



**MURRAY**

**STATE UNIVERSITY**

**SCHOLARS WEEK**

**Program Booklet**

April 16-20, 2012

Updated: 4/15/12

11<sup>th</sup> Annual  
**Scholars Week**  
Program and Abstracts

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**Welcome to *Scholars Week 2012*.** This year marks the eleventh anniversary of Murray State University's (MSU) *Scholars Week* celebration!

The 2011-12 academic year has been productive for Murray State students and faculty.

As I reflect over the year and accomplishments of our undergraduate students taking part in research, scholarly, and creative endeavors I am continually impressed. Throughout the year, a number of faculty-mentored projects have received financial support through the Office of Undergraduate Research and Scholarly Activity's Mini-Grant Program. Four Research Scholar Fellowships were awarded to undergraduate students who participated in a very competitive review process. MSU again coordinated the *Posters-at-the-Capitol* program in Frankfort leading this statewide program on behalf of all the public institutions across the Commonwealth.

This year we continued to see undergraduate students taking part in faculty-mentored learning experiences – coined “high-impact” practices by the Association of American College and Universities – be accepted to state, regional and national conferences. Presentations were not the only outcome; publication of undergraduate student work continued in discipline-specific and multidisciplinary professional journals. Outcomes such as these raise the visibility of our students and open doors to quality graduate programs and career opportunities.

As the academic year culminates, the University is looking forward to the annual *Scholars Week* celebration which recognizes the creative and scholarly work of hundreds of Murray State undergraduate and graduate students. I encourage you to attend as many of this year's *Scholars Week* poster sessions, oral presentation sessions, performances and exhibits as possible. I am grateful to you – our students, faculty, and staff – for making this another outstanding year for scholarly accomplishments at Murray State University.

Randy J. Dunn  
President



Welcome to the 11<sup>th</sup> anniversary of *Scholars Week* at Murray State University. This university-wide celebration of undergraduate and graduate student research, scholarship, and creative activity is something I look forward to each spring semester.

Research shows us that students engaging in faculty-mentored experiences learn better and have a stronger sense of engagement than those without such opportunities. Murray State University has long supported the types of projects on display at *Scholars Week* through our honors, service learning, study abroad, and undergraduate and graduate research programs.

I applaud the efforts of our faculty and staff for continuing to give so generously to our students. I am continually amazed at what they can do when challenged and given necessary support. Whether it is through oral presentations, posters sessions, exhibits, or performances, the results are clear – the students presenting during this celebration are active learners and headed for a bright future.

Please take advantage of all the activities during *Scholars Week* and enjoy!

Bonnie Higginson  
Provost and Vice President for Academic Affairs





There are no guarantees in life; we all have heard that. It's difficult to guarantee anything, especially a college / university's performance with regard to student learning, but there are some parameters: In the world of accountability in which we all live, critical components of student learning are obvious in courses completed, grades achieved, and ultimately graduation; however, another equally critical component of student learning is in research and scholarship during the undergraduate years. "Traditionally, undergraduate education has taken place in the classroom, while research has been for graduate students and faculty. No more. College and universities are pushing hard to get many more undergraduates involved in research" (Justin Pope, Associated Press, USA Today, Feb. 5, 2007). I am very proud, as a Murray State University faculty member and administrator to share with you

that your education here, with tremendous faculty/staff interaction, has been exponentially "ramped up" with regard to undergraduate research under the leadership of the Office of Undergraduate Research and Scholarly Activity. You should be proud of your engagement in scholarship and research during our annual *Scholar's Week*, working hand-in-hand with professors across all of our colleges, departments, and disciplines. I am very proud to welcome you to this cutting edge event where Murray State University is an equal peer to some of the best research universities in the nation.

There are no guarantees in life, and student learning is difficult to measure; however, your participation in Murray State University's *Scholar's Week* is evidence of your success here as a student as well as your success in the not-too-distant-future as a graduate. Don't forget your beginnings, and always remember your alma matre, Murray State University.

