, 163A-C
10:25 am-12:05 pm	Concurrent Paper Session Number 2 Rooms 112,1 13, 138, 163A-C
11:00 am-1:00 pm	Graduate/Undergraduate Poster Session Room 130 *Set-Up 10:30-11:00 am* *Refreshments Provided 12:00-1:00 pm*
1:00-3:25 pm	Concurrent Paper Session Number 3 Rooms 112, 113, 138, 163A-C

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Awards Banquet

The WKU Student Research Conference Awards Banquet will be held from 5:15-7:30 pm CST on Monday, March 2, 2009 in the Cupola Room of the Downing University Center. All students who presented papers and posters at the 39th Annual WKU Student Research Conference, and their faculty mentors, are invited to attend.

The dinner buffet will begin at 5:30 pm. The Sigma Xi Lecture will begin at 6:15 pm. Conference award winners will be recognized following the lecture.

Students will receive an email message with information about how to RSVP for the WKU Student Research Conference Awards Banquet. Students should RSVP by noon on February 24, 2009.

The Sigma Xi Lecturer is Dr. Kimberly Gray, Professor of Civil and Environmental Engineering at Northwestern University in Evanston, IL. Dr. Gray will discuss "Energy and the Environment: The Central Challenge of Sustainability." The abstract for Dr. Gray's lecture is as follows.

The commonly held definition of sustainability put forth in Our Common Future (Brundtland Commission, 1987) states that sustainable development should be pursued globally to "meet the needs of the present without compromising the ability of future generations to meet their own needs." The only problem is that it is not clear how this notion translates into action. The way most Americans live, for instance, is far from sustainable. People in the U.S. use energy and resources to a far greater extent than what they produce and what other countries use. A compelling case for sustainability can be made if we consider energy use and the issues of supply, security and environmental consequence. While there are numerous possible renewable alternatives, there is resistance to making the necessary investments that will allow us to shift our dependence on fossil fuels to other sources, such as solar, wind, nuclear, etc. There have been many predictions that the end of oil is near and as many that refute these warnings. Yet, Amory Lovins advises, "The stone age did not end because the world ran out of stones. . . And the oil age will not end because the world will run out of oil." There is an urgent need to determine the near-term and long-term paths to a sustainable future in an integrated fashion if we are to protect future generations, the environment, and the economies of the world. Technological breakthroughs alone will not rescue us if they are not coupled to changes in how we live and where we live. Do we have the political will to pursue these changes? Do we have sufficient scientific and technical understanding to alter the course we began charting hundred of years ago as societies moved from subsistence agricultural to highly industrialized economies?

Acknowledgements

Funding for the 39th Annual WKU Student Research Conference was provided by the Office of the Provost and Vice President for Academic Affairs and by the WKU Chapter of Sigma Xi.

WKU faculty/staff who served as judges are Darlene Applegate, Lauren Bland, Stuart Burris, Cassandra Cantrell, Janice Chadha, James Chappell, Robert Choate, Walter Collett, Audrey Cornell, Jerry Daday, Constance Edwards, Jane Fife, Jim Fulkerson, Alison Ganze, Marilyn Gardner, Nancy Givens, Dawn Hall, Lance Hahn, Buddy Hooper, Cynthia Houston, Ted Hovet, Sandy Hughes, Guy Jordan, Molly Kerby, Bruce Kessler, Rodney King, Beth Knight, George Kontos, Donna Kridelbaugh, Rich Mancil, Paul Markum, Nancy Marshall, Rosemary Meszaros, Andrew Mienaltowski, Wren Mills, Farley Norman, Jane Olmsted, Raymond Poff, Karen Powell, Carrie Pritchard, Paula Quinn, Claire Rinehart, Mike Seidler, Sadiq Shah, Carnetta Skipworth, Michael Smith, Chad Snyder, Lawrence Snyder, Sharon Whitlock, Ali Wright, Jun Yan, and David Zimmer.

Faculty members who served as mentors to students are indicated parenthetically throughout the conference schedule and abstracts. We commend the faculty mentors for their support of student research and for their assistance in preparing students for the research conference.

Undergraduate students who are in the Honors College are indicated with a * symbol in the conference schedule.

Members of the Student Research Council are Darlene Applegate, Amanda Beers, Craig Cobane, Molly Kerby, Bruce Kessler, Rodney King, Baozhen "Maggie" Luo, Farley Norman, Jessica Orlofske, Raymond Poff (Chair), Sadiq Shah, Carnetta Skipworth, Lawrence Snyder, Phillip Womble, and David Zimmer.

Concurrent Paper Session Number 1
8:30-10:10 am

Room 112 Undergraduate Presentations

8:30 am **Magee, Jessie*** "Protecting Walden Pond: A Step towards Defending Ordinary Nature in the United States" (Dr. Anthony Harkins)

8:45 am **Bender, Shelley Lenora** "Cemetery Roads: The Evolution of Cemetery Architecture in Bowling Green, Kentucky Pre-1900" (Dr. Guy Jordan)

9:00 am **Koeneman, Molly*** "Elizabeth Bennett Finds Happiness" (Dr. Katherine Green)

9:15 am **Lowery, Benjamin Wilson*** "The Earth Abideth Forever: The Theme of Impermanence in Romantic Poems" (Dr. Deborah Logan)

9:30 am **Dooper, Jennifer*** "Sifting Through Symbols: Interpreting the Beautiful in Three Hawthorne Short Stories" (Dr. Sandra Hughes)

9:45 am Discussion

Room 113 Undergraduate Presentations

8:30 am **Deignan, Robert*** "Hand in Hand to Hell: Blanche DuBois and Norma Desmond as Victims of Genre" (Dr. Karen Schneider)

8:45 am **Vaught, Kassidy Allyssa** "Dracula: Embodying the Other since 1897" (Dr. Sandra Hughes)

9:00 am **Osburn, Kaitlen M.*** "*Waiting for Godot*: We Are All Born Mad. Some Remain So." (Dr. Andrea Grapko)

9:15 am **Watkins, Kirby*** "A Beautiful Hell: Symbol of the Tree to Men and Women in *Beloved*" (Dr. Sandra Hughes)

9:30 am **Stewart, Colleen*** "Memory Mysticism in *Eternal Sunshine for the Spotless Mind*" (Dr. Michael Seidler)

9:45 am **Perrin, Anne Gray*** "*Guess Who's Coming to Dinner*: The Web of Racial, Class, and Gender Constructions in Late 1960s America" (Dr. Anthony Harkins)

10:00 am Discussion

Room 138 Graduate Presentations

8:30 am **Cress, Justin** "Consumer Driven Health Plans: Employer Take-Up and Average Contributions" (Drs. Alex Lebidensky, Claudia Strow, and David Zimmer)

8:45 am **Subramanian, Yamuna Devi** "Technology in Healthcare and Its Impact on Quality and Outcomes" (Dr. William Mkanta)

9:00 am **Ward, Sean, Alecea Davis, and Rebekah Golla** "Focusing the Lens: Building Internationalization on Campus" (Dr. Cecile Garmon)

9:15 am **Chahal, Monia** "Health Insurance System in United States" (Dr. William Mkanta)

9:30 am **Truba, Natalie Prisbe** "Perceived Beliefs, Stereotypes and Biases about Terminally Ill Children, Adults and Persons, Their Personality Characteristics, and Their Chance for Survival" (Dr. Rick Grieve)

9:45 am **Kerr, David Michael** "The Crusader Ideal: Richard I and Louis IX" (Dr. Rick Keyser)

10:00 am Discussion

Room 163A Undergraduate Presentations

8:30 am **Clayton, Russell** "Logan Aluminum Lighting Upgrade" (Dr. Stacy Wilson)

8:45 am **Mink, Jared*** "Transformation of *Medicago sativa* with *Agrobacteria* to Create Insecticidal Plants" (Drs. Shivendra Sahi and Priya Padmanabhan)

9:00 am **Sulejmanovic, Dino, Carrie Jo Pruitt, Wei-Ho Ting, and Shing-Yi Suen** "Removal of Benzaldehyde from Methanol Using Alkoxyamine-Functionalized Silica Gel" (Drs. Eric Conte and Hasan Palandoken)

9:15 am **Cook, Kyle W.** "Correlations of Optical and Gamma Ray Variability of Blazars" (Dr. Michael Carini)

9:30 am **Moyers, Austin and Andrew Wulff** "A Geochemical Comparison of CDCS and CDCN Valley Lava Flows" (Dr. Andrew Wulff)

9:45 am **Lodmell, Matthew and Kyle Moss** "ZigBee Radios for Homeland Security Applications" (Dr. Phillip Womble)

10:00 am Discussion

Room 163B Graduate Presentations

8:30 am **Sakampally, Vara Prasad Reddy** "Increased Control over Gold Colloid Adsorption on Substrates for Colloid Displacement Lithography" (Dr. Stuart Burris)

8:45 am **Marpuri, Reddysailaja** "Comparison of Gene Ontology Term Annotations Between *E. coli* K12 Databases" (Dr. Claire Rinehart)

9:00 am **Scott, Joseph Brian** "On-Metal Synthesis of Some Pyridazyl Rhenium Complexes" (Dr. Chad A. Snyder)

9:15 am **Onyenaucheya, Teddy E. and Lakshmi V. Narasimhan** "Reliability Analysis of Wireless Sensor Networks for Oil Spill Monitoring Application" (Dr. Lakshmi Narasimhan)

9:30 am **Kandala, Hiranmayee** "Study of the Variations in the Oxidation Onset Temperature of Biodiesel Caused by Different Anti-oxidants" (Dr. Wei-Ping Pan)

9:45 am **Zervas, Peter G. and Philip Lienesch** "Age, Growth, and Diet of the Yellow Bass, *Morone mississippiensis"* (Drs. Philip Lienesch, Michael Stokes, and Scott Grubbs)

10:00 am Discussion

Room 163C Undergraduate Presentations

8:30 am **Deaton, John Colvin** "A Feasibility Study of Implementing a Wind Turbine in South Central Kentucky" (Dr. Stacy Wilson)

8:45 am **Gilson, Emily, Maria Hougland, Steve Huskey, Andrew Rhyne, and Nicolai Konow** "Modulation of Prey-Capture Behavior in the Goliath Grouper, *Epinephelus itajara*" (Dr. Steve Huskey)

9:00 am **Handzic, Ismet, Mensur Paocic, and Jonathan Rutledge** "Passive Residential Cooling System" (Dr. Kevin Schmaltz)

9:15 am **Riggs, Michelle*, Steve Huskey, Andrew Rhyne, and Nicolai Konow** "Scaling of Feeding Performance in North America's Largest Reef Fish" (Dr. Steve Huskey)

9:30 am **Dias, Vidal B.** "Regional Study of the Hydrocarbon Potential of the Marcellus Shale in Pennsylvania" (Dr. Michael May)

9:45 am **Phelps, James, Ronald Hopper, and Lindsay Hopper** "Cyber Defense at WKU" (Dr. Phillip C. Womble)

10:00 am Discussion

Concurrent Paper Session Number 2
10:25 am-12:05 pm

Room 112 Undergraduate Presentations

10:25 am **Hayes, Adrienne** "*Suite Antique*: Flute and Piano" (Dr. Heidi Pintner)

10:40 am **Olmsted, Galen E.** "Ceramics and Art" (Dr. Guy Jordan)

10:55 am **Schuck, Julie Banner** "Tlingit Dancing Blankets: Art in a Culture of Prestige" (Dr. Guy Jordan)

11:10 am **Ryan, Eileen Catherine*** "Francis Macomber as a Dynamic Character" (Dr. Walker Rutledge)

11:25 am **Reynolds, Michelle Lee*** "Freedom Summer: A Study of How the Federal Government Was Impeded by a Color Barrier When Investigating Civil Rights Crimes" (Dr. Patricia Minter)

11:40 am Discussion

Room 113 Undergraduate Presentations

10:25 am **Kiefer, Jennifer*** "Repressing the Feminine: The Role of the Female Gender in *Frankenstein* and *Mary Shelley's Frankenstein*" (Dr. Sandra Hughes)

10:40 am **Rice, Taryn E.** " The Causes and Tensions That Led to the English Revolution" (Dr. Carol Crowe Carraco)

10:55 am **Beville, Chelsea A.** "Time and Beyond Time" (Dr. Joseph Trafton)

11:10 am **Cox, Mason Alexander** "Pinochet" (Dr. Sonia Lenk)

11:25 am **McPeak, Ryan** "Uruguay: Causas y Efectos de la Emigración entre 1963 y 1975" (Dr. Sonia Lenk)

11:40 am **Webb, Kelsi*** "Ecuador y la Crisis Económica de los Años Noventa" (Dr. Sonia Lenk)

11:55 am Discussion

Room 138 Graduate Presentations

10:25 am **Ranapurwala, Shabbar and Matthew Hill** "Environmental Health Service Learning and Water Quality in Gales Point, Belize" (Dr. Ritchie Taylor)

10:40 am **Namara, Sarah** "Management of Global Technology" (Dr. Mark Doggett)

10:55 am **Golla, Rebekah J.** "Recruiting International Students" (Dr. Aaron Hughey)

11:10 am **Sadhnani, Mahesh** "WKU: Costs and Consequences of Smoking on Campus" (Dr. Cecilia Watkins)

11:25 am **Jennings, L. RaShae, Amanda M. Beers, Jessica M. Swindle, and Elizabeth M. Mullins** "Stereoscopic Shape Discrimination is Invariant across Random Changes in Size" (Dr. Farley Norman)

11:40 am **Aldridge, Jessica R.** "The 2009 Presidential Inauguration: Media Expectations and the Reality of the African American Experience" (Dr. Saundra Ardrey)

11:55 am Discussion

Room 163A Undergraduate Presentations

10:25 am **Marquardt, Joseph Ronald*** "Molecular Tools for Understanding the Population Genetic Effects of Habitat Restoration" (Dr. Jeffrey Marcus)

10:40 am **Bartlett, Derrick** "Innovative Bio Fuel" (Dr. Kevin Schmaltz)

10:55 am **Nichols, Matthew Edward and Phillip C. Womble** "Analysis of Electromagnetic Pulses on Nuclear Impulse-Driven Spacecraft" (Dr. Phillip C. Womble)

11:10 am **Starling, Michael** "Reaction of a Bulky Platinum Triamine Complex with Guanine and Methionine" (Dr. Kevin Williams)

11:25 am **Kramer, Kelly and Andrew Wulff** "Petrogenetic Evolution of the Casitas Shield" (Dr. Andrew Wulff)

11:40 am **Simpson, Michael, Kyle Moss, Joshua J. Pierce, Jon Paschal, and Phillip C. Womble** "Utilizing Wireless Technology for Enhancing the Electrocardiogram" (Drs. Phillip C. Womble and Jon Pascal)

11:55 am Discussion

Room 163B Graduate Presentations

10:25 am **Flomo, Stephen**, **Diana Edlin, Martin Stone, Elmer Gray, and Nathan Howell** "Investigation of Yield and Quality of Grafted Heirloom and Hybrid Tomatoes" (Dr. Martin Stone)

10:40 am **Mandadi, Deepika, Darwin B. Dahl, and Stuart C. Burris** "A Characterization of Caffeine Imprinted Poly-pyrrole Electrodes" (Drs. Darwin Dahl and Stuart Burris)

10:55 am **Starnes, Daniel Lee** "Plants Can Produce Nanoparticles" (Dr. S. V. Sahi)

11:10 am **Kramer, Samantha** "Time Resolved Studies of a Niobium Substituted Titanosilicate for the Determination of the Strontium Ion Exchange Mechanism" (Dr. Aaron Celestian)

11:25 am **Gangula, Srilatha and John Loughran** "Determination of Phenolics in Swine Waste Lagoons" (Dr. Eric D. Conte)

11:40 am **Bollu, Lakshmi Reddy** "Regulation of Corneal Endothelial Cell Proliferation by Endothelin1" (Dr. Kenneth Crawford)

11:55 am Discussion

Room 163C Undergraduate Presentations

10:25 am **Paaso, Esa Aleksi**, **Jack Wallace, and Laxmi Gurung** "Creation of Void Detection Robot for Subsurface Void Detection" (Dr. Stacy Wilson)

10:40 am **Howton, Jonathan** "Is Cryptochrome the Light Receptor that Resets the Circadian Clock in *Chlamydomonas*?" (Dr. Sigrid Jacobshagen)

10:55 am **Edwards, Angelena Brittany*** "Effects of Drought on Small Stream Communities of Fish" (Dr. Philip Lienesch)

11:10 am **Downen, Matthew Ross* and Andrew Wulff** "Young Lavas of the Casitas Shield" (Dr. Andrew Wulff)

11:25 am **Schroll, Austin, Bobby Lindsey, and Brett Meyer** "Industrial Vision Systems for Product Inspection" (Drs. Chris Byrne and Robert Choate)

11:40 am **Cooper, Brian** "Line-Scan X-Ray Imaging System: Feasibility Study" (Dr. Alexander Barzilov)

11:55 am Discussion

Poster Session
11:00 am-1:00 pm

Room 130 Graduate Posters

G001 **Neathery, James and Phenahas Sriramula** "Off-Metal Synthesis of Some Aryl Substituted Rhenium ^{5}-Cyclopenta[*c*]pyridazyl Complexes" (Dr. Chad Snyder)

G002 **Huang, Yan, Chris Abebrese, and Rui Zhang** "Kinetics of Oxidation of Aryl Methyl Sulfides by *Trans*-Dioxoruthenium (VI) Porphyrin Complexes" (Dr. Rui Zhang)

G003 **Jones, Morgan** "A Novel Pervious Cement Reaction Barrier (PCRB) In Situ Arsenic Remediation System" (Dr. Cathleen Webb)

G004 **Tracy, Mark, Erin Lynch, and Dalene Smith** "Dale Hollow Lake State Resort Park: Ranger Response Time, Golf Course Travel Time, and Travel Time for Hikers, Cyclists, and Horseback Riders" (Dr. Jun Yan)

G005 **Miller, Benjamin V.** "Identifying Recharge and Discharge Features of Carroll Cave, Missouri through Dye Tracing" (Dr. Chris Groves and Pat Kambesis, M.S.)

G006 **Dickens-York, Ashley K., Niki J. Kersey, and Lance W. Hahn** "Gender Differences in the Mental Representation of Aggressive and Neutral Words" (Dr. Lance W. Hahn)

G007 **Hutchins, Amanda** "The Relationship between Goal Orientation and Gender Roles" (Dr. Anthony Paquin)

G008 **Reece, Thomas J.** "A More Nuanced Look at Religious Orientation and Homonegativity" (Dr. Rick Grieve)

G009 **Middleton, Juliana D. and Steven Wininger** "Facilitation of Social Cognitive Constructs in an Employee Wellness Exercise Intervention Program" (Dr. Steven Wininger)

G010 **Wang, Zheng** "One-Child Family Policy, What Do We Obtain?" (Dr. Elmer Gray)

G011 **Gupta, Pramod** "Life Expectancy and the Human Sex Ratio" (Dr. Elmer Gray)

G012 **Lakkaraju, Archana** "Human Sex Ratio and Family Size for a Selected Sample from the India Population in 2007-2008" (Dr. Elmer Gray)

G013 **Calico, Molly and Jordan Norris** "Perceptions of Water Quality and Management in Gales Point, Belize" (Dr. Ritchie Taylor)

G014 **Sukkala, Susmita Meher** "Nanotechnology and Public Health" (Dr. Vijay Golla)

G015 **Broadbent, Dorothy Megan and Katherine Gilson** "Saving Lives with Facebook" (Dr. M. Christine Nagy)

G016 **Anilkumar, Chaitra** "Pornography Viewing and Student Views on Sexual Assault and Harassment: Implications for Prevention Programs" (Drs. Stephen and Christine Nagy)

G017 **Ansari, Huma** "Student Characteristics of Soft and Hard Pornography Viewers: Implications for Prevention Programs" (Drs. Stephen Nagy and M. Christine Nagy)

Room 130 Undergraduate Posters

U001 **Terrell, Stephanie** "Photography" (Matt Tullis, M.F.A.)

U002 **Cline, Cynthia** "White Forms" (David Marquez, M.F.A.)

U003 **Schaefer, Jacob** "Not Just Books" (Matt Tullis, M.F.A.)

U004 **Whitaker, Tony** "Guitar Heroes" (Matt Tullis, M.F.A.)

U005 **Adams, Dana*** "Brand Research Collage" (Matt Tullis, M.F.A.)

U006 **Shartzer, Jeremy Lee** "Street Art" (Matt Tullis, M.F.A.)

U007 **Westbrook, Hollye Elizabeth** "Typographers of the 1900s" (Matt Tullis, M.F.A.)

U008 **Clark, Charles Aaron** "Pop Art and Graphic Design" (Matt Tullis, M.F.A.)

U009 **Slattery, Shane** "20th Century Graphic Designers/ Typographers" (Matt Tullis, M.F.A.)

U010 **Bond, John** "Contemporary Graphic Designers" (Matt Tullis, M.F.A.)

U011 **Wilson, Cassandra** "Pop Art" (Matt Tullis, M.F.A.)

U012 **McCurdy, Catherine** "Historical Design Motifs of Commercial Typographers" (Matt Tullis, M.F.A.)

U013 **Ford, Karen Bernadette** "A Historical Study of Advertising with Respect to Graphic Design" (Matt Tullis, M.F.A.)

U014 **Chadwell, Michael E.** "The Inklings" (Matt Tullis, M.F.A.)

U015 **Brown, Valerie D.** "Typographers" (Matt Tullis, M.F.A.)

U016 **Byerley, Sarah** "Art Deco Poster Designers" (Matt Tullis, M.F.A.)

U017 **Harris, John** "Triple A (African American Artist)" (Matt Tullis, M.F.A.)