Tim Todd  
Dean, Arthur J. Bauernfeind College of Business



**Scholars Week** is an exciting event for teacher education and the College of Education and Murray State University. During **Scholars Week** our students who will soon be teachers display the scholarship and professionalism appropriate for education professionals. The display of achievement reflects the quality of our institution and the commitment it has made to the PK-12 education community to improve the educational attainment for students in the service region and the Commonwealth. The professional portfolio that student teachers prepare as part of their student teaching experience, reflects the application of their academic knowledge and the professional skills, standards and ethics required for the increasingly demanding field of PK-12 public education. You are encouraged to talk with students as they present their professional portfolio as a display of the thinking and scholarship representative of the university and to personally congratulate the young scholars for their outstanding work and thoughtful contribution.

As Interim Dean of the College of Education, I welcome you to **Scholars Week** and trust you will be impressed with the display of knowledge and the hospitality and friendliness of our students, faculty, college and university.

Renee Campoy  
Interim Dean, College of Education



On behalf of the College of Health Sciences and Human Services, welcome to **Scholars Week**. This event offers the opportunity to interact with emerging professionals representing our College as they exhibit unique contributions to their fields of study. The disciplines housed within this College are linked together by a common foundation of serving others, particularly in the areas of health, safety, and general well-being. As you peruse the various displays, take time to interact with the scholars, ask questions and discuss the work being presented here. Remember, it is your world to explore!

Susan Muller  
Dean, College of Health Sciences and Human Services



Murray State University's *Scholars Week* provides an exciting opportunity to recognize and celebrate the academic achievements of our undergraduate and graduate students, showcasing the results of their scholarly and creative projects. Research, fundamental and applied, is an essential component of our curricula. Throughout history, major discoveries and new knowledge have been essential to human progress. Through active research agendas and creative endeavors, our faculty and students explore the boundaries of their disciplines and expand our realm of possibilities. Discovery through research and creative activity encourages a sense of relevance and excitement as new knowledge is applied to society, industry, and beyond. The faculty in the College of Humanities and Fine Arts work together with their students on research and creative projects in classrooms, clinics, and studios, becoming partners in the exploration of disciplines and the acquisition of new knowledge. This partnership expands the abilities of our students to think independently, creatively, and critically. As one of the leading universities in the region, this is our ultimate mission.

Ted Brown  
Dean, College of Humanities and Fine Arts

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MSU's *Scholars Week* is a time for us to celebrate the research, scholarship, and creative accomplishments of our students. During this week, we have the opportunity to recognize and affirm those students who have demonstrated their commitment to their disciplines by pursuing learning beyond the confines of the classroom. In addition, we honor those faculty who have invested their time, talents, and resources to involve students in a richer learning experience. The posters and exhibits presented this week are evidence of MSU's dedication to creating a student-centered learning environment where students are encouraged to pursue excellence in their creative and academic achievement. The College of Science, Engineering, and Technology is happy to support *Scholars Week*, and congratulates all who participate.

Steve Cobb  
Dean, College of Science, Engineering, and Technology



On behalf of the Hutson School of Agriculture, I would like to welcome you to this unique opportunity to celebrate research, scholarly, and creative activity. It is also a time to showcase our dedicated faculty who are devoted to the personal and professional growth of our students. The collegiate experience is a journey with many avenues rather than simply a destination. As you participate in this event, you will view the numerous ways the University is committed to academic excellence as well as providing the opportunity to explore these avenues. Through activities like *Scholars Week*, Murray State University and the Murray State University Hutson School of Agriculture offers its students the opportunity to get an education instead of just a degree. I

would like to commend all the participants in this event.

Tony Brannon  
Dean, Hutson School of Agriculture



While the accomplishments of our students is a constant point of pride to Murray State University, *Scholars Week* stands out as it gives us an opportunity to highlight the amazing research and creative activity performed by some of our best and brightest students. Much like the faculty who work with these students firsthand, those of us here in the University Libraries have the good fortune to participate in the learning and growth that accompanies these student endeavors. The excellent displays you will see during *Scholars Week* are the visible result of that learning, and help demonstrate the value Murray State University places on teaching, research and service excellence.

On behalf of the faculty and staff of the University Libraries, welcome!