U018 **Suarez Gonzalez, Astrid*** "Soil Moisture Analysis for the 2007 Drought in the Southeastern Region of the United States" (Dr. Rezaul Mahmood)

U019 **Fusting, Michelle* and Donna Kridelbaugh** "Isolation of a 3-Methylindole-Producing Bacterium from a Swine Waste Lagoon" (Dr. Kinchel Doerner)

U020 **Jordan, Jessica Michelle** "Evidence for Cohesive DNA Ends in a Bacteriophage Genome" (Dr. Rodney King)

U021 **Strain, Jacob M.** "On-Metal Study for the Synthesis of a Bulky Pyridazine Complex" (Dr. Chad A. Snyder)

U022 **Li, Yan-Fen** "Synthesis and Crystal Structures of New Hybrid Polytungstates" (Dr. Bangbo Yan)

U023 **Phillips, Chad L.* and Brian Scott** "On-Metal Synthesis of Some Substituted Rhenium Pyridazyl Complexes" (Dr. Chad A. Snyder)

U024 **Mobley, Justin K.* and James L. Neathery** "Off-Metal Synthetic Study p-Chlorophenyl Substituted Rhenium ^{5}-Cyclopenta[*c*]pyridazyl Complexes" (Dr. Chad A. Snyder)

U025 **Hinson, Daniel* and Phenahas Sriramula** "On-Metal Synthesis Aromatic Substituted Rhenium Complexes" (Dr. Chad A. Snyder)

U026 **Clark, Lindsey M. and Erika Whitehouse** "A Deeper Insight to Hg Bioaccumulation in the Bat Population in Kentucky and Tennessee" (Dr. Cathleen Webb)

U027 **Dame, Heath** "Modifying the Sitinakite Structure for Enhanced Cs and Sr Sequestration" (Dr. Aaron Celestian)

U028 **Gant, Charles Danny** "Comparative Analysis of Tornadic Potential for Two Winter-Time Severe Storm Systems in Kentucky" (Drs. Gregory Goodrich and Joshua Durkee)

U029 **Bryant, Christopher J., Eric Druen, and Michael Doyel** "WKU Student Parking Lot Walking Times" (Dr. Jun Yan)

U030 **Wix, Jane Marie* and Nicholas Rodgers** "Flash Flood Climatology of the Appalachian Mountains: Focus on Eastern Kentucky Summer Rainfall Events" (Dr. Rezaul Mahmood)

U031 **Wharton, Rebecca** "Making Every Visit Count: Correlation between Social Contact and Life Satisfaction of Long Term Care Residents" (Dr. Dana Burr Bradley)

U032 **Seaton, Amanda Lee and Steven R. Wininger** "Comparison of Live Self-Video to Task-Irrelevant Video on Maintenance of Exercise Intensity" (Dr. Steven R. Wininger)

U033 **Gaddes, Amanda and Ann Marie Nejedly** "A Sweeter Look at Caries Control" (Dr. Barbara C. Bush)

U034 **Carney, Kelsea Nichole and Mandy Stinson** "Let Them Smile: Raising Awareness of Early Childhood Caries" (Dr. Lynn Austin)

U035 **Kington, Ellen and Lauren Stephens** "The Parafunctional Habit of Nail Biting (Onychophagia)" (Dr. Barbara C. Bush)

U036 **Hughes, Janet and Abigail Hensley** "Designer Genes" (Dr. Terry Dean)

U037 **Wohlrabe, Sarah and Kristin James** "Dental Loupes: Helping Dental Professionals See Clearly" (Dr. Barbara C. Bush and Becky Tabor, M.Ed.)

U038 **Powell, Nikita Ann and Jenny Perry** "Acid Attack: Research for the Millennial Age" (Dr. Wendi Hulsey)

U039 **Johnson, Erin and Katie Davidson** "Xerostomia" (Dr. Barbara C. Bush)

U040 **Cline, Callie Elizabeth and Heather Brunner** "Forensic Odontology" (Dr. Daniel Carter)

U041 **England, Kasey** "30 Seconds Can Save a Life" (Dr. Barbara C. Bush and Becky Tabor, M.Ed.)

U042 **Barnes, Kimberly and Allison Genton** "HPV: Above and Beyond the Cervix" (Dr. Terry Dean)

U043 **Watson, Leslie Dawn and Holly Dorsey** "Got Milk? Recladent Does" (Dr. Wendi Hulsey)

U044 **Stewart, Katharine Ann** "Using Ratings of Perceived Exertion to Equate Ventilatory Threshold" (Dr. Steven R. Wininger)

WESTERN KENTUCKY UNIVERSITY

Concurrent Paper Session Number 3
1:00-3:25 pm

Room 112 Undergraduate Presentations

1:00 pm **Capillo, Gregory*** "The Farm: Growing a New World" (Dr. Anthony Harkins)

1:15 pm **Colvin, Joseph Brandon*** "A Reasonable Alternative: The Role of Midge in Hitchcock's *Vertigo*" (Dr. Karen Schneider)

1:30 pm **Acquisto, Mary Alexandra** "Unrelenting Ideologies" (Dr. Glenn W. LaFantasie)

1:45 pm **Magee, Jessie*** "William Faulkner the Humanist: How His Nobel Prize Acceptance Speech Changed How We Interpret 'Barn Burning'" (Dr. Mary Ellen Miller)

2:00 pm **Smith, Corey** "An Exposition of Saint Augustine's Theory of Knowledge" (Dr. Arvin Vos)

2:15 pm Discussion

Room 113 Undergraduate Presentations

1:00 pm **Smith, Dalene** "Water Chemistry of a Small Karst Aquifer, Hart County, Kentucky" (Patricia Kambesis, M.S.)

1:15 pm **Bowman, Rachel* and Luke Akridge** "Using Visual Art to Teach Matrix Transformations" (Drs. Peter Hamburger and Bruce Kessler)

1:30 pm **Stewart, Patrick C.* and Michael E. Smith** "Sound Localization in *Otocinclus affinis*" (Dr. Michael Smith)

1:45 pm **Allen, Tyler Stephen and Donna Kridlebaugh** "Detection of p-Ethylphenol-Producing Organisms Using the p-Coumaric Decarboxylase Gene" (Dr. Kinchel Doerner)

2:00 pm **Walker, Rhonda** "Reintroduction of the *Apios priceana*" (Drs. Todd William and Naomi Rowland)

2:15 pm **Pruitt, C.J. Michelle*** "Adsorption Efficiency and Partitioning Capability of Surfactant Monolayers on Gold" (Drs. Eric D. Conte and Stuart C. Burris)

2:30 pm **Davenport, Christopher, Kyle Moss, Ronald Hopper, and Phillip C. Womble** "Building Access Security Using RFID Technology" (Dr. Phillip C. Womble)

2:45 pm **Pike, Lonnie Joe and Justin Clark** "Bryant International Thermal Management System" (Dr. Robert Choate)

3:00 pm Discussion

Room 138 Graduate^/Undergraduate Presentations

1:00 pm **Ufelle, Alexander Chukwuma, Emmanuel Iyiegbuniwe, and M. Christine Nagy** "A Pilot Study on Occupational Hearing Loss Assessment of South-Central Kentucky Farmers: Part 1" (Drs. Emmanuel Iyiegbuniwe and M. Christine Nagy) ^

1:15 pm **Nation, Chris** "An Examination of Communication Patterns: Understanding City Year's Nonprofit Communicative Messages" (Dr. Jennifer Mize-Smith) ^

1:30 pm **Burton, Cory L. and Ashley N. Bartholomew** "Aging Preserves the Ability to Perceive 3-D Object Shape from Static but not Deforming Boundary Contours" (Dr. Farley Norman) ^

1:45 pm **Aldridge, Cody** "Social Movement Convergence: A Photo Ethnography of the 2009 Presidential Inauguration" (Dr. Saundra Ardrey) ^

2:00 pm **Blake, Katherine L.** "Recycling: The College Suites Project" (Dr. Molly Kerby)

2:15 pm **Murray, Andrew and Alicia Smith** "Developmental Changes in Racial Categorization" (Dr. Kelly Madole)

2:30 pm **Nevins, Matthew D.** "Integrating Commerce and Banking: What Would Make New Entrants Attractive?" (Drs. William Davis, Richard Cantrell, and Michelle W. Trawick)

2:45 pm **Digges-Elliott, Lark** "Preconceived and Embryonic Notions" (Dr. Michael Seidler)

3:00 pm Discussion ^ *Graduate*

Room 163A Undergraduate Presentations

1:00 pm **Pinner, Jim and Tony Merriam** "The Web Accessible Robotic Device" (Drs. Stacy Wilson and Walter Collett)

1:15 pm **Gregory, Haley** "Comparative Analysis of Network Traffic Pattern Databases" (Dr. Phillip C. Womble)

1:30 pm **Lane, Stephanie** "Constructing Bacteriophage Mutants by Recombineering" (Dr. Rodney King)

1:45 pm **Hall, Jason*, Steve Huskey, Reyes Quintero, and Mitch Gibbs** "Pattern of Suction Generation in an Elongate Fish" (Dr. Steve Huskey)

2:00 pm **Hayes, Nathan and Charles Krish** "Automated Panoramic Camera Mount" (Dr. Stacy Wilson)

2:15 pm **Musser, Jason, Brett Bolen, and Keith Andrew** "Examining Minimal Length in Quantum Mechanical Barrier Penetration" (Dr. Brett Bolen)

2:30 pm **Paaso, Esa Aleksi and Scott Allen Smith** "Mobile Phone Electro Magnetic Simulations with Finite-Difference Time-Domain (FDTD) Technique" (Dr. Walter Collett)

2:45 pm **Sellers, Hannah M.** "Habitat for Humanity" (Dr. Molly Kerby)

3:00 pm **Webb, Jeremy*** "Screening RNAi Transformants for Reduced Expression of the Photoreceptor Crypto-chrome" (Dr. Sigrid Jacobshagen)

3:15 pm Discussion

Room 163B Graduate Presentations

1:00 pm **Edlin, Diana J., Stephen Flomo, and Nathan Howell** "Heirloom and Hybrid Tomato Yield in Organic and Conventional Production Systems" (Drs. Martin Stone and Elmer Gray)

1:15 pm **Sriramula, Phenahas G.** "Infrared Study of Some Rhenium Pyridazyl Complexes for Oxidation Reactions" (Dr. Chad A. Snyder)

1:30 pm **Maddi, Shravya Reddy** "The Role of Chlamyrhodopsin Protein in the Light Entrainment of the Circadian Clock in *Chlamydomonas reinhardtii*" (Dr. Sigrid Jacobshagen)

1:45 pm **Cho, Gyuchoon** "Driver Safety System" (Dr. Ahmed Emam)

2:00 pm Discussion

Room 163C Undergraduate Presentations

1:00 pm **Kipsiro, Daniel Kiplagat and Dong-Jin Lee** "Hybrid Bicycle Project" (Dr. Michael McIntyre)

1:15 pm **Hubble, Dalton*** "Fabrication of Poly(2-Hydroxyethyl Methacrylate) by Hot Filament Chemical Vapor Deposition" (Dr. Rebecca Carrier)

1:30 pm **Song, Doran K.* and Gretchen Fraze** "Detection of Two Photoreceptors, Phototropin and Cryptochrome, through Western Blot Analysis" (Dr. Sigrid Jacobshagen)

1:45 pm **Freeman, Julia and Donna Kridelbaugh** "Indole Production by *Clostridium scatologenes* under Different Nutritional Conditions" (Dr. Kinchel Doerner)

2:00 pm **Wolff, Schuyler*** "The Revised Rate of Supernovae in the Local Universe" (Dr. Louis-Gregory Strolger)

2:15 pm **Burchett, Brandon, Stephen Flomo, Diana Edlin, Martin Stone, Elmer Gray, and Nathan Howell** "Impact of Red and Black Plastic Mulch on Yield of Field Grown, Staked Tomatoes" (Dr. Martin Stone)

2:30 pm **Brunner, Chelsea Elizabeth** "Geochemistry of Chilean Andes Lava Flows" (Dr. Andrew Womble)

2:45 pm **Gorski, Michael** "Waterborne Threat Interdiction" (Drs. Phillip C. Womble and Keith Andrew)

3:00 pm Discussion

WESTERN KENTUCKY UNIVERSITY

Paper and Poster Abstracts

Graduate Papers

Aldridge, Cody "Social Movement Convergence: A Photo Ethnography of the 2009 Presidential Inauguration" (Dr. Saundra Ardrey)

This photo ethnography demonstrates the diverse groups and organizations represented during the week of the 2009 Presidential Inauguration in Washington D.C. This presentation will describe the convergence of various social groups to create the largest Inaugural crowd in U.S. history. A detailed photo account will be provided to support research findings. [page 23]

Aldridge, Jessica R. "The 2009 Presidential Inauguration: Media Expectations and the Reality of the African-American Experience" (Dr. Saundra Ardrey)

This presentation explains how media expectations shaped the impression management undertaken by African Americans during the 2009 Presidential Inauguration. Participant observation at the Inauguration and documentary research displayed that the Inauguration was a peaceful, historic, and emotional experience that exceeded all expectations. [page 12]

Bartholomew, Ashley N. See Burton, Cory L.

Beers, Amanda M. See Jennings, L. RaShae

Bollu, Lakshmi Reddy "Regulation of Corneal Endothelial Cell Proliferation by Endothelin1" (Dr. Kenneth Crawford)

The purpose of this study is to determine whether the down regulation of cyclin dependant kinase inhibitor's levels by Endothelin-1, will overcome the G1 phase arrest and promote cell cycle progression and wound healing in cultured bovine CECs. The serum starved BCECs were treated with Endothelin-1 for 24 hours. The control cells were left untreated in serum free medium. Total cellular protein was isolated using RIPA buffer. The relative

expression of cyclin dependant kinase inhibitors (p27 and p21) in response to Endothelin-1 was determined by western blot. We observed that cell division in sub-confluent cultures increases with Endothelin-1 treatment. Densitometry of immunoblots revealed an increase in the expression of p27 and p21 in confluent cultures when compared to sub-confluent, dividing cells. P21 was undetectable in sub-confluent, actively dividing cultures. Endothelin-1 treatment for 24 hr led to a dose-dependent decrease in p27 and p21 expression in confluent cultures. Expression of p27 and p21 is greatly reduced in actively dividing BCECs. Endothelin-1 treatment down-regulated these cyclin dependent kinase inhibitors and may promote cell cycle progression via this method. [page 14]

Burton, Cory L. and Ashley N. Bartholomew "Aging Preserves the Ability to Perceive 3-D Object Shape from Static but not Deforming Boundary Contours" (Dr. Farley Norman)

A single experiment investigated how younger and older observers perceive 3-D object shape from deforming and static boundary contours. On any given trial, observers were shown two smoothly curved objects and were required to judge whether they possessed the "same" or "different" shape. The objects presented during "different" trials produced differently shaped boundary contours. The objects presented during "same" trials also produced different boundary contours, because one of the objects was always rotated in depth relative to the other by 5, 25, or 45 degrees. When there was no motion, the older observers performed as well as the younger observers. In contrast, the older observers obtained no benefit in performance at all from the deforming (i.e., moving) silhouettes. The reduced ability of older observers to perceive 3-D shape from motion is probably due to a low-level deterioration in the ability to detect and discriminate motion itself. [page 22]

Chahal, Monia "Health Insurance System in United States" (Dr. William Mkanta)

Health insurance is one of the important insurance subtypes in the US especially due to high cost of health care. In this research paper, we have discussed about both government funded and private insurance plans. We have also identified and summarized the problems of the present health insurance system. The main focus of our research work was to compare the

reforms proposed by 2008 presidential candidates. We have also evaluated the problems and changes suggested by some of the leading healthcare organizations like Robert Wood Johnson Foundation. A comparative analysis of the healthcare systems of various countries was also presented. Both democratic and republican healthcare reforms appeared costly given the current economic recession. However, the National Health Insurance approach suggested by President Obama has definitely been looked upon to have the potential to bring about significant changes in the US healthcare system if adopted. [page 8]

Cho, Gyuchoon "Driver Safety System" (Dr. Ahmed Emam)

The technology for driver safety has been developed in many fields such as airbag system, Anti-lock Braking System or ABS, ultrasonic warning system and etc. Recently, some of automobile company has introduced other feature of driver safety system. This feature is to find drowsy eyes and to make car slower. For instance, Toyota Motor Corporation announced that it has given its pre-crash safety system the ability to determine whether a driver's eyes are properly open with eye monitor. This paper is focusing on finding driver's drowsy eyes by using face detection technology. [page 24]

Cress, Justin "Consumer Driven Health Plans: Employer Take-Up and Average Contributions" (Drs. Alex Lebidensky, Claudia Strow, and David Zimmer)

In an era of rising health care costs, employers seek cost reduction strategies, many relying on consumer driven health plans (CDHP). Utilizing data from a nationally representative survey of firms, this paper outlines employer experiences with CDHP in two areas. First, it describes those firms most likely to offer CDHP. Second, this paper estimates potential cost reductions from an emphasis on CDHP. Results indicate large, non-union employers offer CDHP most often. Further, an emphasis on CDHP plans is not associated with a reduction in average contributions to insurance policies. [page 8]

Davis, Alecea See Ward, Sean

Edlin, Diana J., Stephen Flomo, and Nathan Howell "Heirloom and Hybrid Tomato Yield in Organic and Conventional Production Systems" (Drs. Martin Stone and Elmer Gray)

Tomatoes are one of the most valuable vegetable crops grown in the U.S. but Kentucky contributes less than 0.5% of this production. There is much potential in Kentucky for the niche markets such as heirlooms and organic production, especially. We compared yield of two heirloom cultivars, 'Mr. Stripey' (MS) and 'Cherokee Purple' (CP), to a commercial standard, 'Crista' (CR), under two production systems, organic and conventional. Plants were grown on plastic mulch, in raised beds, and received daily water. Harvesting began August 1 and continued two and three times a week for approximately 12 weeks. 'Crista' yielded more consistent, high quality fruit during the peak of season (mid-August to mid-September). Organic CP fruit weighed significantly more than those grown conventionally, but conventional CR weighed more than organic CR. CP produced significantly larger fruit under organic conditions while MS and CR produced larger fruit in conventional conditions. All tomato grades were better under conventional practices and there were no significant differences between organic and conventional for fruit number. [page 24]

Edlin, Diana J. See Flomo, Stephen

Flomo, Stephen, **Diana J. Edlin, Martin Stone, Elmer Gray, and Nathan Howell** "Investigation of Yield and Quality of Grafted Heirloom and Hybrid Tomatoes" (Dr. Martin Stone)

Tomatoes (*Lycopersicon esculentum Mill*) are one of the most popular vegetable crops grown for fresh market and processing in the U.S. Grafting involves the uniting of a shoot or bud scion with a rootstock to form a compound plant, mainly for managing soil-borne diseases and increasing crop yield. The objectives were to examine the effects of reciprocal and self grafts on tomato fruits, number of fruits, weight, and quality of the cultivars, 'Cherokee Purple', 'Mister Stripey', 'Crista', and 'Maxifort'. Grafted seedlings were planted at WKU Farm on raised beds, protected with red and black plastic mulch under drip irrigation system with regular supply of water. Matured fruits were harvested, weighed, and number of fruits from each plant recorded. The highest yielding combination was the scion 'Cherokee purple'

on ‘Maxifort’ rootstock , which produced 0.67 lb. and 1.64 lb. heavier fruits than ‘Crista’ and ‘Mister Stripey’, respectively. The grade of ‘Crista’ was superior to ‘Cherokee Purple’ and ‘Mister Stripey’ while ‘Mister Stripey’ produced greater fruits but were of lower quality. We found no advantage to self- grafting. [page 13]

Flomo, Stephen See Edlin, Diana J.

Gangula, Srilatha and John Loughran “Determination of Phenolics in Swine Waste Lagoons” (Dr. Eric D. Conte)

There is interest in the land application of manures (and municipal sludges when metal content is not a concern) to improve soil tilth and carbon content (i.e. carbon sequestration). It is believed that simple phenolics are important contributors to building humic substances in the soil and these phenolics are crucial to the long term stability of the soil carbon. We are investigating the presence of phenolic compounds in swine waste lagoons. Swine waste can potentially be used as manure. We are currently searching for the presence of specific phenolics, namely Caffeic acid, Sinapic acid, P-Coumaric acid, Syringic acid, 4-Hydroxy-3-Methoxy Benzoic acid in swine waste. These substances will be separated by high performance liquid chromatography. Further analysis will be made of the swine waste for the presence of other organic substances of interest. [page 14]

Golla, Rebekah J. See Ward, Sean

Golla, Rebekah J. “Recruiting International Students” (Dr. Aaron Hughey)

Higher educational institutions in the United States depend on international students for their research and academic contributions and for the economic impact they make on the federal, state, and local economy. Internationals also benefit from attending some of the most prestigious universities in the world. However, in their quest for higher education, internationals encounter difficulties at U.S. institutions such as fear of deportation, language barriers, social isolation, low self-esteem, and unfamiliarity with the U.S. educational system. These barriers may impede academic progress and distract them from their goal of graduation. In order for international students to achieve success in the United States and for the U.S. to remain competitive with other countries in recruiting some of the brightest minds around the world,

universities need to take special considerations to assist internationals' adjustment. Together the campus community can create an environment where diversity is valued and everyone feels welcome. [page 12]

Hill, Matthew See Ranapurwala, Shabbar

Howell, Nathan See Edlin, Diana J.