Adam Murray  
Dean, University Libraries



Murray State University has established a tradition of undergraduate scholarship culminating annually in ***Scholars Week***. It is an opportunity to share student's accomplishments with the entire University community. Being able to showcase the critical thinking and creative skills that our students possess demonstrates their ability to think "outside the box", to creatively solve problems and to add to the body of nursing knowledge. We are proud of our students, their talents, their work ethic and their accomplishments. We believe that you will share our pride. Welcome to ***Scholars Week!***

Marcia Hobbs  
Dean, School of Nursing



## **A Welcome from the Undergraduate Research and Scholarly Activity Advisory Board and Staff**

On behalf of the Undergraduate Research and Scholarly Activity Advisory Board and staff, welcome to our eleventh annual *Scholars Week* celebration. We are pleased that over the past ten years that several thousand Murray State University undergraduates and graduate students have had the opportunity to present their research, scholarly, and creative works to the university community.

The work displayed in this year's *Scholars Week* abstract booklet represents thousands of hours of effort on behalf of Murray State's students and faculty. To our students, you are to be commended for your dedication and effort! Your efforts will be rewarded when you apply to graduate school or when you look for that first job. To the faculty, you are helping our students succeed and this is among our greatest rewards.

Please join the URSA Advisory Board and staff in celebrating the accomplishments of our students by attending as many of the *Scholars Week* events as possible. Our young scholars need your continued support!

### ***Advisory Board and Staff:***

**Dr. Terry Derting**  
Biological Science

**Dr. Daniel Hepworth**  
SWK, CRJ, & GER

**Dr. Zbynek Smetana**  
Art

**Dr. Meagan Musselman**  
Education

**Dr. Joyce Shatzer**  
Education

**Dr. Paula Waddill**  
Psychology

**Dr. Terry Holmes**  
Business Administration

**Dr. David Ferguson**  
Agriculture

**Dr. John Mateja**  
At-Large

**Dr. Pat Williams**  
Agriculture

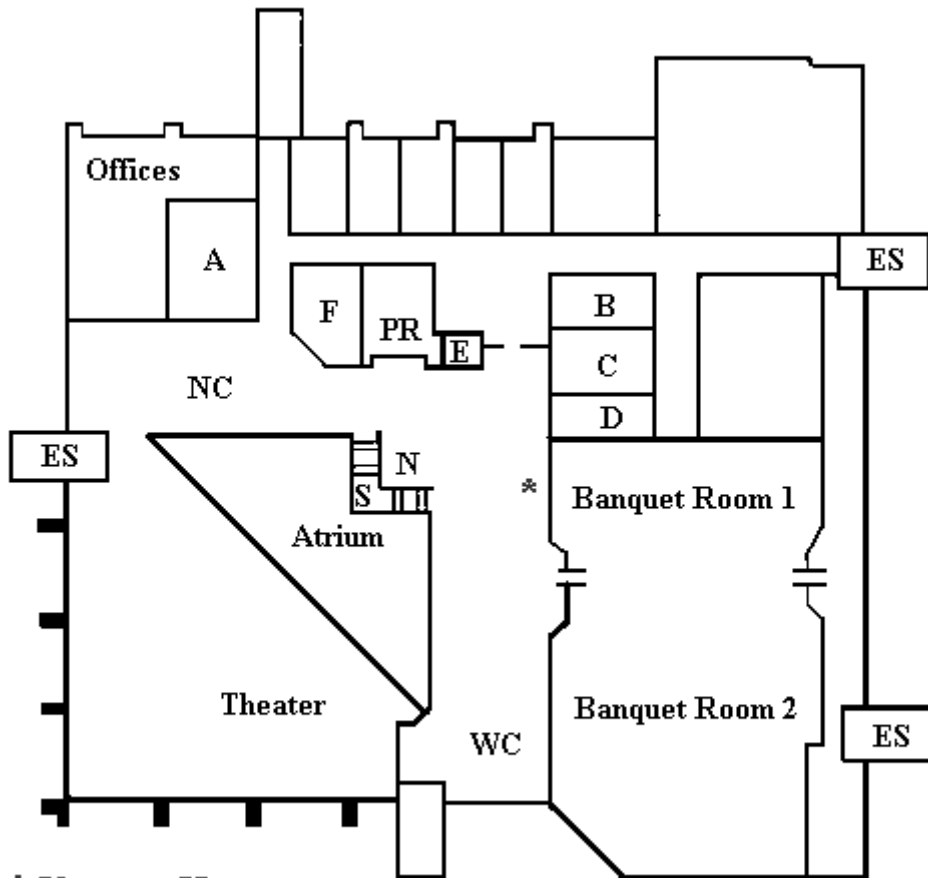
**Dr. Harry Fannin**  
Chemistry

**Ms. Summer Cross**  
Nursing

**Mr. Dieter Ullrich**  
Library

**Dr. David Eaton**  
Economics/URSA

**Mr. Jody Cofer**  
URSA



**\* You are Here**

- |                             |                              |
|-----------------------------|------------------------------|
| <b>A – Barkley Room</b>     | <b>E – Elevator</b>          |
| <b>B – Ohio Room</b>        | <b>F – Tennessee Room</b>    |
| <b>C – Mississippi Room</b> | <b>N – Crow’s Nest</b>       |
| <b>D – Cumberland Room</b>  | <b>PR – Public Restrooms</b> |
| <b>S – Center Stairs</b>    | <b>ES – Emergency Stairs</b> |
| <b>NC – North Concourse</b> | <b>WC – West Concourse</b>   |

## ***Scholars Week Schedule***

**Monday, April 16, 2012**

### **Poster Session**

#### **Sigma Xi Poster Competition**

Large Ballroom, Curris Center

Session Chair: Dr. Claire Fuller

9:00 a.m. – 12:00 p.m. Poster Set-Up

12:00 p.m. – 4:00 p.m. Poster Judging

\* *Undergraduate*

\*\* *Graduate*

Subhash Dasari\*\*

*Preliminary Study on the Inorganic Elemental Concentrations in Water Samples Collected from Selected Locations in Kentucky Lake and Clarks River*

Alexander Earhart\*

*Colonial Relatedness and Adaptability to Tropical Microhabitats in the Caribbean Termite, *Nasutitermes acajutlae*: Adapting Genetic Markers*

Kate Fore\*

*Optimal Control Applied to Real World Models*

Kristen Garcia\*

*Fourth Order P-V Characteristic Curves for Maximum Power Point Tracking*

Morgan Geile and Jeffrey Young\*

*A Mathematical Approach to Polyphenisms in *Ambystoma tigrinum nebulosum**

Lauren Gibson\*

*Thermal Properties of Ionic Liquids Consisting of Phosphonium Cations and Alkyl Sulfate Anions*

Sarah Hargis\*

*Brca2 and Chemotherapy Combinations*

Kristina Herrera\*

*Analysis of the Chemical Methylation of Peptides by Liquid Chromatography-Mass Spectrometry*

Mary Ann Hodge\*

*A Search for Pulsars in Binary Star Systems*

Dan Jenkins\*\*

*Analyzing ACT Composite Score Averages in Kentucky with GIS and Statistical Analysis*

Ramakrishna Katta\*\*

*PCB Aroclor Mixtures: GC-ECD Analysis and Pattern Recognition in Environmental and Biological Samples*

Sooyeon Kim\*

*Synthesis and Thermomechanical Analysis of Michael Addition Polyesters*

Kaitin Knaszak\*

*The Influence of Fire on Organic Matter Resources of Arctic Headwater Streams*

Kari L. Koester\*

*Environmental Memory: The Effect of Scent on Long-Term Memory*

Aaron Lattin\*\*

*nPDF Algorithm Run-time Analysis Using Java Versus C#*

Katie LeBlanc\*

*Soil Quality Responses to Farming Practices in Western Kentucky*

Aaron Lowe\*

*Mapping of Leaf Area Index (LAI) Change in the Tri-county Area of Corbin, Kentucky Using Landsat Imagery*

Jessica Marshall\*

*Mapping Urban Sprawl in Atlanta, Georgia using Landsat Imagery*

Jennifer Martin\*

*Reconstructing the Deposition & Paleogeography of the Coffee Sands*

James McCallon\*

*Using Landsat TM Imagery to Determine Chlorophyll Concentrations in Kentucky Lake*

Jacob Meadows\*

*Monitoring of Migration of Mountain Pine Beetle in North American Boreal Forest Using Landsat Imagery*

Trina Merrick\*\*

*Comparison of Multispectral and Hyperspectral Imaging and Classification to Map Sand Types on Perdido Key, Florida*