Howell, Nathan See Flomo, Stephen

Jennings, L. RaShae, Amanda M. Beers, Jessica M. Swindle, and Elizabeth M. Mullins "Stereoscopic Shape Discrimination is Invariant across Random Changes in Size" (Dr. J. Farley Norman)

An experiment evaluated observers' ability to discriminate the shape of 3-dimensional objects that varied in size and orientation in depth. The objects were defined by binocular disparity, Lambertian shading, and texture. On any given trial, two objects were presented that were either the same or different in terms of shape. When the "same" objects were presented, they differed in their orientation in depth by either 25, 45, or 65 degrees. The observers judged whether pairs of objects were the "same" or "different". The size of the objects was also varied by amounts up to ± 40 percent relative to the standard size. The observers' performance was strongly affected by the orientation changes in depth. In contrast, the observers' discrimination abilities were not affected by changes in size. It appears that human observers can perceive the 3-D shape of objects in a manner that is independent of size. [page 12]

Kandala, Hiranmayee "Study of the Variations in the Oxidation Onset Temperature of Biodiesel Caused by Different Antioxidants" (Dr. Wei-Ping Pan)

Greenhouse gas emissions have a devastating effect on global environment. About 33% of the greenhouse gases in the US result from transportation modules. The major culprit playing a very important role in global warming is the increased level of CO_2, which is released in the atmosphere by the burning of the fossil fuels. Hence the concept of Biodiesel is in lime light. Biodiesel, other than being renewable, eco-friendly with low sulfur and other gas emissions, has high flash point enabling for the safe handling. Biodiesel produces nearly three times the energy required to create it, maintains a

negative CO_2 balance, and surprisingly is as safe as common salt. One of the major problems associated with biodiesel is its Oxidative instability. My research presentation focuses on the production of biodiesel and variations in the oxidative onset temperature caused by employing different antioxidants. To maintain the fuel quality according to ASTM D6751 specifications, various natural and synthetic antioxidants like α-Tocopherols, Ascorbyl Palmitate, BHA, PrG are employed. The effect of the antioxidants on the gases evolved during the thermal oxidative degradation of the different fatty acid methyl esters in correlation with the oxidation onset temperatures is highlighted in the presentation. [page 10]

Kerr, David Michael "The Crusader Ideal: Richard I and Louis IX" (Dr. Rick Keyser)

"The Ideal Crusaders: Richard I and Louis IX" is a study of the motives of the Crusaders; it examines their goals, physical and spiritual, and how these goals were accomplished based on primary documents from various chroniclers. An incredible amount of respect and awe was attributed to the man who claimed or was remembered as a crusader. The goal of my paper is discover the true ambitions of the crusaders. Were there any men who could actually claim all the characteristics attributed to Crusaders? Also, How and why do these famous kings embody the image of the crusader? I attempt to define the ideal crusaders and his characteristics, explain specific moments in certain crusaders lives (Richard I and Louis IX) in which these characteristics shine through, and how these men became images of the Crusades. [page 8]

Kramer, Samantha "Time Resolved Studies of a Niobium Substituted Titanosilicate for the Determination of the Strontium Ion Exchange Mechanism" (Dr. Aaron Celestian)

The mechanics of ion exchange and ion mobility within zeolitic materials and aqueous solutions are not well understood due to the rate of reaction and the difficulty in probing the sample *in situ*. Time resolved X-ray diffraction is an excellent way to observe changes in the structure of zeolitic materials as a reaction occurs. The niobium titanosilicate has been shown to be an excellent material for selectively sequestering radioactive ions from aqueous waste solutions due to its remarkable resistance to high radiation doses and high pH. Using time resolved XRD we examined the fundamental ion exchange

mechanisms involved during diffusion of strontium ions. The structural modeling of high resolution XRD data by Rietveld methods has lead to the determination of the atomic positions of the ions and unit cell parameters. A significant change in symmetry results from the exchange process which we believe enhances its ion selectivity. [page 14]

Loughran, John See Gangula, Srilatha

Maddi, Shravya Reddy "The Role of Chlamyrhodopsin Protein in the Light Entrainment of the Circadian Clock in *Chlamydomonas reinhardtii*" (Dr. Sigrid Jacobshagen)

Chlamydomonas reinhardtii, a unicellular eukaryotic green alga, serves as a model organism to study the circadian clock in plants and animals. The alga shows a circadian rhythm of phototaxis, whose measurement has been automated. Rhodopsins are blue/green-light photoreceptors also found in *C. reinhardtii*. Chlamyrhodopsin (COP), the most abundant eyespot protein, was reported to have no role in the phototactic and photophobic responses in *C. reinhardtii*. We are hypothesizing that the function of COP is to mediate the entrainment of the circadian clock by light. In order to test this hypothesis, we are knocking down *cop* gene expression by an RNA interference mechanism. Strains with reduced COP protein levels will be tested for reduced abilities to entrain their circadian clock to light pulses as compared to the wild type control. The results of this research can be used to understand the circadian clock of many other organisms including humans. [page 24]

Mandadi, Deepika, Darwin B. Dahl, and Stuart C. Burris "A Characterization of Caffeine Imprinted Polypyrrole Electrodes" (Drs. Darwin B. Dahl and Stuart C. Burris)

Nanotechnology has received considerable attention with an ever-increasing demand for new combinations of techniques and methods that can aid in resolving challenging chemical issues. Complex analytical challenges require techniques that possess specificity, stability and sensitivity. Molecularly imprinted polymers (MIP) are proving to be very effective in the development of synthetic recognition systems and are of great interest to those interested in the field of sensor technology. This study examines electrode characteristics that lead to an enhancement in sensitivity and selectivity.

Caffeine is used to test imprinted polypyrrole electrodes using pulsed amperometric detection (PAD). The analytical response was evaluated after modification of MIP film thickness, imprint molecule concentration and rate of deposition. Sensitivity and selectivity results for these modifications will be presented. [page 13]

Marpuri, Reddysailaja "Comparison of Gene Ontology Term Annotations Between *E. coli* K12 Databases" (Dr. Claire Rinehart)

The objective of this project was to get up-to-date functional information on all genes of *E.coli* K12 strains based on genome ontology terms. Gene ontology is described by a defined library of terms related to the cellular, biological and molecular functions of a gene in an organism. The genome sequence of an organism gains its value when it is annotated with gene ontology terms, which bridges the gap from the sequence to the biology of an organism. Since we use annotated gene databases in the prediction of the function of newly sequenced genes, it is important to have databases that are complete and correctly annotated. We compare multiple *E.coli* databases for consistency and completeness in their gene ontology terms. [page 9]

Mullins, Elizabeth M. See Jennings, L. RaShae

Namara, Sarah "Management of Global Technology" (Dr. Mark Doggett)

Nowadays, technology has gone far beyond agricultural and industrial revolution. It has deeply penetrated all aspects of our daily lives including culture, communications, business and commerce. Such areas are increasingly dependent on technology. To a large extent, technology has made our lives easier--it has made us more powerful than before. However, its use has at the same time raised several questions. There are concerns that if left unchecked, technology has the potential of doing more harm than good. For example, it can lead to environmental degradation. This is a big challenge. In this presentation, we will highlight on this challenge, and make suggestions on how to overcome it through effective management of global technology. This presentation will address the nature of technology; the emerging technologies; and the implications of advanced technology on aspects such as culture, communication, business, commerce, and the environment. The presentation will provide insights on effective global management. [page 12]

Nation, Chris "An Examination of Communication Patterns: Understanding City Year's Nonprofit Communicative Messages" (Dr. Jennifer Mize-Smith)

Nonprofit organizations, much like for-profit organizations, create and respond to various communication messages on an ongoing daily basis. It is these messages that cultivate identification, inspire motivation and create a perception of that organization to its audience. Recognizing the importance of communicative messages of an organization, this paper seeks to explore the nature of City Year, a Boston based nonprofit, and how they create and deliver their vision and mission to inspire and inform their primary audience: youth and donors. Organizational Identification and Fisher's (1987) Narrative Paradigm are used in this textual/thematic analysis to apply meaning to City Year's external messages. [page 22]

Onyenaucheya, Teddy E. and Lakshmi V. Narasimhan "Reliability Analysis of Wireless Sensor Networks for Oil Spill Monitoring Application" (Dr. Lakshmi Narasimhan)

This paper examines reliability issues in the architecture, implementation and management of wireless sensor networks. It develops relevant qualitative and quantitative metrics that are useful in determining the residual lifetime of a sensor network. The lifetime of a sensor network is important to a wide spectrum of users because such data would enhance around the clock monitoring of oils spill hazards by providing an early detection mechanism. This will in turn impact positively on oil spill contingency planning and control activities. Sensor network lifetime is defined in the context of the energy provided by battery power that drives network operation. This is because efficient network operation depends to a large extent on how the sensor nodes thrive on limited power. By taking a process-driven approach towards innovation of a specific commercially available product, a case study is developed that provides useful information for future upgrades. [page 10]

Ranapurwala, Shabbar and Matthew Hill "Environmental Health Service Learning and Water Quality in Gales Point, Belize" (Dr. Ritchie Taylor)

As part of the WKU International Health and Human Service Learning Program, an assessment of the local water supply in Gales Point, Belize was conducted. Gales Point is a small rural village located on the Caribbean Sea

coast of Belize. Belize is a developing country thus access to safe drinking water can be problematic, as was observed on the local scale. The lack of technical, managerial and financial capacity coupled with the rural location of the village, create water resource management challenges. The service learning program provided medical, dental, and environmental health services to the community. The environmental health team has collected source water and drinking water samples over a three year period. Quamina Creek, the sole source of public water for this community, is contaminated with fecal coliform bacteria and *E. coli*. This water is pumped directly into homes completely untreated. The overarching purpose of the drinking water assessment was for the environmental health team to identify possible solutions for the protection and provision of safe drinking water to rural villages in Belize. Working with the Ministry of Health, Water Quality Branch, the environmental health team is developing strategies for capacity development of rural water systems in Belize from the national to village scale. [page 14]

Sadhnani, Mahesh "WKU: Costs and Consequences of Smoking on Campus" (Dr. Cecilia Watkins)

The purpose of this presentation is to make people realize the harmful effects of smoking on young adults and the financial drain caused by smoking to campuses all over the country. We shall use the data gathered from various sources and analyze how problematic the costs and consequences of smoking are all over United States, with a focus on Kentucky. The current policies and trends in Kentucky with regards to smoking shall also be explored. The costs associated with smoking on Western Kentucky University's campus and the harmful effects of second-hand shall also be discussed. The objective is educating university management and the public about the huge financial and health costs associated with smoking on the university campus. [page 12]

Sakampally, Vara Prasad Reddy "Increased Control over Gold Colloid Adsorption on Substrates for Colloid Displacement Lithography" (Dr. Stuart C. Burris)

We have optimized the conditions for gold colloid particle adsorption for colloid displacement lithography using a scanned probe microscope. The system consists of a scrupulously cleaned glass surface coated with

poly(diallyldimethylammonium chloride) (PDDA) and then with 5-nm gold colloid particles. The optimum conditions include the use of very low molecular weight PDDA (avg MW <100,000 g/mol) or low molecular weight PDDA (avg MW 100,000-200,000 g/mol) with an exposure time to the glass substrate of 120 to 150 minutes followed by a 24-hour exposure to the colloid solution. We are also investigating on potassium iodide, potassium bromide, potassium chloride, sodium fluoride, sodium sulfate, potassium hydrogen phosphate, potassium hydrogen phthalate, sodium citrate and potassium phosphate as potential blocking agents of which the sulfate salt has shown interesting features as a potential blocking agent. The ultimate goal of this work is the construction of nanometer scale electronic devices and sensors. [page 9]

Scott, Joseph Brian "On-Metal Synthesis of Some Pyridazyl Rhenium Complexes" (Dr. Chad A. Snyder)

Pyrroles and their derivatives have been of great interest for conductive polymers due to their novel properties and environmental stability as compared to non-aromatic analogs (e.g. polyacetylene). There are a few reports owing to the synthesis toward pyrrole formation that would be useful for polypyrrole research, such as the Paal-Knorr synthesis. However we are interested synthesizing organometallic pyrroles from pyridazyl complexes for polymer research. Pyridazyl complexes of rhenium were synthesized in three steps beginning from 1,2-diacylcyclopentadienes. These complexes are expected to undergo ring contraction to their corresponding pyrrole complexes by utilizing the Boger and coworker's conditions. 1,2-Diazines treated with activated zinc powder in glacial acetic acid yielded pyrroles in high yield (up to 92%). Synthesis and characterization of $[Re(CO)_3\{1,2\text{-}C_5H_3(CRN)(CRN)\}]$ (R = Ph, Tp) are reported here. [page 9]

Sriramula, Phenahas G. "Infrared Study of Some Rhenium Pyridazyl Complexes for Oxidation Reactions" (Dr. Chad A. Snyder)

Our group is focused on the synthesis of organometallic pyridazines and pyrrole complexes. These complexes have potential use in the field of organometallic semiconductors and catalysis. For this research, it is important to accurately predict which pyridazine monomeric complexes will be good candidates for oxidation/reduction reactions following polymerization.

Infrared analysis, of the rhenium CO triple bond, is a useful characterization tool that has been used to determine pyridazine eligibility. On-metal synthesis and IR analysis of some pyridazines complexes are reported here. [page 24]

Starnes, Daniel L. "Plants Can Produce Nanoparticles" (Dr. Shivendra Sahi)

At the dawn of the 20th century the scientific and research focus was to build on ever larger and bolder scales. Now here in the 21st century some of the biggest breakthroughs in science have occurred on the exceedingly small nano-scale. 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. With today's focus on sustainability and environmental protection there is also an additional interest in the "Green" synthesis of these nanomaterials. We have found that various plant species have the potential to synthesis gold nanoparticles from chloroaurate. 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 and produce various nanoparticles. Currently we are evaluating the nanoparticle production qualities of Alfalfa. [page 14]

Subramanian, Yamuna Devi "Technology in Healthcare and Its Impact on Quality and Outcomes" (Dr. William Mkanta)

Information technology is increasingly recognized as an essential tool for improving patient safety and quality of care by promoting evidenced-based medicine. This paper examines use of Electronic Medical Record (EMR) in healthcare. It focuses on the successful implementation of EMR in Veterans Affairs Health System and the fruitful results it has given to the VA health services. By using the VA example, the paper further explains the importance of expanding EMR use and how it can be used to improve patient satisfaction and other remarkable benefits for patients. We have concluded that all major entities in the provision of health services including physicians, hospitals, and other healthcare organizations should shift towards paperless record keeping systems by adopting EMR for effective and timely care delivery. [page 8]

Swindle, Jessica M. See Jennings, L. RaShae

Truba, Natalie Prisbe "Perceived Beliefs, Stereotypes and Biases about Terminally Ill Children, Adults and Persons, Their Personality Characteristics, and Their Chance for Survival" (Dr. Rick Grieve)

Understanding how individuals perceive those who are ill has many implications to our health care system. Having an understanding of whether or not people view adults who are terminally ill, children who are terminally ill and people, in general, who are terminally ill more negatively then those people who are believed to not have a terminal illness, or are perceived as "healthy," may help us understand why certain people live longer, or increase their chances of living longer, then other people. We will randomly sample undergraduate Western Kentucky University and use several different vignettes to evaluate whether people believe that terminally ill children are more resilient, and have more positive personality characteristics, than terminally ill adults and that terminally ill persons have more negative personality characteristics than non- terminally ill persons, which could influence how health care providers, friends and family members react to them and influence their quality of care and life. After we finish collecting and interpreting our data we will present our findings. [page 8]

Ufelle, Alexander Chukwuma, Emmanuel Iyiegbuniwe, and M. Christine Nagy "A Pilot Study on Occupational Hearing Loss Assessment of South-Central Kentucky Farmers: Part 1" (Drs. Emmanuel Iyiegbuniwe and M. Christine Nagy)

American farmers face an increasing risk of occupational hazards as a result of the unique work environment. Noise induced hearing loss is one of the most prevalent occupational hazards of farming. The present occupational hearing loss assessment was conducted among a sample of farmers in South Central Kentucky through the use of self-administered hearing loss survey questionnaire on occupational noise exposure. A total of 9 full time farmers (8 men and 1 woman) participated in the survey and their ages ranged from 19-59 (mean = 31 and median = 27) years. Approximately 44% of the respondents reported that they were married and have college education. The results further indicated that more than half of the respondents seldom or never wore hearing protection but understood the negative effects of noise induced hearing loss during farming or recreational activities. Ear plug was

the predominant form of hearing protection used by the farmers. The health and economic implications of hearing loss among farmers cannot be overlooked, hence various prevention and control measures have been recommended to reduce noise exposures among this population of rural farmers. [page 22]

Ward, Sean, Alecea Davis, and Rebekah Golla "Focusing the Lens: Building Internationalization on Campus" (Dr. Cecile Garmon)

With the push toward internationalization, university administration increasingly looks at study abroad programs as a way to increase individual levels of intercultural communication competence. While students benefit from their experiences abroad, research highlighting how the university as a whole benefits from the push to send students abroad remains lacking. Furthermore, these issues have not been examined through a leadership lens such that communication and the style of leadership impact the structure that creates internationalization. This essay looks to the structuration communication theory to examine how a duality of structure can create a link between study abroad participants and university administration. Furthermore, the essay looks to an ethical transformational leadership style as a means to develop communication between leaders and followers for true internationalization on campus. The University Internationalization Matrix using the core components of leadership, ethics, and communication will provide a structure for universities to effectively build internationalization on campus. [page 8]

Zervas, Peter and Philip Lienesch "Age, Growth, and Diet of the Yellow Bass, *Morone mississippiensis"* (Drs. Philip Lienesch, Michael Stokes, and Scott Grubbs)

Barren River Lake is a typical southeastern flood-control reservoir located in the southern Pennyroyal region of Kentucky on the border of Allen and Barren counties. Although native the Ohio River Drainage, *M. mississippiensis* is non-native to Barren River and subsequently, the Barren River Lake; they were accidentally introduced in the 1990s. The purpose of this study is to gain information on the age, growth, and diet of *M. mississippiensis* in Barren River Lake, Kentucky. Three general sampling regions were chosen and sampled monthly beginning in March 2008.

Individuals were captured using a boat-mounted electro-fisher and immediately transferred to ice. The fish were then transported to the lab for processing where I recorded length, weight, and collected scales, otoliths, and the entire gut, which I preserved for later diet analysis. Most adults switched from a diet of larval insects to small *Dorosoma,* but some became exclusively zooplanktivorous. Yellow bass life history traits will be discussed in relation to recent declines in the white bass population. [page 10]

Undergraduate Papers

Acquisto, Mary Alexandra "Unrelenting Ideologies" (Dr. Glenn W. LaFantasie)

As the second half of the nineteenth century began, the United States was experiencing its most violent sectional conflict in history. "Unrelenting Ideologies" attempts to address the opposing perspectives that did indeed exist between Northerners and Southerners in Antebellum America. It examines closely, the events that further aided in the widening of the sectional gap, such as the Dred Scott Decision, and the establishment of the new Republican Party. The theme, however, centers upon Southerners and their aspiration for an ideal liberty. Ironically, their ideal liberty only functioned if an inextricable bond with slavery was present. My research also alludes to the understanding of the South's unwavering persuasions—that they were indeed a catalyst for the Civil War. Conclusively, it was the harsh opposition of ideologies in the North and South that eventually, inevitably, crippled them as a nation. [page 21]

Akridge, Luke See Bowman, Rachel

Allen, Tyler Stephen and Donna Kridlebaugh "Detection of p-Ethylphenol-Producing Organisms Using the p-Coumaric Decarboxylase Gene" (Dr. Kinchel Doerner)

Malodorants, produced by anaerobic bacteria in animal waste, are a major source of public complaint. p-Ethylphenol is a long-lived malodorant produced by beef and swine production units. Previously, a *Lactobacillus* sp. which generates p-ethylphenol from p-coumaric acid was isolated from a hog waste lagoon. Also, lactobacilli from other environments are known to

produce p-ethylphenol by expression of the p-coumaric acid decarboxylase gene (*pdc*). Here we explore use of the *pdc* gene as a molecular tool to detect p-ethylphenol producing organisms in swine lagoon enrichments. Polymerase chain reaction experiments using *pdc*-specific primers indicate 1) the *Lactobacillus* sp isolate, swine lagoon, and swine lagoon enrichments all exhibit products consistent with the presence of the *pdc* gene suggesting this gene may be involved in p-ethylphenol production. Experiments in progress are testing the hypothesis lactobacilli populations in swine lagoon and swine lagoons enrichments are the microbial components responsible for p-ethylphenol production. [page 22]

Andrew, Keith See Musser, Jason

Bartlett, Derrick "Innovative Bio Fuel" (Dr. Kevin Schmaltz)

Due to concerns of energy cost and supply, as well as the environmental issues, WKU Mechanical Engineering and WKU Agriculture are collaborating to construct a bio-diesel processing plant at the Agriculture Farm. The ME Senior project will benefit the campus and community, as well as provide experience operating a small facility for WKU ME students. The bio-diesel facility being installed is a 500 gallon batch bio-diesel processing facility which will process 6000 gallons of waste cooking oil annually from WKU Food Services and convert it into bio-diesel for use by the WKU agriculture farm vehicles. This is the second year of the project is sponsored by Ogden College and the Department of Agriculture. The current senior project team, Innovative Bio Fuel, is completing the facility construction, and will be processing and testing the bio-diesel fuel produced to develop operating and safety procedures for the facility. [page 13]

Bender, Shelley Lenora "Cemetery Roads: The Evolution of Cemetery Architecture in Bowling Green, Kentucky Pre-1900" (Dr. Guy Jordan)

For the early settlers, South Central Kentucky was a wild, untamed land fraught with dangers. This wilderness, which would later become part of Warren County and the city of Bowling Green, was home to early explorers and the families of Revolutionary War veterans. These intrepid pioneers were from many different cultural backgrounds. When they brought their wives and children to carve out better lives, they brought their cultural traditions

and customs with them. However, these old ways were adapted to their new experiences, and those adaptations are reflected in the cemetery architecture of Bowling Green, Kentucky. By researching area historical cemeteries and photographing almost four thousand grave markers, I have found that cemetery architectural styles changed significantly from pioneer days to 1900. Austere markers influenced by Protestantism were common during the 1700's but gave way to more ornate styles throughout the 1800's, which reflects the romantic Victorian appreciation for symbolism and melodrama. [page 7]

Beville, Chelsea A. "Time and Beyond Time" (Dr. Joseph Trafton)

"Time and Beyond Time" is a essay that attempts to unravel the minutiae of one man's theory on the passage of time. C.S. Lewis' theory "does not involve going back in time, traveling to the future, or changing history. It involves stepping out of time and looking back in, in order to examine it and use the explanation to gain a clearer view the Creator and His relationship with His creations." The theory Lewis proposes in *Mere Christianity* shapes the ways he crafts his fantasy novels, such as *The Chronicles of Narnia* and *Perelandra*. The paper aspires to explore the theory itself, and how it is embedded in his other works. [page 12]

Blake, Katherine L. "Recycling: The College Suites Project" (Dr. Molly Kerby)

My research project focused on gender and racial perspectives involved in waste recycling within my residential community, College Suites. Over a time frame of five months, I discussed awareness of the importance of recycling with the other residents and met with the manager to discuss why the complex has never implemented its own recycling unit. I soon learned it was because no one had ever researched the information and brought it to her attention. My next step was determining prices for apartment complex communities and I learned that it was relatively cheap for each unit to have its own recycling box. My biggest feat was to develop a plan to entice residents to want to recycle. I went door to door asking people if they had the option of recycling if they would. I learned that women were more motivated to recycling than men (race was not statistically significant). [page 23]

Bolen, Brett See Musser, Jason

Bowman, Rachel and Luke Akridge "Using Visual Art to Teach Matrix Transformations" (Drs. Peter Hamburger and Bruce Kessler)

A teaching method for matrix transformations in R^2 was developed using works of visual art altered by matrix transformations. The program was created using Mathematica 6.2 to compute and display the transformed works of art. The coordinates of each pixel of the works were multiplied by a matrix in R^2 repeatedly to form altered images and animations. The images and animations created exemplify the effects of different types of transformation matrices on a point or vector in space. Stochastic, shear, rotational, and dilation matrices were used to transform the images. A pixel multiplied by each type of matrix any number of times produced a changed image. These images show the effects of matrix transformations in a manner that is more engaging for students. [page 21]