Jared Militello\*\*

*Alligator Gar Restoration in the Clarks River of Western Kentucky*

Basma Mohamed\*\*

*Modeling of Urban Sprawl Using Remote Sensing and GIS*

Eric L. Morris\*\*

*Evaluating Oceanic-terrestrial Groundwater Intrusions Utilizing Remote Sensing Monitoring Techniques*

Ajadi Olaniyi\*\*

*Integration of Remote Sensing, Geographic Information System and Geophysical Techniques to Delineate the New Madrid Seismic Zone*

Hanna Oliver\*

*Detection of Nitrogen Deficiency in Corn using Remotely Sensed Data*

Sijin Ren and Austin Jameson\*

*Extraordinary Strong Interactions between Nucleotide Bases and Reactive Species*

Kristen Trenis Reynolds\*

*Quantification of the Historical Sediment Transport Capacity of the Buffalo National River*

Nissa Rudh\*

*Identification of Sound-Producing Freshwater Invertebrates in Recordings using Digital Signal Recognition*

Kristen Ruga\*

*Cohesion among Sport Fans in the Athletic Arena Setting*

Kristen Ruga\*

*Measuring Cohesion: Validating the Generalized Cohesion Scale (GCS)*

James Smith\*\*

*Using Social Media to aid Emergency Management*

Nathan Truax\*

*Mapping Turbidity of Kentucky Lake Using Landsat ETM+*

Mara S. Varvil\*

*Differential Gene Expression of the Lux Operon of Vibrio harveyi by mRNA Processing*

Thomas Werfel\*

*Remotely Ignited, Flexible and Non-thermal Micro-plasma Jet for Endoscopic Surgery*

Thomas Werfel\*

*Proximity Activated Smart Nanoparticle for the Delivery of siRNA to Metastatic Tumor Cells*

Yuchen Zhang\*\*

*High Level Correlated Ab Initio Investigations on the Intermolecular Potential of the Superoxide-HF Complex*

## Oral Sessions

### **Economics Senior Seminar**

Ohio Room, Curris Center

Session Chair: Dr. David Brasfield

1:30 p.m. – 3:00 p.m.

Liz Fiero

*The Charity Bowl: Examining Big Bowl Games and Nonprofit Correlation*

Matt Luken

*Bailouts and the Effectiveness of TARP*

Michael Newman

*Bidding for the Big Game*

Pritesh Patel

*Which Type of Economic Policy Measures Tackle Recessions Better?*

Jeremy Vaughn

*Eco 499 Senior Seminar*

### **Mathematical Biology Session**

Mississippi Room, Curris Center

Session Chair: Dr. Maeve McCarthy

2:30 p.m. – 4:00 p.m.

Chelsy Chambers and Nadia Miodrag

*Review of the Model for Acetaminophen-induced Liver Damage*

Alexander Earhart and Andrew Thompson

*Evaluation of Statistical Modeling of HIV Infection Progression*

Kyle McClary and Derick Thomas

*The Naturalization Hypothesis*

Joshua Mercer and William Huddleston

*Modeling the Biological Processes of Epidermal and Dermal Wound Healing: Predicting Healing Rate and Geometry of a Wound Space Over Time*

Sam Pellock and Yanyan Lin

*Analysis of Cancer Cell Populations Using Continuous Models*

Leslie Potts and Devan Buckhalter

*A Population Viability Analysis Using a Vortex Model to Estimate the Recovery Rate of Killer Whale Populations in the Prince William Sound, Alaska after the 1989 Exxon Valdez oil s*

Elizabeth Tarter and Cara Bohrman

*Ubiquity of the Michaelis-Menten Model: Applications Across Disciplines*

Yuling Xiong (Alice) and Sewon Park

*Biomathematical Model for Spread Disease*

**Tuesday, April 17, 2012**

**Oral Sessions**

**Freshman Reading Experience Essay Contest Winner's Session**

Ohio Room, Curris Center

Session Chair: Dr. Josh Adair

2:30 p.m. – 3:30 p.m.