Brunner, Chelsea Elizabeth "Geochemistry of Chilean Andes Lava Flows" (Dr. Andrew Wulff)

Mineral phases of lavas from the DGCA complex of the Southern Volcanic Zone of the Chilean Andes were analyzed using an electron microprobe and scanning electron microscopy. Samples were taken in stratigraphic order from four sections along the flanks of the volcano; lavas examined were from section CDCN. Four polished thin sections were analyzed for precise chemical compositions of crystal phases. Petrogenetic processes which formed the lavas may be inferred with these mineral data. Mineral phase chemistries of ground mass pyroxenes, phenocryst growth zones, and equilibrium feldspars were analyzed. Differences (e.g. Mg#, FeO*, alkali elemental ratios, mineral rim compositions) were evaluated between the phase chemistry and the surrounding equilibrium matrix material. Crystal chemistries will be compared to bulk chemistry from powdered samples of the same section for petrogenetic analysis. These data are fundamental in characterizing the eruptive history of volcanic complexes, such as in the Andes where exposure is ideal. [page 25]

Burchett, Brandon, Stephen Flomo, Diana J. Edlin, Martin Stone, Elmer Gray, and Nathan Howell "Impact of Red and Black Plastic Mulch on Yield of Field Grown, Staked Tomatoes" (Dr. Martin Stone)

Tomatoes represent an underserved niche opportunity for Kentucky agriculture because of the growing demand for locally grown food. We determined the influence of red or black plastic mulch color on the size, weight, grade, and number of tomatoes produced. This was part of a larger study involving grafting plants and organic production techniques. Plants were field-grown, staked, and irrigated daily with drip tape at the WKU-AREC in Bowling Green. Plants were harvested 2 -3 times each week for twelve weeks. We found that black plastic mulch produced more fruit per plant than red plastic ($p<0.05$). However, the fruits grown on red plastic mulch were larger, heavier, and graded higher (fewer flaws) than those grown on black plastic mulch. Because red plastic mulch costs up to four times more than black, economic analysis is needed to determine whether the advantage for red plastic is cost effective. [page 25]

Capillo, Gregory "The Farm: Growing a New World" (Dr. Anthony Harkins)

There are fewer more stark indications of an unhealthy society than an unstable or insecure food supply. The rash of food-borne illnesses both in meat and vegetables cannot help but create environmental angst among some Americans at the dawn of the 21st century. Yet if there is one great American tradition, it is that of the pioneer. While several different political entities lay claim to the singular founding element of the United States, they all boil down to the opportunity to move and create a new way of life if one is displeased with their current state. I will show what malcontents and revolutionaries dissatisfied with how society treats the environment today can learn from the lessons of the last wave of pioneers seeking a new and better way of life, the hippy communes of the 1960's. I will focus specifically on the largest and most successful of these, the Farm, located outside of Hohenwald, Tennessee discussing their religious beliefs and their effects on their experiment to find a better way. [page 21]

Clark, Justin See Pike, Lonnie Joe

Clayton, Russell "Logan Aluminum Lighting Upgrade" (Dr. Stacy Wilson)

The goal of our project is to help the Logan Aluminum plant in Russellville, Kentucky to reduce the costs of power consumption by performing an efficiency upgrade on their current lighting system. Logan's energy costs have increased significantly in the past year and upgrading the lighting in this massive 35 acre factory environment will greatly reduce their power consumption. The goals of our project include specifying the lighting fixtures, planning the upgrade for the entire plant, and performing economic analysis in order to determine how the new alternative lighting upgrade would benefit Logan Aluminum over time. The majority of the fixtures that are currently being used at Logan are older, less energy efficient metal halide fixtures. Research must be done to find a suitable replacement for these fixtures. Once a list of suitable replacement fixtures is selected, economic power calculations will be performed to determine how much energy these replacement fixtures will save the company over a 3, 5, and 10 year period. Visual simulation software will also be used to test the performance of the current and future lights in the factory environment. This software is able to calculate lighting intensity at different heights in order to be sure that there will be sufficient lighting throughout the plant. An attempt an increase of lighting intensity using the new fixtures while still decreasing power consumption throughout the plant. [page 9]

Colvin, Joseph Brandon "A Reasonable Alternative: The Role of Midge in Hitchcock's *Vertigo*" (Dr. Karen Schneider)

My presentation analyzes of one of the most overlooked characters in Alfred Hitchcock's oeuvre: *Vertigo*'s (1958) Marjorie "Midge" Wood. Approaching Midge from a functional perspective, I seek to define her integral role in providing a standard of pragmatic "normalcy," which allows for audience identification and which grounds *Vertigo*'s ethereal mystery in an everyday context. I also tackle the controversial issue of whether or not Midge is intended as a sympathetic character and how this impacts her significance in the narrative. Centering my argument around the use of cinematic point-of-view in a few key scenes and Hitchcock's decision to excise an alternate ending from the film's final cut, I suggest that while Midge's rational alternative to *Vertigo*'s irrational events is depicted as understandable and

viable, it is not presented as entirely desirable or sympathetic, preserving the ambiguity that is central to *Vertigo*'s thematic concerns. [page 21]

Cook, Kyle W. "Correlations of Optical and Gamma Ray Variability of Blazars" (Dr. Michael Carini)

For the past 8 years Western Kentucky University has built a database of collected data on the optical variability of approximately 50 members of a class of astronomical objects called Blazars, a subset of which is under observation by the Fermi Gamma Ray Space Telescope. The FGST is monitoring these Blazars in the gamma ray wavelengths which makes it possible to conduct efficient correlations between optical and gamma ray variability. My role in this research begins with the collection of the optical data using WKU's network of telescopes, and continues in the reduction and analysis of this data for inclusion in the database. In addition, by using the Fermi public archive we will be able to access the gamma ray data for variability correlations with the optical which should give an indication of the jet dynamics. This research has been conducted with the assistance of the Kentucky Space Grant Consortium. [page 9]

Cooper, Brian "Line-Scan X-Ray Imaging System: Feasibility Study" (Dr. Alexander Barzilov)

We are developing a quick low-dose digital x-ray imaging system that could be used for health services and security applications. The system is based on the line-scan camera method. The collimated x-ray source moves together with a linear photon detector along the scanned object providing its two-dimensional image. The Monte Carlo radiation transport code MCNP was used to design the collimator and to shape the millimeter-thick fan-type photon beam. The ionization chamber was modeled to be 0.7 meters long and was filled with Xenon, which has a high concentration of protons. The electric fields in the intra-electrode space of the detector, ion and electron processes in xenon, and current induced in pixel electrodes were modeled using Maxwell and Garfield codes. The results of the computational studies of the physics processes in the system to evaluate its feasibility will be discussed. [page 15]

Cox, Mason Alexander "Pinochet" (Dr. Sonia Lenk)

Si estudiamos la historia, podemos evitar repetir los errores del pasado y corregirlos. Este ensayo es un análisis de la dictadura de Augusto Pinochet, los efectos que tuvo en la economía de Chile y el rol que desempeñó los Estados Unidos al ayudar a Pinochet a tomar control del gobierno. Examinar la intervención de los Estados Unidos en la política de Chile nos lleva a entender mejor el tipo de política exterior sobre nuestro país y expresarnos como ciudadanos al respecto. Pese a que este tema ha sido bastante documentado, este trabajo lo examina usando distintos textos y puntos de vista cuestionando el rol intervencionista de los Estados Unidos. Esta presentación se centra en el aspecto de los derechos humanos, específicamente como encontrar justicia para las familias de las víctimas al mismo tiempo que se trata de unir a la nación y reinsertarle en la democracia. [page 12]

Davenport, Christopher, Kyle Moss, Ron Hopper, and Phillip Womble "Building Access Security Using RFID Technology" (Dr. Phillip Womble)

Security is very important at the API because there are currently many projects dealing with the Department of Defense and the Department of Homeland Security, and with growing threat with security these projects must be protected. Additionally the API carries radioactive sources that also need limited access. RFID technology allows for limited access to the building and certain project areas. Radio Frequency Identification (RFID) is a technology where identification is verified by passing an RFID tag by a corresponding RFID reader. The RFID tag is an object that can be used to identify or track a person, animal or product using radio frequency. RFID tags contain two parts, an integrated circuit for storing information and an antenna for receiving and transmitting the signal. The API currently uses Passive RFID tags which are incorporated into a badge upon which is printed a picture, a name, and an access level. "Passive" means the tag does not contain a battery; power is produced by a magnetic field generated by the RFID reader when the tag is close enough. This allows the card to be smaller, such as the size of a credit card. At the API we have also added wired network capabilities that allow us to control more than one door with the same computer. With these tags and badges, we have created a sophisticated building access system with a small amount of money. [page 22]

Deaton, John Colvin "A Feasibility Study of Implementing a Wind Turbine in South Central Kentucky" (Dr. Stacy Wilson)

The goal of this project is to determine the feasibility of adding a wind turbine to generate supplemental power for Logan Aluminum. To accomplish this goal, research of several different wind turbines is being conducted to determine the maximum power output anticipated given the expected wind speeds in the region. This information will be used to estimate the amount of time that it will take to create a return on the initial investment. If it is not currently feasible, an assessment will be made regarding what variables must change and by how much for the project to become feasible. [page 10]

Deignan, Robert "Hand in Hand to Hell: Blanche DuBois and Norma Desmond as Victims of Genre" (Dr. Karen Schneider)

Author Sam Staggs once noted that Blanche DuBois and Norma Desmond belong "in the lineup of magnificent doomed women…". Though Blanche is the tragic heroine in Elia Kazan's family melodrama *A Streetcar Named Desire* while Norma plays the role of the femme fatale in Billy Wilder's film noir *Sunset Boulevard*, these two women indeed share a kindred spirit: they refuse to accept their fates and, instead, embrace a fantasy in which they are still idealized women. Yet, audiences are not allowed to sympathize equally with these women, for the different film genres become lenses through which viewers watch the stories unfold, influencing their responses. Audiences must work their way through the architecture of genre in order to see Blanche and Norma for what they share: a fiery desire to resurrect a bygone era and a romanticized image of the self. [page 7]

Dias, Vidal B. "Regional Study of the Hydrocarbon Potential of the Marcellus Shale in Pennsylvania" (Dr. Michael May)

The Middle Devonian shale of the Central Appalachian Basin also known as the Marcellus Formation has been known to be a gas producing shale for the last few decades. This thermally mature, fractured, and organic-rich shale has high average log porosity ranging from about 5 to 7 percent and is being exploited at various depths in units ranging from as little as 50 feet to as much as several hundred feet thick. Variation in shale thickness and depth is most pronounced from east to west. There is an estimated 500+ trillion cubic

feet (TCF) of gas in place in the Marcellus Formation in the Appalachian alone (NY, PA, WV and northeastern KY). This volume is enough to meet U.S energy demands for about two years and this represents an estimated present market value of about one trillion dollars. [page 10]

Digges-Eliott, Lark "Preconceived and Embryonic Notions" (Dr. Michael Seidler)

This paper justifies embryonic stem cell research as an ethical pursuit of science. At the same time it argues that such research must be tempered by moral guidelines and a careful characterization of the tissue involved, that is, the embryo. An understanding of the history of in vitro fertilization (IVF) provides guidance for the embryonic stem cell research debate. Special attention is paid to the attitude of those who defend the 'rights of embryos' and how drastically that attitude may change depending on the embryo's intended use: for IVF or for embryonic stem cell research. The Kantian argument about not using people as a mere means to an end is also explored, with attention to the agency of early embryos. Ultimately, the use of human embryos to create stem cell lines is found to be as morally justifiable as their creation for reproductive purposes. [page 23]

Dooper, Jennifer "Sifting Through Symbols: Interpreting the Beautiful in Three Hawthorne Short Stories" (Dr. Sandra Hughes)

This paper addresses moral and symbolic ambiguities in three of Nathaniel Hawthorne's short stories and their subsequent effects on the interpretation of beauty within the works. The paper seeks not to define beauty within "Rappaccini's Daughter," "Young Goodman Brown" and "The Birthmark" but rather to make parallels between the respective ambiguities in the stories and the subjective nature of beauty presented by Hawthorne. By citing numerous symbols of beauty and exploring their implications within the questionable realities of the stories, the paper provides an exposition of Hawthorne's symbolic assertion that beauty cannot be confined. The paper concludes by admitting that the effects of beauty are as varied as the number of meanings Hawthorne invites his readers to ponder within his stories. [page 7]

Downen, Matthew Ross and Andrew Wulff "Young Lavas of the Casitas Shield" (Dr. Andrew Wulff)

This project examines the whole-rock geochemistry of multiple sections of stacks of lava flows from the Descabazado Grande Cerro Azul Volcanic Complex in the Southern Volcanic Zone of the Chilean Andes to determine the behavior of volcanoes. In 2002, samples were taken in stratigraphic order from stacks of lavas from the Casitas shield exposed in valleys on the flanks of the volcanoes that had been carved out by the erosive action of glaciers. Samples were weighed, crushed, powdered, and fused into glass discs that were then analyzed with XRF to determine the whole-rock geochemistry. The lava flows are basaltic andesites with a composition of 52%-54% silica and 4%-4.7% magnesium. These lava flows are from the youngest two of four eruptive cycles analyzed. The geochemistry of the eruptive cycles gives insight to the petrogenetic processes responsible for changing the composition of the lava flows from the original source of magma. [page 14]

Edlin, Diana J. See Burchett, Brandon

Edwards, Angelena Brittany "Effects of Drought on Small Stream Communities of Fish" (Dr. Philip Lienesch)

During severe drought, small streams often dry to small isolated pools with subsequent high densities of fishes. Under such conditions, fish may be stressed by high temperatures, low food availability, and lack of refugia from predators. I was interested in whether fish restricted to isolated pools burn more calories than they take in, resulting in a loss of storage lipids (high energy molecules) in their bodies. During the 2007 drought, I conducted a fish survey of small stream communities in the Drake's Creek watershed in south central Kentucky. I examined storage lipid content by processing each fish through a series of petroleum ether washes and calculated the % storage lipid in each fish's body. The average % storage lipid of fishes in isolated pools was decrease than that from free flowing streams. The results will be discussed in relation to the effects of droughts on stream fishes. [page 14]

Flomo, Stephen See Burchett, Brandon

Fraze, Gretchen See Song, Doran K.

Freeman, Julia and Donna Kridelbaugh "Indole Production by *Clostridium scatologenes* under Different Nutritional Conditions" (Dr. Kinchel Doerner)

Clostridium scatologenes produces 3-methylindole (3-MI) and indole. Previous research indicates *Cl. scatologenes* produces 3-MI in rich media but not in a defined medium (DM) with glucose (DMG). However in DMG, *Cl. scatologenes* generates indole. Research was conducted to further explore growth conditions which lead to indole production. *Cl. scatologenes* was tested for indole production in DM, DM with all natural amino acids except tryptophan (AA), DMG, and DMG+AA. Duplicate cultures were started, measured for growth by spectrophotometry and samples were drawn for determination of indole by HPLC analysis. As expected DM did not produce indole, and DM+AA produced indole late in growth (48 hrs). DMG produced indole throughout growth and DMG+AA produced indole early in growth (24 hrs) but failed to produce indole at 48 hrs. These data suggest *Cl. scatologenes* paradoxically spills indole when grown in DM+AA or DMG+AA and may re-utilize the indole late in growth. [page 25]

Gibbs, Mitch See Hall, Jason

Gilson, Emily, Maria Hougland, Steve Huskey, Andrew Rhyne, and Nicolai Konow "Modulation of Prey-Capture Behavior in the Goliath Grouper, *Epinephelus itajara*" (Dr. Steve Huskey)

The ability of a predator to interpret prey constraints and employ different predatory behaviors is known as modulation. Generalist-feeders exhibit variability in the behaviors used to capture diverse prey. Our objective was to determine if goliath groupers, capable of eating many organisms on the reef, will demonstrate modulation of feeding behaviors relative to the type of prey consumed. High-speed video recordings were utilized to quantify feeding behaviors in the wild. Kinematic analyses revealed significant differences in the feeding behaviors of goliath groupers relative to prey type and/or location. Analysis of prey-capture behaviors revealed that goliath groupers feeding on live fish in the water column demonstrated larger excursions, increased velocities, faster timings, and greater angles as opposed to their behavior while feeding on dead fish located on the ocean floor. Goliath groupers employ highly variable behaviors to capture their diverse diet and their predatory breadth likely shapes entire reef communities. [page 10]

Gorski, Michael "Waterborne Threat Interdiction" (Drs. Phillip C. Womble and Keith Andrew)

There is currently little defense against terrorist attacks from beneath the water, making this an area of high vulnerability for the Department of Homeland Security. Plans for an acoustic impulse generator are being developed for deterring hostile underwater intruders and disrupting underwater equipment that threaten our ports and our naval assets. The proposed generator will launch a highly collimated acoustic wave into the water that has enough energy to deter or disable hostile divers and disrupt their underwater equipment from a great distance. The first challenge in this project is to determine whether: 1) A pressure wave of large amplitudes can be focused and 2) the wave will dissipate its energy before striking the target. We are currently using the multiphysics program COMSOL as well as Mathmatica to solve the Kohklov-Zabolotskaya-Kuznetsov (KZK) equation for wave characteristics while accounting for numerous conditions, such as temperature, viscosity, density, and bulk modulus. [page 25]

Gregory, Haley "A Comparative Analysis of Network Traffic Pattern Databases" (Dr. Phillip C. Womble)

The Cyber Defense Laboratory at Western Kentucky University is developing a Network Traffic Archive. This Network Traffic Archive will be a database used to archive the patterns of typical network traffic packets. After an extensive internet search for companies that have developed similar databases, it has been found that no existing database currently meets the specifications of WKU-CDL's Network Traffic Archive. Companies such as MITRE, Bit9, MD Pro, NG-Mon, and What-is-exe have databases of packet information but the majority are malware related. This paper will describe the Network Traffic Archive being developed at WKU-CDL and compare it with the existing databases. [page 23]

Gurung, Laxmi See Paaso, Esa Aleksi

Hall, Jason, Steve Huskey, Reyes Quintero, and Mitch Gibbs "Pattern of Suction Generation in an Elongate Fish" (Dr. Steve Huskey)

Suction feeding is a dominant mode of feeding in fishes. Though much research has been devoted to this topic, little is known about the dynamics of the subambient pressures that occur inside the buccal cavity. For trumpetfish, *Aulostomus chinensis*, and other fish with elongated jaws/skulls, the

transmission of suction through the buccal cavity is potentially highly variable and the length of their jaws may compromise feeding performance. The purpose of this project was to quantify the potential variation in suction pressure in a fish with an elongated buccal cavity. High-speed video and pressure recordings revealed: 1) where suction is initially generated, 2) where suction is the greatest, and 3) the time delay between posterior and anterior pressure peaks within the buccal cavity. For predators with highly specialized morphologies such as elongate skulls there is a significant trade-off with feeding performance that likely shapes their overall feeding habits and prey-capture success. [page 23]

Handzic, Ismet, Mensur Paocic, and Jonathan Rutledge "Passive Residential Cooling System" (Dr. Kevin Schmaltz)

For this project, a team of three Mechanical Engineering seniors have designed a passive cooling system for a model house roof top with the intention of decreasing the energy consumption to cool the building. The design project was sponsored by the American Society of Heating, Refrigerating and Air-Conditioning Engineers. Building roofs have the greatest exposure to heat and are a major contributor to heat gain inside houses. The project team has focused on lowering the heat gain. The team investigated the use of evaporating water on the roof to shield incoming solar energy and to decrease the temperature on the roof and inside the house. After the building and testing of the lab system, the team has concluded the project by providing a statement of feasibility and they have looked at possible full design proposals for a residential scale building. [page 10]

Hayes, Adrienne "*Suite Antique:* Flute and Piano" (Dr. Heidi Pintner)

Suite Antique, originally scored for flute, strings, and harpsichord, pays homage to a Baroque *suite* with modern features. A Baroque *suite* is a genre that has several movements in the same key and based on the form and style of dance music. There are six movements in the *Suite Antique* for flute and piano; originally scored for flute, strings, and harpsichord. Rutter combines Bach-imitated sounds and a modal jazz scheme to his *suite*, which gives variation and uniqueness to the tone color of the flute and piano. Throughout the *suite,* triads with added seconds, circle of fifths chords, jazz improv, swinging polyrhythm, and a folk dance are heard that help aid the thematic

material. . John Rutter is exceptional through his presentation of intense rhythmic passages and picturesque lyrical melodies in *Suite Antique*; these textures evoke an influence of Bach and modern styles of jazz and folk dance. [page 11]

Hayes, Nathan and Charles Krish "Automated Panoramic Camera Mount" (Dr. Stacy Wilson)

The task for the Automated Camera Mount team is to design and construct a camera mount that will automatically rotate the camera and release the shutter to collect digital photos that can be used to create a panoramic or 3D environment. This mount will accommodate various sizes of cameras and lenses and allow the photographer to have minimal contact with the actual camera, which will allow for much greater accuracy. In the end, after a few specifics are given to the interface, the photographer will be able stand back and let the automated mount do all the work. [page 23]

Hopper, Lindsay See Phelps, James R.

Hopper, Ronald See Davenport, Christopher

Hopper, Ronald See Phelps, James R.

Hougland, Maria See Gilson, Emily

Howell, Nathan See Burchett, Brandon

Howton, Jonathan "Is Cryptochrome the Light Receptor that Resets the Circadian Clock in *Chlamydomonas*?" (Dr. Sigrid Jacobshagen)

Cryptochrome is a strong candidate for the primary photoreceptor that perceives the daily light/dark cycles to entrain the circadian rhythms in the unicellular green alga *Chlamydomonas reinhardtii*. In order to test cryptochrome's importance to entrainment in *C. reinhardtii*, the light-induced resetting of the circadian rhythm of phototaxis of a wild type strain will be compared to that of a transformed strain with reduced cryptochrome levels. In a first step towards this goal, the extraction of the cell wall degrading enzyme autolysin was successfully performed so that the transformation would not be inhibited by the cell wall. It enabled another student to transform the wild type strain CC48 using an RNA interference construct

designed to silence the gene responsible for cryptochrome synthesis. Experiments are currently underway to harvest total protein from various transformants and test the samples using western blot analysis to determine if a significant reduction in cryptochrome was induced. [page 14]

Hubble, Dalton "Fabrication of Poly(2-Hydroxyethyl Methacrylate) by Hot Filament Chemical Vapor Deposition" (Dr. Rebecca Carrier, Northwestern University)

Using hot filament initiated chemical vapor deposition (CVD), biocompatible poly(2-hydroxyethyl methacrylate) (pHEMA) polymers were deposited in thin-film coatings onto silicon substrata to develop current techniques for the manufacture of topographically biomimetic culturing templates. Degradation and spectroscopy studies on developed polymers examined factors contributing to pHEMA film longevity and methods for tailoring polymer properties. The pHEMA polymers fabricated demonstrated significantly more rapid degradation than has previously been observed using similar plasma enhanced CVD methods. Results highlighted the affects of CVD reaction parameters on pHEMA properties, with implications for improving the tailoring of specialized polymers for a variety of biomedical and tissue engineering applications. [page 25]

Kiefer, Jennifer "Repressing the Feminine: The Role of the Female Gender in *Frankenstein* and *Mary Shelley's Frankenstein*" (Dr. Sandra Hughes)

On the surface, Mary Shelley's *Frankenstein* appears to be a cautionary tale about the scientific power to create and give birth to a reconstituted human being. However, Shelley's monster tale is encrypted with overlying messages about the female gender. The paper explores, in detail, themes of gender in both the novel *Frankenstein* and Kenneth Branagh's film *Mary Shelley's Frankenstein*, examining the consequences of two polar female identities: Shelley's original tale is one of voiceless females, a largely feminized creature, and male domination of the solely female ability to give birth, while Branagh's film presents strong female characters, stressing the incestuous relations of Victor and Elizabeth, the inspiration of monstrous birth, and the silencing of confident, independent females by male characters. The paper concludes that the females perish whether strong or weak, and in both the

film and the novel, the creature becomes feminized in its creation, rejection, and abandonment. [page 11]

Kipsiro, Daniel Kiplagat and Dong-Jin Lee "Hybrid Bicycle Project" (Dr. Michael McIntyre)

A hybrid bicycle is a bicycle designed for general-purpose utility or commuter cycling on paved and unpaved roads, paths, and trails. Also known under such names as City bike, Cross bike, or Commuter, the hybrid takes design features from both the road bicycle and the mountain bicycle with the goal of making a bike for general commuting and transportation. The goal of this project is to study the overall design of the electric bicycle, check the efficiency and improve the bicycle. Studying the project will consist of redesigning parts and, installing new devices. Currently the electric bicycle rides short distances and the battery charge gets low very fast. Since the goal of this project is to increase the efficiency of the bicycle through the redesigning, devices will be put in to measure the data round the routes established. This data will be used to determine the project efficiency. The gathered data will be speed, calories burned, and distance covered. With more distance covered than before, less calories burnt and maintained speed, the efficiency of the bicycle will have been improved. Safety issues will also be examined. [page 25]

Koeneman, Molly "Elizabeth Bennett Finds Happiness" (Dr. Katherine Green)

In my research of Jane Austen's *Pride and Prejudice* I found arguments against the independent nature of the heroine, Elizabeth Bennett. In the eighteenth century, a woman was in dire need of the stability that comes with marriage. Without it the female would be left to the good will of male relatives, a gender of relatives Elizabeth Bennett was lacking. Given the stipulations of her society, Elizabeth is a strong, independent woman whose qualities are emphasized by the women she encounters. Just because she ends up marrying a deliciously wealth and handsome gentlemen does not take away her much earned title of an early feminist character. [page 7]

Konow, Nicolai See Gilson, Emily

Konow, Nicolai See Riggs, Michelle

Kramer, Kelly and Andrew Wulff "Petrogenetic Evolution of The Casitas Shield" (Dr. Andrew Wulff)

This project studies the whole-rock geochemistry of lava flows from the Casitas Shield in the Descabazados Grande-Cerro Azul complex in the Southern Volcanic Zone in the Chilean Andes. Lava samples were collected in stratigraphic order from stacks of lava flows exposed in several locations on the walls of cirques on the flanks of the volcano. The samples were weighed, crushed, powdered, fused and analyzed with the XRF. Four eruptive cycles were examined in this fashion. This project focuses on the oldest of these four. While lavas from all four cycles analyzed were found to be basaltic andesite in composition, flows from the oldest eruptive cycle are noticeably higher in MgO, K2O, and P2O5 and lower in total Fe. The geochemical data will be augmented with petrographic data to determine the dominant petrogenetic process for each eruptive cycle. Results will be used to model the geochemical evolution of the volcanic complex. [page 13]

Kridlebaugh, Donna See Allen, Tyler Stephen

Kridelbaugh, Donna See Freeman, Julia

Krish, Charles See Hayes, Nathan

Lane, Stephanie "Constructing Bacteriophage Mutants by Recombineering" (Dr. Rodney King)

Bacteriophage are viruses that infect bacteria and they are useful models for understanding how genes are regulated. All members of the Lambda phage family share a similar genetic organization and control early gene expression by suppressing transcription termination; this process is called antitermination. The mechanism of transcription antitermination in the lambdoid phage HK639 differs greatly from its relatives. Antitermination in HK639 is mediated by an RNA molecule, whereas in other lambdoid phages it is mediated by a phage-encoded protein. Here, we report the construction of mutations in HK639 by employing a relatively new technique called "recombineering". The effect of the mutations on bacteriophage growth was determined. A mutation in a gene called M3 inactivated the virus. Although the function of the M3 gene is unknown, our results show that it is essential for phage growth. [page 23]

Lee, Dong-Ji See Kipsiro, Daniel Kiplagat

Lindsey, Bobby See Schroll, Austin

Lodmell, Matthew and Kyle Moss "ZigBee Radios for Homeland Security Applications" (Dr. Phillip C. Womble)

There are three key elements in successful ionizing radiation detection for Homeland Security Operations. These elements are: 1) detection of the radiation 2) identification of the radiation emitting source and 3) location of the radiation source. This project addresses the location of the radiation source using radiation detectors communicating using the ZigBee (IEEE 802.15.4) standard. Three or more of the ZigBee radios (transceivers) exchanging information with each other can automatically form a mesh or star network. In addition to the collected data, the units send and receive signals to determine their relative location through triangulation. Knowing the position of one module can allow the relative positions to map all the transceivers with their data. This system can be utilized in several applications, one being the tracking of radioactive materials. By attaching a radiation detector to the radios, the intensity of the radiation can be recorded and mapped. Knowing the intensity of the radiation at specific locations can determine the size and location of the radioactive source. [page 9]

Lowery, Benjamin Wilson "The Earth Abideth Forever: The Theme of Impermanence in Romantic Poems" (Dr. Deborah Logan)

An opening verse of the book Ecclesiastes states that "Generations come and generations go, but the earth remains forever" (Ecclesiastes 1.4). This passage illustrates the human conception of impermanence, or mortality. Humankind and all the fruits of its labors are destined not to last, and it is the task of every person to decide how one should cope with this reality. The impermanence of humanity elicits various responses from poets, but none can be as pervasive and poignant as those expressed by the Romantic poets Anna Barbauld, Percy Shelley, William Blake, and John Keats. These poets deal with the issue from different perspectives and express divergent attitudes despite the similarities in content. Barbauld and Shelley focus on the impermanence of human society while Blake and Keats discuss the mortality of the individual. [page 7]

Magee, Jessie "Protecting Walden Pond: A Step towards Defending Ordinary Nature in the United States" (Dr. Anthony Harkins)

This paper explores the history of land protection in the United States, specifically looking at Walden Pond. Walden Pond, where Henry David Thoreau lived and wrote the masterpiece *Walden*, was later protected because of its place in American history rather than because of its exceptional natural qualities. This paper explores the reasons behind giving such a place the distinction of National Historic Landmark by the National Park Service and justifies protecting historic and cultural lands because they are ecologically ordinary and the important role the land serves for the surrounding community. [page 7]

Magee, Jessie "William Faulkner the Humanist: How His Nobel Prize Acceptance Speech Changed How We Interpret 'Barn Burning'" (Dr. Mary Ellen Miller)

"William Faulkner the Humanist" addresses different aspects of humanism in Faulkner's writing, specifically using the short story "Barn Burning" for examples. After Faulkner gave his Nobel Prize acceptance speech, which discusses the endurance of man and the compassionate spirit inherent in everyone, the world realized it had been misinterpreting the themes and characters in his writing. No longer believing him to be a naturalist like many of his contemporaries and predecessors, literature enthusiasts and the general public alike took a second look at his work to discover its humanist qualities. This paper explores those humanist aspects by using the famous short story, "Barn Burning." [page 21]

Marquardt, Joseph Ronald "Molecular Tools for Understanding the Population Genetic Effects of Habitat Restoration" (Dr. Jeffrey Marcus)

Habitat isolation and fragmentation has been found to lead to restrictions in gene flow between fragmented butterfly populations. Much of the fragmentation in south central Kentucky is the result of extensive grazing and other agriculture uses of natural habitats. The Conservation Reserve Enhancement Program (CREP) aims to remedy this problem, among others, by replanting natural vegetation destroyed by grazing and initiating land use changes away from agriculture. Six butterfly species will be used; two

believed to be directly affected by the seed plantings, two believed to be indirectly affected by land use changes, and two unaffected by the process. The use of a genetic fingerprinting technique known as Randomly Amplified Fingerprints (RAF) was used to study the population structure of these butterflies. By collecting data in the early stages of CREP we can compare this data to future data obtained after the program matures and determine the program's efficacy. [page 13]

McPeak, Ryan "Uruguay: Causas y Efectos de la Emigración entre 1963 y 1975" (Dr. Sonia Lenk)

Los Estados Unidos se ha formado por inmigrantes de distintos países. El entender mejor por que las personas de un país como el Uruguay deciden migrar nos da un mejor entendimiento sobre algunas de las causales de la migración. En el caso de Uruguay hubo una gran ola emigratoria entre 1963 y 1975. Después de una investigación en distintos textos, encontré información sobre las causas que motivaron a muchos uruguayos a abandonar su país. En mi presentación hablaré sobre la mala situación económica de este país en los años sesentas y el golpe de estado que ocurrió en 1973. Adicionalmente, hablaré sobre los efectos que este éxodo causó en la situación financiera y de seguridad social y los efectos que tuvo en los países vecinos que aceptaron la mayoría de los emigrantes. [page 12]

Merriam, Tony See Pinner, Jim

Meyer, Brett See Schroll, Austin

Mink, Jared "Transformation of *Medicago sativa* with *Agrobacteria* to Create Insecticidal Plants" (Drs. Shivendra Sahi and Priya Padmanabhan)

Highly efficient transformation can be achieved with the Alfalfa plant (*Medicago sativa*) using *Agrobacterium*-mediated transformation. As the fourth most widely grown crop in the United States, Alfalfa is an extremely important plant. Because of the significant damage caused by insects, there is a need to develop alfalfa expressing insecticidal traits, which we are attempting to create via our experiment. We used *Agrobacteria* to transfer the plasmid gene pcry2A to the alfalfa. The cry2A plasmid contained a gene from the Bacillus thuringiensis (Bt) bacteria that causes the recipient alfalfa to express an insecticidal trait. The transgenic alfalfa calli were cultured on a

Murashige and Skoog (MS) plate for growth and development. The growth media contained Ticarcillin and Kanamycin, for the elimination of Agro-bacterium and for the selection of plants that displayed transgenic qualities, respectively. The current data suggests that a small percentage of the alfalfa cells were transformed by this plasmid. Molecular analysis will be further performed to determine the expression of the transformed gene. [page 9]

Moss, Kyle See Davenport, Christopher

Moss, Kyle See Lodmell, Matthew

Moss, Kyle See Simpson, Michael

Moyers, Austin and Andrew Wulff "A Geochemical Comparison of CDCS and CDCN Valley Lava Flows" (Dr. Andrew Wulff)

The focus of this project was to correlate stratigraphic lava flows using primarily geochemical characteristics of lavas sampled from the Casitas shield of the Descabezados Grande-Cerro Azul volcanic complex of the Central Chilean Andes. Methodology included crushing, powdering, and the fusing of eight rock samples. The fused samples were analyzed using X-Ray Fluorescence to determine the whole-rock geochemical composition of each sample. Samples ranged from basaltic to basaltic-andesite (SiO_2 = 51.4 – 54.07 Wt%; MgO = 3.96 – 4.02 Wt%). Some samples from the north side of the CDC valley strongly correlate with the south side samples. All southern samples are tholeiitic, but a majority of the northern samples are calc-alkaline in affinity. Geochemical parameters may be incorporated into petrogenetic models of magma mixing, fractional crystallization, assimilation, and partial melting. These data will then be compared to other data from lavas erupted elsewhere in the Southern Volcanic Zone. [page 9]

Murray, Andrew and Alicia B. Smith "Developmental Changes in Racial Categorization" (Dr. Kelly Madole)

Race is a powerful social category in American society, but how race is categorized unclear. In comparison to many object categories, racial categories have very "fuzzy boundaries" so that perceivers must rely on an ambiguous pool of identifying features, the nature of which remains unexplored. The current study examines the role of skin color and facial

features in the process of categorization. Sixteen younger children (7-9), fifteen older children (10-12) and ten adult participants viewed African-American and European-American faces that had been altered by a cropping process in which skin tone was the same for both face types. Participants pressed keys to indicate racial category membership. Results indicate younger children had more errors (19.3%) than either older children (11.9%) or adults (5.6%). Finally, there was a Face race X Age group interaction: Adults had fewer errors when categorizing African-American faces, younger children made fewer errors with European-American faces. [page 23]

Musser, Jason, Brett Bolen, and Keith Andrew "Examining Minimal Length in Quantum Mechanical Barrier Penetration" (Dr. Brett Bolen)

Tunneling is one of the first non-classical predictions that arise from quantum theory. Most theories of quantum gravity require a minimal length to be introduced. This forces a change in the form of the Schrödinger equation. We will discuss the effect of adding a minimal length to the Schrödinger equation for the case of quantum mechanical tunneling. [page 24]

Nevins, Matthew D. "Integrating Commerce and Banking: What Would Make New Entrants Attractive?" (Drs. William Davis, Richard Cantrell, and Michelle W. Trawick)

Consumers have preferences and tastes. That fact is simple, however, being able to forecast and predict what those preferences of a group of consumers in a specified market area proves to be very complex and difficult. Forecasting the size of a bank, using deposits, in a specified market area using regression analysis is complex. In fact many of the factors this writer thought previously to be important in choosing one bank over another proved to be statistically insignificant. Numerous discussions and debates have ensued over the integration of commerce and banking. The effects of competition and profits margins, the stability of markets and industries, the overall effect on the economy, etc. are heavily argued and investigated. These are indeed vital topics to consider, but more fundamentally this writer wanted to identify factors that newly integrated banks could focus upon in order to pull deposits out of specified market areas. [page 23]

Nichols, Matthew Edward and Phillip C. Womble "Analysis of Electromagnetic Pulses on Nuclear Impulse-Driven Spacecraft" (Dr. Phillip C. Womble)

In the early 1950's, General Atomics began work on a manned external pulsed plasma propulsion spacecraft named Project Orion. The particular method of propulsion investigated incorporated the detonation of nuclear weapons to produce external thrust and drive the rocket, and several experiments during Cold War weapons testing proved that the project was mechanically feasible. However, electromagnetic pulses are produced during nuclear blasts and can damage computers and communications devices regardless of shielding. Our group utilizes MCNP and COMSOL Multiphysics computer models to study the ionizing and electromagnetic effects on nuclear pulse propulsion spacecraft and internal electrical systems as well as the effects of shielding by various materials. Furthermore, we will investigate the effects of the Earth's magnetic field while initially launching the spacecraft, and various visual simulations based upon these calculations will be presented. This work is supported in part by the Applied Research and Technology Program of Western Kentucky University. [page 13]

Olmsted, Galen E. "Ceramics and Art" (Dr. Guy Jordan)

Clay is a material that has long been stigmatized by the high modern art world as being practical and functional. Craft mediums have always had a direct connection with life, often decorating living spaces, setting our tables, or playing symbolic roles in rituals, but not with critical thought or self-critical examination. It is this direct connection with life that can prevent critical art from taking place. That is to say, when a viewer is disconnected from any use of an art object, he or she can look and analyze from a perspective stripped of pragmatic issues of function and can deal directly with the medium and the art. My presentation will explore the connections between ceramic art and high art in an attempt to break down the barriers that can narrow thought and vision. [page 11]

Osburn, Kaitlen M. "*Waiting for Godot*: We Are All Born Mad. Some Remain So." (Dr. Andrea Grapko)

Samuel Beckett's *Waiting for Godot* is recognized as one of the most quintessential scripts in the Absurdist canon, an assertion that is explored in this essay. A brief introduction to Absurdism follows an explanation of *Godot*'s noteworthy production history in the past half-century. An analysis of Beckett's use of language, themes, and character follows to provide insight to the enduring popularity of this "bottomless" and "timeless" tragicomedy said so often to describe the human experience so poignantly. [page 8]

Paaso, Esa Aleksi and Scott Allen Smith "Mobile Phone Electro Magnetic Simulations with Finite-Difference Time-Domain (FDTD) Technique" (Dr. Walter Collett)

Electromagnetic tools such as FDTD technique can be used to simulate the radiation effects from cellular phones. Since its development in the mid 1970's the effectiveness of FDTD method has increased exponentially due to the advances in computer calculation speed. Today FDTD has become a widely used tool to simulate electromagnetic wave propagation. As mobile telephones use ultra high frequency (UHF) electromagnetic waves to communicate, the radiation effects associated with it need to be considered. Our research goal is to investigate and construct simulations that will demonstrate the effects of UHF waves with different frequencies and with different transmission power levels. Our main focus is Specific Absorption Rate (SAR) calculations, which describe the energy absorbed by the body when exposed to UHF electromagnetic fields. [page 24]

Paaso, Esa Aleksi, Jack Wallace, and Laxmi Gurung "Creation of Void Detection Robot for Subsurface Void Detection" (Dr. Stacy Wilson)

The WKU Department of Engineering in support of the Center for Cave and Karst Studies is developing a remotely controlled robot that will be used to locate voids underground. The robot is a remotely controlled vehicle that uses microgravity and GPS to accurately detect and measure voids below the surface. The robot maneuvers rough terrain and carried the microgravity meter (MGM) to locations that may be unsafe for people. This robot has many applications which include search and rescue and location of underground caves or tunnels. The robot also contains a GPS system with centimeter accuracy that will allow the user to precisely locate caves, tunnels, or air pockets underground. The system can read elevation of ground and

height of the machine to ground at each station (measuring point). Also, the robot has the ability to self-level the MGM. Other system requirements have been identified during the design phase of this project. It is anticipated that the robot will be able to function up to a mile from the operator. It is hoped that this robot will also be used in military applications to locate other types of voids underground such as tunnels and bunkers. This paper will describe the construction of the robot and the use of microgravity technology to locate subsurface voids with the robot. [page 14]

Paocic, Mensur See Handzic, Ismet

Perrin, Anne Gray "*Guess Who's Coming to Dinner:* The Web of Racial, Class, and Gender Constructions in Late 1960s America" (Dr. Anthony Harkins)

This paper analyzes *Guess Who's Coming to Dinner* (1967) as a means of understanding the effects of the Civil Rights movement on the constructions of race, class, and gender in popular culture within the context of the late 1960's social movements. The film is set up as a problem film in which there is a clear resolution to the dilemma of interracial relationships, and it presented itself as a challenging and realistic examination of current social issues. However, the perfection of the characters into archetypes and the simplicity of the plot sterilized the reality of interracial associations for the time period. Contemporary newspaper articles questioned both the authenticity of the film by examining interracial relationships across class lines and the validity of Hollywood's racial liberalism. Mark Harris argues rightly in *Pictures at a Revolution* that the popularity of the movie reflected that it was in keeping with mainstream liberalism but that the rising criticism of Sidney Poitier's character points to the rise of the more militant faction of the Civil Rights Movement. I agree that the censure of *Guess Who's Coming to Dinner* is actually a reproach of the moderate, integrationist movement and that its reception marked a turning point in the American cultural consciousness that preceded Black Power and Black Nationalism. Harris as well as previous scholars such as Thomas E. Wartenberg, Naomi Angel, and Andrea Levine, however, have focused on gender and racial issues separately. Instead of seeing the movie as primarily a commentary of racial issues, I argue that the way it portrays the resolution of political conflict

solely between elite black and white men defines racial politics as who has the power over white women. Therefore, the movie's simultaneous depiction of the class and gender hierarchy is the means by which the social category of race is preserved. [page 8]

Phelps, James R., Ronald Hopper, and Lindsay Hopper "Cyber Defense at WKU" (Dr. Phillip C. Womble)

It is well known that modern society depends heavily on computer networks to fulfill even its most basic functions, and while this continuing trend towards furthered digital interconnectivity certainly has advantages it also creates new avenues for criminals activity. As such, the security of our networks has become an issue of the utmost importance; as the ability to safely transfer digital information now directly impacts the lives of a vast amount of the global populace. For current trends in progress to continue into the future unhindered new methods and tools must continually be developed to ensure the integrity of our global communication infrastructure. WKU's Cyber Defense Laboratory (CDL) is host to several projects aiming to increase the knowledge and efficiency of the network security field. This talk will be an overview of the facilities and current projects at the CDL, along with their place within the larger cyber security community. [page 11]

Pierce, Joshua J. See Simpson, Michael

Pike, Lonnie Joe and Justin Clark "Bryant International Thermal Management System" (Dr. Robert Choate)

TCP engineering, a senior design team from Western Kentucky University was approached with a project of designing a Thermal Management System (TMS) within the interior of military vehicles. This design project is sponsored by Bryant International who will help coordinate design requirements and specifications. This prototype design will have special focus and implementation requirements meeting that of the Stryker LAV. The Stryker is an eight-wheeled light armed vehicle which has primarily been used in Iraq and Afghanistan in the "War on Terror." This project's intentions are to improve the attentiveness of military personnel and reduce environment related electronic equipment failure by conditioning the air. The conditioned air must help compensate for the internal and external heat flux

generated within the vehicle leading to extreme heat stress on both the military personnel and instrumentation. [page 22]

Pinner, Jim and Tony Merriam "The Web Accessible Robotic Device" (Drs. Stacy Wilson and Walter Collett)

The Web Accessible Robotic Device (hereafter 'WARDen') is a multi-year project in which successive teams of senior students will build upon the accomplishments of previous teams. The device is an 'innovation platform', which may be used for continuous improvement in the areas of robotics, controls, power, and vision systems. The WARDen's initial design phase, the 2008-2009 academic year, consists of constructing an expandable platform with some accompanying functionality. The expandable platform involves a core frame or chassis (i.e., a device "skeleton"), an efficient power routing scheme (the "blood vessels") and sensory network ("nervous system"). A central processor ("brain") controls all functions, with auxiliary storage capacity implemented. The device is remotely controllable via a handheld controller and the web, and has a single simple automatic trajectory built in. The purpose of this presentation is to discuss the design and construction of the robot platform. [page 23]

Pruitt, C.J. Michelle "Adsorption Efficiency and Partitioning Capability of Surfactant Monolayers on Gold" (Drs. Eric D. Conte and Stuart C. Burris)

We are investigating the adsorption efficiency of sodium dodecylsulfate (SDS) from a pH 7 phosphate buffer onto polycrystalline gold substrates using electrostatics as the primary driving force via electrochemical control of the gold surface potential. It is easily shown through surface capacitance measurements by electrochemical impedance spectroscopy that the adsorption occurs quite readily. We are endeavoring to measure the adsorption isotherm of the SDS onto the substrate by following the change in surface capacitance as a function of the bulk concentration of SDS in the buffer. The investigation of the gold surface potential as an additional factor may also be presented. Further, we are probing the capability of the SDS monolayers to partition small polyaromatic hydrocarbons (PAHs) from aqueous solutions. The ultimate goal of this work is to produce an electrically switchable surface that will allow the efficient pre-concentration of PAHs prior to their determination by chromatographic methods. [page 22]

Pruitt, Carrie Jo See Sulejmanovic, Dino

Quintero, Reyes See Hall, Jason

Reynolds, Michelle Lee "Freedom Summer: A Study of How the Federal Government Was Impeded by a Color Barrier When Investigating Civil Rights Crimes" (Dr. Patricia Minter)

During Freedom Summer of 1964 the murders of three Mississippi Civil Rights Workers would shock the nation to its very core. James Chaney, a black volunteer, and Andrew Goodman and Michael Schwerner, white volunteers, disappeared for over a month before their bodies were discovered by the FBI. Although hundreds of black volunteers and bystanders had been murdered throughout the movement, including two young men by the name of Henry Dee and Charles Moore, their cases were never investigated. The intent of this research is to assert that the Federal Government was impeded by a color barrier when attempting to investigate and prosecute these crimes. To investigate this assertion I will examine the case of Goodman, Chaney, and Schwerner, in comparison with the case of Charles Moore and Henry Dee and the ways in which each were treated in the 1960s, as well as in the modern era. [page 11]

Rice, Taryn Elizabeth "The Causes and Tensions That Led to the English Revolution" (Dr. Carol Crowe Carraco)

The English Civil War was an upheaval of political and monarchial traditions during the seventeenth century. Initially, this conflict was associated with the tyranny of King Charles I and his unwillingness to take counsel from his Parliament and the people he was born to serve. Historians have long attempted to pinpoint the specific religious, political, intellectual and societal issues that resulted in this turning point regarding British history. Each scholar provides unique reasons that differ from other valued opinions on what caused the English Revolution. There is not one specific reason that ultimately led to the outbreak of revolution in England, but several chief issues or struggles resulted in societal, religious, ethnic changes. [page 11]

Riggs, Michelle, Steve Huskey, Andrew Rhyne, and Nicolai Konow "Scaling of Feeding Performance in North America's Largest Reef Fish" (Dr. Steve Huskey)

Scaling is defined as the change in body size an animal undergoes during its life history. The goliath grouper, *Epinephelus itajara*, undergoes one of the greatest amounts of scaling of any animal known, growing from 3mm at hatching to 3m as adults. This tremendous change has implications for their own development, while impacting their niche as a top-level predator on coral reefs. However, the consequences of their drastic change in body size for feeding performance have never been quantified. A juvenile goliath was recorded using high-speed video in the lab and sequences were compared to videos collected on adults in the wild. Behavioral analyses are ongoing, however preliminary results suggest that juveniles are capable of generating the same amount of suction pressure as adults while feeding, even though their feeding kinematics are significantly faster than adults. Goliath groupers appear to maximize their capabilities at all stages of their ontogeny. [page 10]

Rhyne, Andrew See Gilson, Emily

Rhyne, Andrew See Riggs, Michelle

Rutledge, Jonathan See Handzic, Ismet

Ryan, Eileen Catherine "Francis Macomber as a Dynamic Character" (Dr. Walker Rutledge)

The initiated character is one of the most frequently discussed aspects of Ernest Hemingway's works. He (or she) is a character who understands the chaotic, irrational nature of the universe and accepts it with endurance. While most of his characters are clearly either uninitiated or initiated, in his short story "The Short Happy Life of Francis Macomber," Hemingway presents readers with the dynamic title character who transitions from one to the other over the course of a guided hunting trip in Africa. Hemingway uses animal imagery to emphasize this development. His descriptions of the prey, the lion and the buffalo, serve as benchmarks to illustrate Macomber's growth between the encounters with the two, both through the change in his reaction to them and through the increasing parallels between Macomber and the hunted animals. [page 11]

Schroll, Austin, Bobby Lindsey, and Brett Meyer "Industrial Vision Systems for Product Inspection" (Drs. Chris Byrne and Robert Choate)

The purpose of this project is to design, test, and build a system to inspect the dimensions and positions of bolt holes and the pilot hole of brake drums for a manufacturing facility located in Kentucky. The design project is sponsored by the manufacturer and Western Kentucky University, who will coordinate design requirements and specifications. Other stake holders who will be interested in or impacted by the design include the Mechanical Engineering Department at WKU, operators at the manufacturing facility, as well as manufacturing and quality engineers looking to install a similar system. Major goals of the design include developing a system that is robust and capable of measuring bolt-hole dimensions within specified tolerances. Driving forces of the design will include environmental conditions, space limitations, and equipment capabilities. [page 14]

Schuck, Julie Banner "Tlingit Dancing Blankets: Art in a Culture of Prestige" (Dr. Guy Jordan)

During the 19th century, women of the Tlingit culture, a Native American matrilineal hunter-gatherer society inhabiting the coast of southern Alaska, produced distinctive blankets with boldly colored, figural designs. Known as Dancing blankets, or Chilkat blankets, these textiles were used to enhance prestige and cement ties between matrilineal moieties through display and gifting at potlatch ceremonies. An artist was also able to enhance her own social standing, and that of her family, by obtaining high prices for her work. As members of a society that valued group identity over individuality, Tlingit women created an art form that was highly conservative in design and function, but innovative in technique. [page 11]

Sellers, Hannah M. "Habitat for Humanity" (Dr. Molly Kerby)

As an Architectural Sciences major, I constructed a floor plan that was later used in the Habitat circuit. I composed the Habitat House in my Architectural Documentation class where I also put together a Building Section, Wall Section, Elevations, and Enlargements for my design. We worked on-site 10 hours in production of the Johnson family's home at 1837 Oak Street in Madisonville, Kentucky, the first Habitat house where I was actually able to assist in the building of the foundation, walls, and drywall. Being a part of the structural process was a great experience. Not only did was I able to see how a residential home was designed from the architect's point of view, but I also

saw how a home like my design would be put into actuality. Habitat has built almost 80,000 houses around the world, providing some 400,000 people in more than 2,000 communities with safe and affordable shelter. [page 24]

Simpson, Michael, Kyle Moss, Joshua J. Pierce, Jon Paschal, and Phillip C. Womble "Utilizing Wireless Technology for Enhancing the Electrocardiogram" (Drs. Phillip C. Womble and Jon Paschal)

The Applied Physics Institute is developing a system to analyze and monitor several body functions. This system can be used by patients from their home, decreasing the frequency of trips to medical institutions. The system will also increase the patients' level of comfort, allowing them to sleep in a well known environment. The sleep study device will monitor brain activity (electroencephalography), eye movement (electroculography), muscle activity (electromyography), heart rhythm (electrocardiogram), and respiratory effort during sleep. The circuitry will be contained in a small, light handheld design which can easily be operated by the patient. The information can then be sent via Bluetooth® (IEEE 802.15) and Wi-Fi (IEEE 802.11) through the internet and cellular connections to provide the data to the PSG professional. The preliminary designs were made to conceptual specifications and changed due to specific parameters. The components then underwent augmentation due to issues with the design as well as the machinery used in its creation. [page 13]

Smith, Alicia B. See Murray, Andrew

Smith, Corey "An Exposition of Saint Augustine's Theory of Knowledge" (Dr. Arvin Vos)

Although Saint Augustine of Hippo never systematically formulated a theory of knowledge, his synthesis of Christian theology and neo-Platonic philosophy implicitly created an epistemology original, enduring and influential. I will discuss the main epistemological problems Augustine treats in his voluminous writings. Next, I will explicate Augustine's solution to these problems, i.e. his famous theory of divine illumination. Finally, I will end my presentation by arguing that Augustine's theory of divine illumination is best interpreted as the claim that God enables human knowledge by providing necessity to inductively derived propositions. [page 21]

Smith, Dalene "Water Chemistry of a Small Karst Aquifer, Hart County, Kentucky" (Patricia Kambesis, M.S.)

The purpose of this research was to determine if there were seasonal variations in the water chemistry of a small, local karst aquifer. The study site is a shallow karst sub-basin located adjacent to Mammoth Cave National Park. Weekly water sampling was conducted at a perennial waterfall located within Dogwood Cave, Hart County, Kentucky during wet and dry periods in the summer and fall of 2008. In addition, physical parameters (temperature, pH and conductivity) were measured during each sampling event. Samples were titrated in order to determine alkalinity. The data from sample results were used to calculate saturation index with respect to calcite. Saturation index is a measure of whether groundwater is dissolving or depositing carbonate. Based on the water chemistry results and from observations of the total lack of speleothem development in the waterfall area, it was determined that the waterfall was undersaturated with respect to carbonate and was thus dissolving the limestone unit in which it flowed. Despite variations in rainfall during the sampling period, the waterfall maintained a steady discharge. This along with the saturation index values may indicate that the aquifer, though developed in limestone, displays predominantly diffuse flow, rather than turbulent flow which in turn may be a reflection of the stratigraphic composition of the limestone in which the aquifer has formed. [page 21]

Smith, Michael E. See Stewart, Patrick C.

Smith, Scott Allen See Paaso, Esa Aleksi

Song, Doran K. and Gretchen Fraze "Detection of Two Photoreceptors, Phototropin and Cryptochrome, through Western Blot Analysis" (Dr. Sigrid Jacobshagen)

The two photoreceptors that were studied, cryptochrome and phototropin, are possible candidates for mediating the resetting of the circadian clock by light. Two strains of the green alga *Chlamydomonas reinhardtii* with an extra cryptochrome gene fused to a heat-shock promoter were tested to see whether heat shock would increase the production of cryptochrome protein. Western blot analysis demonstrated that both strains show this increase but not the control. The strains can now be used in experiments that test the effect of this

increase on the resetting of the circadian clock. In another experiment, several strains with an RNA interference construct were tested for reduced amounts of phototropin. First results suggest that the antiserum against phototropin used in the western blot analysis might be degraded. If reduced phototropin levels can be confirmed, experiments will be performed to test the effects of reduced phototropin levels on the resetting of the circadian clock. [page 25]

Starling, Michael "Reaction of a Bulky Platinum Triamine Complex with Guanine and Methionine" (Dr. Kevin Williams)

Previous studies have indicated that [Pt(dien)Cl]Cl [dien = diethylenetriamine] reacts faster with N-acetylmethionine (N-AcMet) than with guanosine 5'-monophosphate (5'-GMP) [Barnham, K. J.; Djuran, M. I.; Murdoch, P. D.; Sadler, P. J., J. Chem. Soc. Chem. Comm. 1994, 721-722]. In the current study, we have prepared a bulky platinum triamine complex, $[Pt(Me_5dien)(NO_3)](NO_3)$ [Me_5dien = N,N,N',N',N"-pentamethyldiethylenetriamine], by methods analogous to those for $[Pt(Me_5dien)(CF_3SO_3)](CF_3SO_3)$ [Cini, R.; Intini, F. P.; Maresca, L.; Pacifico, C.; Natile, G., Eur. J. Inorg. Chem. 1998, 1305-1312]. An equimolar mixture of $[Pt(Me_5dien)(NO_3)](NO_3)$, 5'-GMP, and N-AcMet was monitored for several hours by ^{1}H NMR spectroscopy. The dominant product was [Pt(Me_5dien)(5'-GMP-*N7*)]+. To our knowledge, this is the first example of a platinum amine complex that reacts faster with 5'-GMP than with N-AcMet. [page 13]

Stewart, Colleen "Memory Mysticism in *Eternal Sunshine for the Spotless Mind*" (Dr. Michael J. Seidler)

Memories, pleasant and daunting, are the building blocks that form our identity and an inescapable aspect of our everyday consciousness. But what if selective memories were escapable? Would we be the same if we, abiding by "ignorance is bliss," decided to erase a painful recollection? This is the underlying philosophical inquiry that Michel Gondry addresses in the film *Eternal Sunshine for the Spotless Mind*. My paper addresses these questions with references to the film, scientific journals, and the philosophies of Kant, Locke, Descartes, and Hume. As cultural stoicism becomes a notion of the past and neurotechnology improves, the possibility of memory manipulation, as seen in the movie, becomes more tangible. The mysticism of memory,

though sometimes painful, is a crucial element that shapes our very being. The film Eternal Sunshine of the Spotless Mind is a testament to the dangers of trying to control the human mind. [page 8]

Stewart, Patrick C. and Michael E. Smith "Sound Localization in *Otocinclus affinis*" (Dr. Michael E. Smith)

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. Previous experiments demonstrated that *Otocinclus affinis* could be trained via classical conditioning to approach a speaker producing conspecific sounds. Twenty-six trained fish were used to test the acuity of this sound localization by randomizing a conspecific sound-stimulus through four speakers mounted along the edge of a round tank and videotaping fish behavior. Fish were acclimated for 5 min, exposed to the sound for 5 min, and then recorded for another 5 min . At the beginning of each trial, 19 out of 26 fish (73%) swam to the correct sound-producing speaker first. Fish spent significantly more time near the sound-producing speaker than the other three speakers. Future experiments will examine the effects of swim bladder deflation on sound localization capabilities in *O. affinis*. [page 21]

Suen, Shing-Yi See Sulejmanovic, Dino

Sulejmanovic, Dino, Carriejo Pruitt, Wei-Ho Ting, and Shing-Yi Suen "Removal of Benzaldehyde from Methanol Using Alkoxyamine-Functionalized Silica Gel" (Drs. Eric D. Conte and Hasan Palandoken)

Alkoxyamines ($RONH_2$) react readily with aldehydes and ketones to form stable oxime ethers, and, thus are expected to be excellent scavengers of these compounds. We installed alkoxyamines on silica gel surface to remove benzaldehyde from methanol. Silica gel was immersed in H_2O_2/H_2SO_4 solution to activate the surface. Activated silica gel was then reacted with 3-chloropropyltrichlorosilane. Displacement of the chloride with N-hydroxyphthalimide and subsequent treatment with hydrazine provided alkoxyamines on the surface of silica gel. The resulting silica gel surface with alkoxyamine functional groups was immersed in a 100 ppm benzaldehyde

solution in methanol. After 24 h, the results showed 86.5 ± 7.2 % removal of benzaldehyde from methanol. [page 9]

Ting, Wei-Ho See Sulejmanovic, Dino

Vaught, Kassidy Allyssa "Dracula: Embodying the Other since 1897" (Dr. Sandra Hughes)

Commonly viewed as a predator, the Vampire is more accurately the victim. Since Bram Stoker's *Dracula* was published the vampire has been burdened with society's secret desires. Each generation projects their various fears upon this misunderstood creature. This essay explores the many stages of vampires and of the societies to which they belong, be they the German's of the early 20th century using the vampire to represent their fear of the Jews, or even our more modern society where vampires symbolize homosexuality and the spread of AIDS. Vampires live out the fantasies that we in polite society cannot; they become the desires that we fear within ourselves – our very own "Other." [page 7]

Walker, Rhonda "Reintroduction of the *Apios priceana*" (Drs. Todd William and Naomi Rowland)

In 1896 Sadie Price, a Warren County, Kentucky botanist, first discovered and described *Apios priceana,* a perennial herbaceous legume. *Apios priceana* was once used as a staple food source for Native Americans. Despite much research and testing on this tuberous and leguminous plant it remains on the U.S. Fish and Wildlife Service (USFWS) endangered species listing. Although preservation has been successful, reintroduction efforts have not been initiated. According to the USFWS no further research has been performed on this species since 1990. Considering technological advances during the past 19 years I am interested in using tissue culture methods in an attempt to remove this plant from the endangered species listing and continue the research regarding its potential uses as: a food source for humans and animals, a perennial leguminous fuel source, and a landscape plant. [page 22]

Wallace, Jack See Paaso, Esa Aleksi

Watkins, Kirby "A Beautiful Hell: The Symbol of the Tree to Men and Women in *Beloved*" (Dr. Sandra Hughes)

Toni Morrison's novel *Beloved* has received much attention from critical readers. Most critics focus on the more obvious themes in the novel such as the bestial imagery, the loss of identity, or perhaps the ghost story in general. However, the story also deserves a more ecologically critical eye. This essay explores the various ways that Morrison incorporates botanical symbolism in her greatest novel. Trees are often used to show vitality and life, but in this novel they are also used to represent death; Morrison excels in her use of paradox. *Beloved* certainly reveals a darker side of humankind to the reader, and the use of natural imagery conveys this message more clearly. [page 8]

Webb, Jeremy "Screening RNAi Transformants for Reduced Expression of the Photoreceptor Cryptochrome" (Dr. Sigrid Jacobshagen)

Light is vital to plants. In order to anticipate the daily light changes in the environment, plants evolved a circadian clock. The clock can be reset by light through photoreceptors, which perceive the light and pass input signals to the central pacemaker of the clock. It is hypothesized that the blue/UV-A light absorbing photoreceptor called cryptochrome is responsible for resetting the circadian clock in the model organism *Chlamydomonas reinhardtii*. In order to test this, strains of *C. reinhardtii* have been genetically altered using a RNA interference construct and are currently screened for reduced expression of the cryptochrome protein. Strains that show significantly reduced cryptochrome levels can then be studied for aberrant resetting abilities upon light pulses. Reduced abilities to respond to blue light will indicate chryptochrome's importance in entrainment to the daily light/dark cycles in *C. reinhardtii*. [page 24]

Webb, Kelsi "Ecuador y la Crisis Económica de los Años Noventa" (Dr. Sonia Lenk)

A finales de los años noventa, Ecuador sufrió la crisis económica más severa en la historia del país. Este estudio discute los eventos y las acciones que causaron el desastre económico y los efectos directos que tuvieron en la situación del país. Con la información de fuentes secundarias sobre el país durante este período turbulento, el estudio explica como una combinación de

una gran deuda externa, precios bajos del petróleo, problemas en los bancos, y los daños causados por el fenómeno natural de "El Niño" tuvo problemas muy graves para la sociedad y el gobierno del Ecuador. Esta época de creciente inestabilidad económica en el Ecuador, nos permite tener un mejor entendimiento de los procesos y los resultados de las crisis económicas de otros países. [page 12]

Wolff, Schuyler "The Revised Rate of Supernovae in the Local Universe" (Dr. Louis-Gregory Strolger)

Originally completed in 2001, the Nearby Galaxies Supernova Search (NGSS) Project surveyed approximately 500 square degrees along the celestial equator to find low redshift supernovae. This survey intended to measure the rate of supernovae occurrences in nearby galaxies, and map out the diversity of supernova characteristics. I will present on my contributions to the project. This will include a calculation of the sensitivity and depth of the survey with false supernovae, an estimated luminosity density I have created for all the galaxies probed in the survey using literature estimates, and determining the control times for the survey which correct for the fraction of supernovae that could have been missed due to the cadence and sensitivity of the survey. The project aims at a measurement of the rate of both Type I and II supernovae in the nearby universe ($z < 0.1$). The event rate allows us to determine the lifetime of possible progenitor stars and how much chemical enrichment has occurred up to this point. [page 25]

Graduate Posters

Abebrese, Chris See Huang, Yan

Anilkumar, Chaitra "Pornography Viewing and Student Views on Sexual Assault and Harassment: Implications for Prevention Programs" (Drs. Stephen Nagy and M. Christine Nagy)

Research on the effects of pornography on men and women remain inconclusive but confirms that immature individuals and individuals predisposed to sexual assault are an audience who dehumanize men and

women as a consequence of having viewed porn. Does viewing porn predispose students to believe that porn does not affect sexual assault and sexual harassment? We attempt to answer this question in order to guide the development of prevention programs addressing sexual assault and sexual abuse. Student responses to an electronic survey conducted during the spring of 2008 yielded 1551 responses. Student responses on items that they had viewed pornographic movies, internet sites and pornographic magazines were used to define pornographic viewers and non-pornographic viewers. These two groups were then compared on their demographic characteristics and their attitudes towards sexual assault and sexual harassment. Our findings are discussed in light of their implications for program planning. [page 16]

Ansari, Huma "Student Characteristics of Soft and Hard Pornography Viewers: Implications for Prevention Programs" (Drs. Stephen Nagy and M. Christine Nagy)

The development and delivery of programs in public health requires practitioners to target their public health messages to identifiable groups using approaches that are compatible with group characteristics and value systems. This study examined student group characteristics in response to questionnaire items on sexual violence and pornography. Methods closely mirrored studies published and conducted at other universities. 1551 students responded to items on various forms of pornography. Two general categories of soft pornography and hard pornography were assessed. Initial comparisons showed responses consistently differed by gender. Therefore all comparisons were conducted separately by gender. Three forms of pornography included magazines, movies and use of internet. We examined soft and hard porn practices based on ethnicity, frequency of religious practice, sexual orientation, marital status, and on or off campus living status. Implications from these findings will be discussed in terms of prevention program tailoring and delivery. [page 16]

Broadbent, Dorothy Megan and Katherine Gilson "Saving Lives with Facebook" (Dr. M. Christine Nagy)

In Kentucky 740 people are waiting to receive an organ transplant and every day 15-17 die while waiting. According to the Kentucky Organ Donor Affiliates, "One individual donor can provide organs, bones and tissue for

nearly 50 people in need." This statement highlights the desperate need that Kentucky is in for raising awareness about organ donation and increasing the number of people in the Commonwealth who are willing to become organ donors. This presentation proposes one method for increasing the number of people intending to become organ donors on a college campus through the use of Facebook. Facebook is a popular social networking service utilized by a large number of college-aged persons. By creating a Facebook group with facts, discussion boards, videos, and current events, there is the potential to draw a large audience to participate in discussions, raise awareness, and even increase the number of organ donors across Kentucky. [page 16]

Calico, Molly and Jordan Norris "Perceptions of Water Quality and Management in Gales Point, Belize" (Dr. Ritchie Taylor)

In January, the WKU College of Health and Human Services, International Health and Human Service Learning Program traveled to Belize with the purpose of providing medical, dental, and environmental health services to the village of Gales Point. The program sought to understand the community members' perceptions of water quality and management. Villagers were interviewed about these perceptions and findings indicate that villagers have little knowledge of water treatment. The community's external locus-of-control dictates action by both the water board and the village council. There exists a generational gap in perceptions; older community members are more likely to resist intervention because they have acquired immunity over time and therefore are least affected by water-borne diseases. For this reason, it is important to intervene in schools, educating children at an early age about water-borne illness and the importance of water treatment. Future interventions will need to address these varying perceptions. [page 16]

Dickens-York, Ashley K., Niki J. Kersey, and Lance W. Hahn "Gender Differences in the Mental Representation of Aggressive and Neutral Words" (Dr. Lance W. Hahn)

Males tend to be more physically aggressive than females. To determine if this difference is also present in the mental representation of words associated with physically aggressive words, we administered free association tasks consisting of ten aggressive words and ten neutral words to 24 males and 24 females. If the mental representations reflect the established gender

differences in aggression, then we expect males to have more associates for aggressive words. A second hypothesis is that females have a broader vocabulary than males. If this is reflected in the mental representation of words, then females may have more associates for all words than males. Neither of the hypotheses was supported by our preliminary data. However, we unexpectedly found more associates for the aggressive stimuli than for the neutral stimuli. We hypothesize that the ten aggressive words created a cohesive context that increased the associate count for words within this context. [page 15]

Gilson, Katherine See Broadbent, Dorothy Megan

Gupta, Pramod "Life Expectancy and the Human Sex Ratio" (Dr. Elmer Gray)

Both Life expectancies and secondary sex ratios vary among countries of the world. Sex ratio (males: 100 females) change with advancing age. Objectives of the present study were to characterize life expectancies and sex ratios for countries of the world and to explore possible relationships between these two indices of the human population. Life expectancy and sex ratio data for 2006 were obtained for 209 countries from Central Intelligence Agency World Fact Book (ISSN 1553-8133). Life expectancies ranged from 32.6 to 83.5. Average sex ratios were: 104 at birth, 104 under 15, 102 for 15 to 65, 81 for over 65, and 100 for total. Both indices showed that males exceed females at birth and that females outlive males. Life expectancy and sex ratio relationships were inconsistent over different ages. Linear correlations between sex ratios for adjacent stages were positive and significant; however, others were not significant. Correlations between life expectancies and ratios at birth and under 15 were positive and significant but not for other stages or for the total sex ratio. [page 16]

Huang, Yan, Chris Abebrese, and Rui Zhang "Kinetics of Oxidation of Aryl Methyl Sulfides by *Trans*-Dioxoruthenium (VI) Porphyrin Complexes" (Dr. Rui Zhang)

The *trans*-dioxoruthenium(VI) porphyrins have been among the best-characterized metal-oxo intermediates and their oxidizability in the alkene epoxidations have been extensively studied. The kinetic study of two-electron

oxidations of *para*-substituted phenyl methyl sulfides with a series of well-synthesized and characterized *trans*-dioxoruthenium(VI) porphyrin complexes was performed by the stopped-flow spectroscopy. The kinetic effect by substituents in sulfides and in dioxoruthenium(VI) complexes was investigated. Results showed the decay of *trans*-dioxoruthenium(VI) porphyrins in the presence of reactive sulfides follows a biexponential process. The reactivity order in the series of dioxo complexes follows TPFPP> TPP>TMP, consistent with expectations based on the electrophilic nature of high-valent metal-oxo species, and the effect of substituent on substrate for the oxidation of *para*-substituted thilanisoles was minor during the oxidation process. [page 15]

Hutchins, Amanda "The Relationship between Goal Orientation and Gender Roles" (Dr. Anthony Paquin)

Goal orientations are perceptual-cognitive frameworks for how individuals approach, interpret, and respond to achievement situations. Gender roles are the behaviors, thoughts, and emotions that are considered acceptable and appropriate for each gender based on society and culture. This study was aimed at determining the relationship between a person's goal orientation and the gender roles that they adopt. Five hundred and twenty five participants answered an online questionnaire assessing their goal orientations and gender roles identification. The results showed that there was a significant positive relationship between masculinity and mastery orientation and femininity and mastery orientation. There was a significant negative relationship between masculinity and performance avoidance. There was also a significant negative relationship between femininity and performance approach and femininity and performance avoidance. There was no relationship between masculinity and performance approach. [page 16]

Jones, Morgan "A Novel Pervious Cement Reaction Barrier (PCRB) In Situ Arsenic Remediation System" (Dr. Cathleen Webb)

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. Our primary contaminant of interest is arsenic. This project used batch, column, and adsorption experiments to evaluate and model the adsorptive capacity of the PCRB for arsenic uptake. The total absorptive capacity of a PCRB was determined from the breakthrough of arsenic from column adsorption. [page 15]

Kersey, Niki J. See Dickens-York, Ashley K.

Lakkaraju, Archana "Human Sex Ratio and Family Size for a Selected Sample from the India Population in 2007-2008" (Dr. Elmer Gray)

The human sex ratio is of great interest especially in countries that are characterized by high population and strong gender preference. India epitomizes such countries by being the second most populated country in the world and by having a strong son preference. In 2007 and 2008, students at nine colleges in Andhra Pradesh, India, were surveyed for family size and secondary sex ratio data. The 1190 respondents (595 of each gender) provided data on parental, present, and projected generations. For these generations, average number of children were 4.27, 2.99 and 2.10, and sex ratios were 101, 87, and 99; respectively. Although son preference was evident, more families stopped having children when both genders were present than when existing children were of same gender, including all sons. The most desired family consisted of two children, both genders, with the male born first. Realization of the average number of children (2.10) in families of the projected generation would result in a more stabilized population. Significant differences between observed and expected combinations of genders in families of different sizes and significant negative correlations between gender compositions of successive births within families indicated a lack of independence in sex ratio outcomes. [page 16]

Lynch, Erin See Tracy, Mark

Middleton, Juliana D. and Steven Wininger "Facilitation of Social Cognitive Constructs in an Employee Wellness Exercise Intervention Program" (Dr. Steven Wininger)

This study examines the influence of social cognitive variables on physical activity in an 8-week physical activity promotion program. In addition to health related factors, exercise intervention programs aimed at increasing employees' amount of exercise can reduce organizational turnover, absenteeism, and health care expenses. Four specific components are examined: implementation intentions, goal commitment, barrier self-efficacy, and value. Participants include faculty and staff from Western Kentucky University's Employee Wellness Program. Participants in the treatment group received goal-setting prompts focused on developing implementation intentions, identifying the value of expectancies, and overcoming self-efficacy barriers. Participants in the control group did not receive goal-setting prompts. It is expected that goal-setting prompts will increase implementation intentions, goal commitment, value, barrier self-efficacy, and the amount of physical activity participants engage in. Data from the program has been entered and collected. It will be analyzed over the next couple weeks. [page 16]

Miller, Benjamin Verlinden "Identifying Recharge and Discharge Features of Carroll Cave, Missouri through Dye Tracing" (Dr. Chris Groves and Patricia Kambesis, M.S.)

Carroll Cave is a large stream cave, 27.4 km in length, located in Camden County, Missouri. Carroll Cave is known to be a significant in terms of biological diversity, hydrological characteristics, and speleological resources. Due to the potential impacts from surface activities on sensitive cave biology, the necessity of understanding the local karst hydrology is crucial. In September, 2008 a project was initiated to delineate the recharge area of Carroll Cave, which previously was unknown. A second component of the project was to identify the discharge features of the cave system. To date three dye injections have been completed with one positive trace from Traw Hollow into the cave system and eight positive traces from inside the cave system to multiple spring outlets at Toronto Springs. This project has been a cooperative effort between Western Kentucky University, the USDA-Agricultural Research Service, and the Carroll Cave Conservancy. [page 15]

Neathery, James and Phenahas G. Sriramula "Off-Metal Synthesis of Some Aryl Substituted Rhenium ^{5}-Cyclopenta[*c*]pyridazyl Complexes" (Dr. Chad A. Snyder)

Heterocyclic organic and organometallic compounds (e.g. polypyrrole) and their derivatives have been of great interest for conductive polymers due to their novel properties and environmental stability as compared to non-aromatic analogs (e.g. polyacetylene). We are interested synthesizing organometallic pyrroles from pyridazyl complexes for polymer research. Pyridazyl complexes of rhenium were synthesized in three steps beginning from 1,2-diacylcyclopentadienes. These complexes are expected to undergo ring contraction to their corresponding pyrrole complexes by utilizing the Boger and coworker's conditions. 1,2-Diazines treated with activated zinc powder in glacial acetic acid yielded pyrroles in high yield (up to 92%). Off-Metal synthesis and characterization of $[Re(CO)_3\{1,2\text{-}C_5H_3(CRN)(CRN)\}]$ ($R = C_6H_4OMe$, C_6H_4Cl) are reported here. [page 15]

Norris, Jordan See Calico, Molly

Reece, Thomas John "A More Nuanced Look at Religious Orientation and Homonegativity" (Dr. Rick Grieve)

The current study proposes a change in the way researchers examine the role of religion in attitudes toward homosexuality and homosexuals. A common practice is to treat religion as a unified construct rather than as a multidimensional concept. The result of such an undifferentiated view is a simplistic view of not only the religious experience but also of the interaction of religion and homonegativity. The current study examines the role of religion, using Batson's Religious Life Inventory, and homonegativity, with two measures of homonegativity, one a measure of overt homonegativity and the other a more subtle scale of attitudes toward homosexuals and homosexuality. Data analysis revealed differential performance for religious dimensions in predicting scores on homonegativity scales. The implications of these findings are discussed. [page 16]

Smith, Dalene See Tracy, Mark

Sriramula, Phenahas G. See Neathery, James

Sukkala, Susmita "Nanotechnology and Public Health" (Dr. Vijay Golla)

Nanotechnology is an extremely diverse field whose theme is to control matter in molecular or an atomic scale, developing materials or devices at

particle sizes of 100 nanometers (10^{-9}) or smaller, roughly the width of three or four atoms. Nanotechnology has a variety of applications in medicine, public health, toxicology, pharmacology, electronics and energy production. Lux Research estimates that by the year 2014, approximately $2.6 trillion in manufactured goods will incorporate nanotechnology. Nanotechnology could provide the field of public health with new ways to manage, monitor, measure, and reduce environmental contaminants. United States Environmental Protection Agency states that contaminants from soil and ground water can be removed by using iron nanoparticles. Though nanotechnology has a great potential to benefit humankind, it is necessary to understand its potential health and safety implications. The products used by nanotechnology in electrical, medical and various other fields like engineering, food, biotechnology may have potential health effects. For example, carbon nanotubes that are useful in several applications of nanotechnology and materials science are limited by their potential toxicity that can cause lung damage similar to that of asbestosis. It is not only important to recognize the significance of the applications of nanotechnology for advancements in the field of public health, but also identify potential exposures that can cause adverse health effects as a result of the use of new technologies. [page 16]

Tracy, Mark, Erin Lynch, and Dalene Smith "Dale Hollow Lake State Resort Park: Ranger Response Time, Golf Course Travel Time, and Travel Time for Hikers, Cyclists, and Horseback Riders" (Dr. Jun Yan)

Dale Hollow Lake State Resort Park (DHLSRP) is situated in southern Kentucky in Clinton and Cumberland counties on the overlooking Dale Hollow Lake. In this project, geospatial data are collected and complied to support park services and management, including a network of all DHLSRP roads, trails, and cart paths using GPS, Digital Orthophotos with 2ft resolution and DEM files. Three main tasks are conducted using GIS: 1) cave survey and mapping; 2) park facility mapping; 3) analysis of travel time in the DHLSRP for four travel modes, hiking, horse riding, ATV, and cycling. [page 15]

Wang, Zheng "One-Child Family Policy, What Do We Obtain?" (Dr. Elmer Gray)

The present study, comprised of 976 university students with equal numbers of males and females, was conducted to look into the possible changes and trends in family sizes and sex ratios. Student respondents were requested to informate numbers of children and genders by order of births. Average numbers of children were 4.5, 1.6, and 1.7, and secondary sex ratios were 101.2, 108.3, and 107.1 for the parental, present and projected generations; respectively. In the present generation, approximate percentages of families stopping with 1, 2, and 3 children were 54, 34, and 9; respectively. For desired families in the projected generation, the approximate percentages wanting 0, 1, 2, and 3 children were 9, 19, 66 and 4; respectively. The conclusions include: 1. The One-Child Family Planning Policy, implemented in 1979, did effectively reduce the family size from parental to present generation. 2. Traditional son preference and restrictive population control have led to an abnormally high sex ratio and 3. In the future, it is likely that the policy will be relaxed, permitting two-child families with both sexes preferred by majority of couples. [page 16]

Undergraduate Posters

Adams, Dana "Brand Research Collage" (Matt Tullis, M.F.A.)

The object of my student research project is to create effective visual communication. I will develop a theme that centers on the historical design motif of brand development. Through my research, I will choose to focus on key participants in the history of brand and logo development. My research is focused on a design culture other than my own and the resulting report and collage will be based on physical logos, the history and influences of artists, and results of the discoveries and inventions that designs have impacted on current design. The ending result of my gained insight will be reflected in my finished visual piece through the choices I make regarding the principles and elements of design. [page 17]

Barnes, Kimberly and Allison Genton "HPV: Above and Beyond the Cervix" (Dr. Terry Dean)

The human papilloma virus (HPV) is a double-stranded DNA virus that infects the epithelial cells of the skin and mucous membranes. HPV-16 is the same virus responsible for the majority of cervical cancers in women, and it is the fastest growing segment of the oral cancer population. It primarily appears in the tonsillar area, base of the tongue, and the oropharynx. The largest known risk factors of oral cancer include use of tobacco products, heavy alcohol use, prolonged sun exposure, poor oral hygiene, being male, and being infected with HPV-16. HPV-16 is spread through sexual contact, both conventional and oral. Oral cancer screenings are important for early detection. Harmful oral spots or lesions often look identical to those that are harmless, but testing can tell them apart. Knowing the risk factors and regular dental check-ups can help prevent this deadly disease. [page 20]

Bond, John "Contemporary Graphic Designers" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the historical design motif of Contemporary graphic artists Stefan Sagmeister, Neville Brody, and Shepard Fairey, I chose to focus my research on a design culture other than my own and the resulting written report and digital collage will be based on the following information. I will explore how these designers push the limits of current design and its affect on society today. I will show how these designers work goes beyond aesthetically pleasing and conveys a deeper subtext. [page 17]

Brown, Valerie Denise "Typographers" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the design of three different typographers. I chose to focus my research on a design culture other than my own and the resulting written report and digital collage will be based on the following information. I will be designing digital collage based on the work of David Carson, William Caslon, and Milton Glaser. All of these artists are graphic designers but they all focus on different areas. William Caslon is famous for typeface designer and engraving. Milton Glaser is famous for his popular development of icons, and David Carson is famous for his work as a typographer. [page 17]

Brunner, Heather See Cline, Callie Elizabeth

Bryant, Christopher J., Eric Druen, and Michael Doyel "WKU Student Parking Lot Walking Times" (Dr. Jun Yan)

This research uses ArcGIS to analyze Western Kentucky University student parking lots and the time it takes to walk to the buildings of the campus. This project shows that Western Kentucky University has gone to great lengths to have parking lots which serve every segment of the campus with many of the service areas overlapping. The walking speed of 4 fps (2.7 mph) was used for this project using one minute intervals with a maximum of five minutes. [page 19]

Byerley, Sarah "Art Deco Poster Designers" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the historical motif of Art Deco poster designers. The Art Deco period is among the more recognizable design eras in history. Some of the best-known designers of this time are referred to as the "Three C's": A.M. Cassandre, Paul Colin, and Jean Carlu. I propose to communicate this newfound knowledge through the visual communication of traditional collage art and a written paper focusing on these three designers. [page 18]

Carney, Kelsea Nichole and Mandy Stinson "Let Them Smile: Raising Awareness of Early Childhood Caries" (Dr. Lynn Austin)

Children in today's society face several obstacles on a day to day basis. One such obstacle is a condition known as Early Childhood Caries (ECC), a condition that is totally preventable yet its prevalence is overwhelming. This disease has the potential to cause pain, affect speech, and affect the emotional wellbeing of the child with ECC. ECC is defined as one or more decayed, missing or filled tooth surfaces in children less than 72 months (6 yrs) of age. A child with severe childhood caries (SCC) has at least one filling or cavity on a primary maxillary incisor. Children are affected daily by this disease not only physically but emotionally as well. Children who have untreated tooth decay have trouble eating, sleeping, and paying attention in school which affects their capacity to learn. With a few preventive measures we can protect children from this disease and let them smile. [page 19]

Chadwell, Michael E. "The Inklings" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the activities of the famous British group of writers called the Inklings. The resulting written report and digital collage will be based on three influential writers. C.S. Lewis, J.R.R. Tolkien, and Charles Williams. These three writers were in a writing group called the Inklings. Through these authors powerful literature a vibrant visual poster collage can be created. C.S. Lewis was most well known for his *Chronicles of Narnia* series, J.R.R. Tolkien known for the famous trilogy *Lord or the Rings*, and Charles Williams most known for his novel *Descent into Hell* in the 1950's. [page 17]

Clark, Charles Aaron "Pop Art and Graphic Design" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the historical design motif of pop art in graphic design. I chose to focus my research on a design culture other of my own and the resulting written report and digital collage will be based on the following information. I am interested in the pop art movement and its influence on graphic design. Through my research I would like to find out how much impact the pop art movement had on graphic design. I will investigate the works of Andy Warhol, Roy Lichtenstein, and Billy Apple. [page 17]

Clark, Lindsey M. and Erika Whitehouse "A Deeper Insight to Hg Bioaccumulation in the Bat Population in Kentucky and Tennessee" (Dr. Cathleen Webb)

Mercury (Hg) is a persistent neurotoxin that is readily transported through karst aquifer systems such as the South Central Kentucky Karst (SCKK) ecosystem, which includes Mammoth Cave National Park (MCNP). 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 to 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). Further analysis will be performed on insects to gain additional information regarding how bats bioaccumulate Hg through the food chain. Many insect species that we believe to be the primary food source for the bats have been collected at MCNP and Abraham Lincoln National Park. They are undergoing analysis to determine the Hg concentrations present in the bats' food supply. Quality analysis and quality control tests were done using human hair reference standards. [page 19]

Cline, Callie Elizabeth and Heather Brunner "Forensic Odontology" (Dr. Daniel Carter)

Forensic odontology is the use of dental records along with bite mark analysis to help make positive body identifications. It has aided in solving many crimes across the country. The most important role in bite mark analysis takes place long before the bite is made on the evidence. It is essential to have accurate dental records in order to compare bite marks to an individual. Dental hygienists play an important role in helping make bite mark analysis a sound way to solve crimes because it is their duty to keep dental records accurate and up to date. By following the procedures to accurately maintain dental records and understanding what all goes into bite mark analysis, dental hygienists and general dentists can contribute to forensic dentistry one bite at a time! [page 20]

Cline, Cynthia "White Forms" (David Marquez, M.F.A.)

My work involves creating imaginative environments and elements that trigger curiosity. I use a variety of materials, quite often steel and plaster. My recent series of forms are teardrop shaped with a texture and feel like eggshells. A handful of them are perfectly formed, flawless and smooth floating at various heights on flexible steel legs. In contrast more than three times that many are cracked have small broken holes or are broken entirely in half showing a roughly swirled interior. The viewers' curiosity is engaged, one wonders what lived or lives in these shells. The smooth white surfaces reflect the colors of their environment without overpowering the senses and there is a purity and cleanliness to white. I have been using an unusual technique to achieve hollow molded seamless forms of plaster such as these.

In a gallery setting I have also used music, scents and very specific lighting to further change the space. I aim to combine these aspects of installation and stage art with the aesthetic of minimalism, surrealism and abstraction. [page 17]

Dame, Heath "Modifying the Sitinakite Structure for Enhanced Cs and Sr Sequestration" (Dr. Aaron Celestian)

Sitinakite is a natural and an engineered nanoporous material that is used for the removal of Cs and Sr from high level radioactive wastes. The sodium titanium silicate structure has great ion exchange capabilities for sequestering radioactive waste. However, sitinakite only sequesters an average of 25% of the available site occupancies for Cs along the large one dimensional channel. There exists a smaller diameter channel perpendicular to the large channel, but these secondary sites are too small for the large cesium radius. In an effort to increase the exchange capacity of this titanium silicate we have explored new structural compositions that maintain the ion exchange mechanisms by increasing the radius of the secondary channel, and thus increase the overall ion exchange capacity without lose of ion selectivity. [page 19]

Davidson, Katie See Johnson, Erin

Dorsey, Holly See Watson, Leslie Dawn

Doyel, Michael See Bryant, Christopher J.

Druen, Eric See Bryant, Christopher J.

England, Kasey "30 Seconds Can Save a Life" (Dr. Barbara C. Bush and Becky Tabor, M.Ed.)

One of the Kentucky's major health issues is literally home-grown. Kentucky has the highest rate of middle school smoking in the United States. Kentucky also has the highest smoking rate in the Unites States. There are several benefits of Smoking Cessation. Quitting gives almost instant gratification. The financial aspect is unbelievable. Smoking is rather an expensive way to kill yourself. Smoking is the single most preventable cause of death and disease. Smokers try several times to quit before they actually succeed. There are several ways to begin a smoking cessation program. Talking to your

patients about smoking cessation is a hard thing to do. Here are some helpful ways to communicate with your patients. Ask, advice, assess, assist, and arrange with every patient or client about their tobacco use. It only takes 30 seconds to ask a patient; do you smoke? So make it a habit, save some lives. [page 20]

Ford, Karen Bernadette "A Historical Study of Advertising with Respect to Graphic Design" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication that will center on the historical development of advertising with respect to graphic design. I chose to focus my research on a design culture other than my own and the resulting written paper and digital collage will be based on the comparison of three designers famous for their work in product advertising: Paul Rand, Lester Beall and Leo Burnett. Rand is most recognized for his work with corporate logos, like UPS, IBM and Westinghouse. Burnett similarly created iconic product symbols, like the Marlboro Man, Pillsbury Doughboy and Jolly Green Giant. Beall was most famous for his posters advertising for the Rural Electrification Administration during the Great Depression. By examining the works of three such notable designers, I will thoroughly explore the history of advertising from three different design perspectives—corporate identity, poster design and iconic product symbols. [page 17]

Fusting, Michelle and Donna Kridelbaugh "Isolation of a 3-Methylindole-Producing Bacterium from a Swine Waste Lagoon" (Dr. Kinchel Doerner)

With an increase in animal production closer to populated areas, odorants from animal waste are a rapidly rising concern. 3-Methylindole (3-MI) is an odorant produced from the biodegradation of L-tryptophan by bacteria in animal waste. Currently, no 3-MI producer has been isolated from swine waste, and isolation of such an organism would provide insight into production and regulation of 3-MI. Therefore, an experiment was designed to isolate a 3-MI producer based on previous work which indicates the presence of Fe(III) increases 3-MI levels. An *Enterococcus sp.* was isolated from WKU's primary swine waste lagoon in rich, anaerobic medium plus tryptophan and Fe(III). Successive laboratory culturing of this bacterium resulted in the loss of 3-MI production, which may be due to a lack of

nutritional requirements. Current work is focused on testing various growth conditions, such as different carbohydrate sources, and additions of rumen fluid, lagoon slurry, vitamins, and indoleacetic acid. [page 18]

Gaddes, Amanda and Ann Marie Nejedly "A Sweeter Look at Caries Control" (Dr. Barbara C. Bush)

Xylitol is relatively new in the dental field and is extremely advantageous as well as easy to recommend to patients. Xylitol is a five-carbon sugar alcohol used as an alternative to sucrose in some aspect of our diets. It can be found as an additive in chewing gums, mints, lozenges, mouthwashes, etc. It can be found naturally in raspberries, strawberries, and plums. It reduces plaque formation and bacterial adherence, inhibits enamel demineralization, and aids in remineralization, thus preventing dental caries. Specific populations that can be helped by the addition of xylitol into their daily routines are new mothers, children, soldiers and diabetics. This poster presentation introduces the audience to xylitol, covering what it is, where it can be found, its advantages, its disadvantages and how it can be incorporated into anyone's daily routine. [page 19]

Gant, Charles Danny "Comparative Analysis of Tornadic Potential for Two Winter-Time Severe Storm Systems in Kentucky" (Drs. Gregory Goodrich and Joshua Durkee)

Two major storm systems impacted the Southeast region of the United States and particularly Kentucky early in 2008. On January 29, 2008, a strong cold front with an unusually tight baroclinic zone pushed across the Southeast, bringing with it damaging winds and moderate hail. A week later on February 5, 2008, the "Super Tuesday Outbreak" became the 15th deadliest tornado outbreak in history. While the two storm systems were similar in that they were unusual winter-time severe weather outbreaks, this study focuses on a few major meteorological variables at the synoptic- and meso-scale to determine why these two systems differed in tornadic supercell potential. Key differences between the two storm systems include differing amounts of instability, dynamic forcing, and shear. We also discuss how the passage of the first storm system influenced the outcome of the second system. [page 19]

Genton, Allison See Barnes, Kimberly Corder

Harris, John "Triple A (African American Artist)" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the historical design motif of African American Graphic Artists. I chose to focus my research on a design culture in which I am interested and with which I am familiar. The resulting written report and digital collage will be based on the following information. African American art has always played an influential part in my life as well as my own work. I have decided to do my research on three distinguished African American Artists; Ernie Barnes, Frank Morrison, and Justin Bua. These artists have similar attributes but have just as many differences as well; therefore my collage art will compare and contrast the work of these three artists. [page 18]

Hensley, Abigail See Hughes, Janet

Hinson, Daniel and Phenahas G. Sriramula "On-Metal Synthesis Aromatic Substituted Rhenium Complexes" (Dr. Chad A. Snyder)

Heterocyclic organic and organometallic compounds (e.g. polypyrrole) and their derivatives have been of great interest for conductive polymers due to their novel properties and environmental stability as compared to non-aromatic analogs (e.g. polyacetylene). We are interested synthesizing organometallic pyrroles from pyridazyl complexes for polymer research. Pyridazyl complexes of rhenium were synthesized in three steps beginning from 1,2-diacylcyclopentadienes. These complexes are expected to undergo ring contraction to their corresponding pyrrole complexes by utilizing the Boger and coworker's conditions. 1,2-Diazines treated with activated zinc powder in glacial acetic acid yielded pyrroles in high yield (up to 92%). Synthesis and characterization of $[Re(CO)_3\{1,2\text{-}C_5H_3(CRN)(CRN)\}]$ (R = C_6H_4OMe, C_6H_4Cl) are reported here. [page 18]

Hughes, Janet and Abi Hensley "Designer Genes" (Dr. Terry Dean)

"Designer Genes" is a presentation that is intended to inform our audience of the congenital dental abnormality known as Hypocalcified Amelogenesis Imperfecta (A.I.). Hypocalcified A.I. occurs one in every 14,000 individuals in the United States. It is caused by mutations in the genes that code for the formation the enamel of teeth. The mutations cause the enamel to form

improperly leaving it soft, fragile, and easily worn away. The enamel is also discolored leaving the teeth with a yellow to brown appearance. Because the enamel is so thin, the underlying dentin is unprotected and often exposed causing tooth hypersensitivity. This presentation discusses the specific genetic mutations that cause A.I. including the patterns in which they are inherited. It also discusses various treatment options available and the dental hygienists' role in dealing with this disease. [page 20]

James, Kristin See Wohlrabe, Sarah

Johnson, Erin and Katie Davidson "Xerostomia" (Dr. Barbara C. Bush)

Saliva has been recently defined as the miracle fluid of the 21st century. Saliva serves a variety of purposes and contributes greatly to our oral health by functioning as a mechanical cleanser, reducing antimicrobial activity, controlling pH levels, removing food debris, lubricating the mouth, re-mineralizing and maintaining the oral mucosa, as well as aiding in the digestion of food. Many individuals take the comfort saliva affords them for granted until discomfort occurs. For instance, dental patients in recent years have been more consistently complaining of problems resulting from dry mouth which is a condition known as xerostomia. Xerostomia is defined as chronic dry mouth resulting from reduced or absence of normal salivary flow. Patients experiencing xerostomia complain of problems eating, speaking, and swallowing, as well as the inability to wear dentures comfortably. As a dental care provider our responsibility is to identify the causative factor(s) of xerostomia and help alleviate any discomfort from it. [page 20]

Jordan, Jessica Michelle "Evidence for Cohesive DNA Ends in a Bacteriophage Genome" (Dr. Rodney King)

The linear DNA of a bacteriophage circularizes after it is injected into a bacterial host. Circularization occurs through the interaction of single stranded complementary sequences at the genome ends. These sequences are commonly known as cohesive ends. We have been characterizing two bacteriophage that control the expression of their early genes in a unique way. To develop a more thorough understanding of these phage, we have attempted to obtain evidence for genome circularization. We used DNA

restriction analysis to determine that at least one of the two phage has cohesive DNA ends. [page 18]

Kington, Ellen and Lauren Stephens "The Parafunctional Habit of Nail Biting (Onychophagia)" (Dr. Barbara C. Bush)

Researchers have found problems associated with nail biting, oral health and systemic health. It has been shown that people who bite their nails are at risk for damaging not only their teeth, but dental bonds, crowns, veneers and orthodontic treatment. Nail biters are at higher risk for gingivitis and for ulcerating the tissue around the teeth they use to bite their nails. Nail biting can be responsible for the passing of infections into the mouth and throughout the body. Nail biting occurs in 28-33% of children ages 7 to 10 with the numbers increasing to 44% of adolescents. Techniques to follow in attempting to break the nail biting habit include having professional manicures, using bitter-tasting commercial products on fingernails, wearing gloves or bandages, snapping a rubber band against your wrist as a reminder to stop nail biting, holding a small stone or playing with a small toy and relaxation techniques. [page 20]

Kridelbaugh, Donna See Fusting, Michelle

Li, Yan-Fen "Synthesis and Crystal Structures of New Hybrid Polytungstates" (Dr. Bangbo Yan)

Polytungstates are a major group of polyoxometalates. The remarkable feature of these polytungstates is they exhibit enormous versatility in structures, and their salts and free acids are usually highly soluble in aqueous solutions. Another unique characteristic of polytungstates is the Lewis basicity of their terminal oxygen atoms and their ability to form coordination complexes with many transition metal ions such as cobalt, copper, and iron. Our research objective is to investigate the combination of metal complexes with polyoxotungstate units into hybrid solid state assemblies under hydrothermal conditions. Here, we report two new organic-inorganic hybrid compounds of polytungstates which have been synthesized hydrothermally. Their structures have been characterized by elemental analysis, thermogravimetric analysis and single-crystal X-ray diffraction studies. [page 18]

McCurdy, Catherine "Historical Design Motifs of Commercial Typographers" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the historical design motifs of commercial typographers. I chose to focus my research on a design culture other than my own and the resulting written report and digital collage will be based on the following information. The goal of my research is to find and analyze three commercial typographers who have developed and combined original typography and graphic symbols for use in everyday life, which are often overlooked. My research will show the creative element of such work and its artistic intent. [page 17]

Mobley, Justin K. and James L. Neathery "Off-Metal Synthetic Study p-Chlorophenyl Substituted Rhenium ^{5}-Cyclopenta[*c*]pyridazyl Complexes" (Dr. Chad Snyder)

Transition metal complexes offer materials chemistry tremendous benefits that range from enhanced electrical conductivity, catalysis, and semiconductor research. We are interested synthesizing aryl substituted pyridazyl complexes for these benefits. Our research focuses on the synthesis of organometallic rhenium pyridazyl complexes. These pyridazyl complexes were synthesized in three steps beginning from 1,2-diacylcyclopentadienes in the Snyder Research Group. Off-Metal synthesis and characterization of $[Re(CO)_3\{1,2\text{-}C_5H_3(CRN)(CRN)\}]$ (R = C_6H_4Cl) is reported here. [page 18]

Neathery, James L. See Mobley, Justin K.

Nejedly, Ann Marie See Gaddes, Amanda

Perry, Jenny See Powell, Nikita Ann

Phillips, Chad L. and Brian Scott "On-Metal Synthesis of Some Substituted Rhenium Pyridazyl Complexes" (Dr. Chad A. Snyder)

Pyrroles and thiophenes have been of great interest in the field of semiconductors since their discovery in the late 1970's. Organometallic complexes of pyrroles can be synthesized from pyridazyl complexes. In our group, pyridazyl complexes of rhenium were synthesized in three steps beginning from 1,2-diacylcyclopentadienes. These complexes are expected to

undergo ring contraction to their corresponding pyrrole complexes by utilizing the Boger and coworker's conditions. 1,2-Diazines treated with activated zinc powder in glacial acetic acid yielded pyrroles in high yield (up to 92%). On-metal synthesis and characterization of [$Re(CO)_3${1,2-C_5H_3(CRN)(CRN)}] (R = Ph, Tp) are reported here. [page 18]

Powell, Nikita Ann and Jenny Perry "Acid Attack: Research for the Millennial Age" (Dr. Wendi Hulsey)

Risk factors for dental acid erosion occur due to the excessive consumption of acidic food and beverages. Societal behaviors such as larger portions of meals, drinks, and unhealthy snacks are a trend of today's population and particularly the millennial age group. Applied research was performed to prove that carbonated beverages had more acid erosion effect on tooth enamel than did flavored water or sports drinks. Methods utilized to perform this experiment were extracted teeth placed in three different solutions for a specific time frame. The research revealed that there was significantly greater effect on the enamel of the tooth that had been subjected to flavored water. The results were not consistent with the initial hypothesis due to the higher acid content in the flavored water. In conclusion, acid wear can affect people of all ages and is a growing dental problem for this millennial age. [page 20]

Rodgers, Nicholas See Wix, Jane Marie

Schaefer, Jacob "Not Just Books" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the historical design motif of 15th and 16th century woodblock printed books, specifically, *De Humani Corporis Fabrica*, *The Nuremberg Chronicles*, and *Hypnerotomachia Poliphili.* The resulting written report and digital collages will be based on the premise that these books are not only wells of information, but also works of art. [page 17]

Scott, Brian See Phillips, Chad L.

Seaton, Amanda Lee and Steven R. Wininger "Comparison of Live Self-Video to Task-Irrelevant Video on Maintenance of Exercise Intensity" (Dr. Steven R. Wininger)

The purpose of the study was to compare live self-video versus task-irrelevant video as attentional focus strategies for facilitating maintenance of high intensity exercise. The main outcome variable was maintenance of a prescribed exercise intensity for a duration of 25 min. Differences in affective variables and predictors of performance and affect were also examined. A repeated measures design was employed. Participants exercised on two separate days. During trial 1, participants were allowed to choose a Saturday Night Live video to view while exercising. During trial 2 participants were directed to attend to the live video feedback back of themselves running. Order was counterbalanced. N = 67. Proposed explanations for the findings as well as applied implications are discussed. [page 19]

Shartzer, Jeremy Lee "Street Art" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the design motif of street art. I chose to focus my research on a design culture. The written report and digital collage will be based on the following information. Street art is often hated by city officials and business owners. However, the colorful illustrations on trains, bridges, etc. always catch our eye. Many street artists are escaping the underground world of graffiti and bringing their work to art galleries across the world. Graffiti from Robin Gunningham, Ellis Gallagher, and Richard Mirando might be worth millions, but look quickly, because they will be painted over soon. [page 17]

Slattery, Shane "20th Century Graphic Designers/Typographers" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the historic design motif of minimalism and hand-cut collage in poster design and typography. I chose to focus my research on a design culture other than my own and the resulting written report and digital collage will be based on the following 20th Century designers/typographers: Willem Sandberg, Joseph Muller-Brockman, and Saul Bass. Sandberg, Muller-Brockman, and Bass were prolific typographers and graphic designers who were known for successfully combining hand drawn type, stylized simplistic geometric shapes, illustration, and printed type in poster design. [page 17]

Sriramula, Phenahas G. See Hinson, Daniel

Stephens, Lauren See Kington, Ellen

Stewart, Katharine Ann "Using Ratings of Perceived Exertion to Equate Ventilatory Threshold" (Dr. Steven Wininger)

Traditionally, heart rate is used to monitor exercise intensity, but it has been found that rate of perceived exertion (RPE) is a more reliable and convenient method. RPE is a scale ranging from six which is "no exertion at all" to 20 which is "maximal exertion." To achieve maximum benefits from aerobic exercise one should exercise at the ventilatory threshold, because this is where the aerobic-anaerobic transition occurs. Research has concluded that RPE can be used to measure this threshold more reliably than heart rate. Data from several studies, including some at WKU, recommends using an RPE from 13 to 15 for exercising at ventilatory threshold. It is from this research and data that it is recommended that future studies use RPE to monitor or manipulate exercise intensity. [page 20]

Stinson, Mandy See Carney, Kelsea Nichole

Strain, Jacob M. "On-Metal Study for the Synthesis of a Bulky Pyridazine Complex" (Dr. Chad A. Snyder)

Herein, the reported highly bulky pyridazine complex has potential as a semiconductive polymer. The proposed complex has several sites for polymerization owing to the numerous aromatic groups. For this research, it is important to synthesize the pyridazine ring following diacyl complex formation. Ring closure of the diacyl complex using hydrazine hydrate is proposed. On-metal synthetic route and current data is reported here. [page 18]

Suarez Gonzalez, Astrid "Soil Moisture Analysis for the 2007 Drought in the Southeastern Region of the United States" (Dr. Rezaul Mahmood)

During 2007, the Southeastern Region of the United States experienced severe to extreme drought conditions. During peak conditions, precipitation deficits were reported to range between 381 and 762 mm. In order to quantify the effects of the drought, soil moisture data from fifteen locations across seven of the most affected states was analyzed. The study was conducted

using data from USDA/NRCS' Soil Climate Analysis Network (SCAN), a new in-situ observation platform that provides unique opportunity to assess drought using soil moisture data. Daily soil moisture data for five depths including 5, 10, 20, 50 and 100 cm below surface and precipitation observations were studied. The wettest and driest years in record for each location were determined and compared with respect to 2007 data. Although 2007 was not the year with the lowest soil moisture content at all locations, the observed patterns highlight the dependency of soil moisture to climatic conditions. [page 18]

Terrell, Stephanie "Photography" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the historical design motif of photography. I chose to focus my research on a design culture other than my own and the resulting written report and digital collage will be based on the capturing of unique personalities and the attitude of rock and roll personalities and events through the body of work and life led by three infamous Rolling Stone photographers: Leibovitz, Seliger, and LaChappelle. I propose to communicate this newfound knowledge through the visual communication of traditional collage art and a written paper. [page 17]

Watson, Leslie Dawn and Holly Dorsey "Got Milk? Recladent Does" (Dr. Wendi Hulsey)

Recaldent (CPP-ACP) technology was developed in Australia at the University of Melbourne. Casein phosphopeptide (CPP) is a milk derived protein able to bind calcium and phosphate ions and stabilize them as Amorphous Calcium Phosphate (ACP). Recaldent, which adheres to soft tissue, plaque, pellicle, and hydroxyapatite, delivers amorphous calcium and phosphate into the saliva and plaque fluid. CPP-ACP can also help eliminate sensitivity. Recaldent can help from both a reparative and a preventive approach. Recaldent can be used by almost any patient. Children can also use Recaldent for the treatment of white spot lesions of deciduous teeth as well as for early childhood caries lesions. For people with large, widespread carious lesions Recaldent can help stabilize the oral environment until other treatment is rendered. Patients with xerostomia can use Recaldent to reduce the harmful effects of plaque derived-acid and encourage remineralization by

increasing levels of calcium in the saliva and plaque. The nature of the methodology used in this research was by way of literature review only. Studies have shown dramatic results with the use of Recaldent in the dental practice and with patient use. Recaldent is the definitive way for remineralization and will be the chemical of the future for dentistry. [page 20]

Westbrook, Hollye Elizabeth "Typographers of the 1900s" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on the historical design motif of typographers of the 1900s. I chose to focus my research on a design culture other than my own and the resulting written report and digital collage will be based on the following information. The life and works of Herb Lubalin, Paul Rand, and Edward Johnston will be displayed. [page 17]

Wharton, Rebecca "Making Every Visit Count: Correlation between Social Contact and Life Satisfaction of Long Term Care Residents" (Dr. Dana Burr Bradley)

Studies have demonstrated the idea of a social support network having a significant effect on the quality of life for a resident of a long term care facility. Visits from family and friends illustrate the idea of a social support network; however, in order for visitors to be effective, there must be an understanding of the need for family caregiving within a long term care facility. The goal of the 2007 Nursing Home Resident Counsel Conference was to gather data that would be used to provide a communication tool between nursing home residents and their visitors. The study surveyed nearly 100 residents about the characteristics of recent visits. When combining the survey results with other research, the significance of social contact can be reflected in resident's physical and mental wellbeing. [page 19]

Whitaker, Tony "Guitar Heroes" (Matt Tullis, M.F.A.)

"Guitar Heroes" is a series of three posters based on the idea that a single musical instrument, the guitar, can produce many different kinds of music, including country, folk, and hard rock. While Johnny Cash was best known for his country hits, Paul Simon is associated with his folk tunes, and Jimi

Hendrix adds a psychedelic sound to rock music. These three artists will be represented by a series of posters, one per person, with the imagery tying all three artists from different music genres as a cohesive group linked to one basic instrument. While each will have the same basic design, elements from each genre will also help individualize each poster. [page 17]

Whitehouse, Erika See Clark, Lindsey M.

Wilson, Cassandra "Pop Art" (Matt Tullis, M.F.A.)

The objective of my student research project is to create effective visual communication. I will develop a theme that centers on historical design motifs of pop art, printmaking and advertising. I chose to focus my research on a design culture other my own and the resulting written report and digital collage will be based on the following information. My objective in this visual presentation is to relate the artists with their works in printmaking and fine art. The movement was based on mass production and advertising, which tie the artists together. The three artists who I will compare are Andy Warhol, Robert Rauschenberg, and Jasper Johns. [page 17]

Wix, Jane Marie and Nicholas Rodgers "Flash Flood Climatology of the Appalachian Mountains: Focus on Eastern Kentucky Summer Rainfall Events" (Dr. Rezaul Mahmood)

The Appalachian Mountains are subject to flash floods due to interactions between complex terrain and frequent rainfall. Previous studies have shown that a number of environmental factors can trigger flash floods, which can leave behind a variety of outcomes. However, there is a lack of research concerning flash floods in the Appalachian region including eastern Kentucky. This study addresses these concerns by examining summer (June-August) rainfall frequency and intensity in connection with flash floods in the Appalachian region of eastern Kentucky during 1995-2005. Flash floods were identified using the National Climatic Data Center's (NCDC) Storm Database. Radar estimated rainfall data from the Jackson, KY site were provided by the NCDC. In order to examine relationships between flash flood events and rainfall amounts, the latter was categorized for: 0 to 24.99 mm, 25 to 49.99 mm, 50 to 74.99 mm, 75 to 99.99 mm, 100 to 124.99 mm, and 125 to 150 mm. Subsequently, we have calculated flash flood frequencies

associated with these rain fall amount and categories. It is speculated that both large and small-scale atmospheric circulation, combined with antecedent soil moisture conditions played a role in producing flash floods. [page 19]

Wohlrabe, Sarah and Kristin James "Dental Loupes: Helping Dental Professionals See Clearly" (Dr. Barbara C. Bush and Becky Tabor, M.Ed.)

This paper's goal is to stress the importance of loupes in the dental field. Dental loupes are magnifying devices that dentists and hygienists use to better visualize the oral cavity so that a proper diagnosis can be made. There are four factors that must be researched in depth before purchasing a pair of loupes: working range, width of field, magnification, and depth of field. Included in this paper are the repercussions that could occur if these four factors are not considered when selecting loupes. Also researched are the different types of loupes that one can choose from. Advantages and disadvantages are also discussed throughout this paper. Overall, the research concludes that the increased efficiency of dental loupes will prove them to be a valuable and long lasting tool to dental professionals. [page 20]