Brenton Bailey

*Persepolis Essay*

Elizabeth A. Brown

*Marji's Veil: Power and Responsibility*

Xinyi Ge

*Woman, Show Yourself*

Hye-jin Park

*Is Marjane's Intention of Writing Properly Delivered?*

**BioMaps Mini-Symposium**

Mississippi Room, Curris Center

Session Chair: Dr. Renee Fister

2:30 p.m. – 4:00 p.m.

Morgan Geile and Jeffrey Young

*A Mathematical Approach to Polyphenisms in *Ambystoma tigrinum nebulosum**

Bryce Norris

*Can Math Save Lives?*



## **Modern Language Senior Colloquium**

Barkley Room, Curris Center  
Session Chair: Dr. Meg Brown  
3:30 p.m. – 5:30 p.m.  
(listed in alphabetical order)

John J. Bratton Jr.  
*Baudelaire and Impressionism: The Relationship*

Shannon Brooks  
*The African Diaspora and its Effect on the Cuban Cultural Identity: An analysis of the Film, Guantanamera*

Jeffrey Frye  
*Psychological and Social Effects of Single or Dual-identity of Puerto Ricans in America*

James Gardner  
*Surreal Belgium*

Emily Hensel  
*Bertolt Brecht: Revolutionary Theatrical Theories*

Jacqlyn Murdock  
*Comparison of the Works of Gaudi and Hispanic Literary Modernisms*

Kristen Tinch  
*American, European and Mexican Perspectives on the Second Mexican Empire (1864-1867)*

Jeff Wood  
*Oviedo's Negative Portrayal of Native Americans: The Motives Behind the Words*

## **Other Sessions**

### **Awards Recognition Reception**

Faculty Club  
4:00 p.m. – 5:30 p.m.  
(Faculty & Staff Only)

Dr. Bommanna Loganathan, Professor of Chemistry, 2012 Recipient of the University Distinguished Mentor Award

Dr. Michael B. Flinn, Assistant Professor of Biological Sciences, 2012 Recipient of the Alumni Association's Emerging Scholar Award

Dr. William H. Mulligan, Jr. Professor of History, 2012 Recipient of the Alumni Association's Distinguished Researcher Award

### **Sigma Xi Banquet**

Large Ballroom, Curris Center

Contact: Dr. John Mateja

6:00 p.m. – 8:00 p.m.

*(For Sigma Xi Members, Competition Participants, and Invited Guests Only)*

**Wednesday, April 18, 2012**

### **Poster Session**

#### **General Poster Session**

Small Ballroom, Curris Center

9:00 a.m. – 11:30 a.m.

*Students will be with their posters from 10:30 a.m. to 11:30 a.m.*

*\*\* Sigma Xi Poster Competition Participant*

*\*\*\* American Humanics or Service Learning Posters*

Saad Alsahli \*\*\*

*Family Fitness Center*

Kaitlyn Arant and Allie Darnell

*The Effect of Adding Blueberries to Enhance Antioxidant to Full Potential*

Pamela Blaylock

*The Effects of the Use of Splenda as a Replacement for Sugar in a Cheesecake*

Hailey Buth, Ashley Wiseman, and Courtney Carlton \*\*\*

*Stay Beautiful Bash*

Susan Camp, Carey Boggess-Story, and Charlton Story

*Methods of Sucker Control for Dark Fired Tobacco with Over-the-Top Applications*

Tyler Carson \*\*\*

*Zumba Fitness - Service Learning Experience*

Kaitlin Cary

*Opening Communication Between Parents of Silent Victims and Educators*

Catherine Chambers

*Cytauzoonosis in Domestic Cats in Southern Illinois and Western Kentucky*

Sara M. Cook

*Consumer Acceptance of Nut Substitute Butters in Chewy Peanut Butter Cookies*

Kayla Crusham and Samantha Durbin  
*Acceptability of Substituting Green Tea for Water in Four Increments in Milk Chocolate Cupcakes*

Subhash Dasari \*\*  
*Preliminary Study on the Inorganic Elemental Concentrations in Water Samples Collected from Selected Locations in Kentucky Lake and Clarks River*

Lindsey Hope Dean and Alexander Green  
*Effects of Tofu as an Egg Replacement in Brownies*

Lara Delahunt  
*Effects of Substituting Apple/Pear Fruit Puree for Fat on the Sensory Properties of a Blueberry Muffin*

Felicia Dihel \*\*\*  
*Hemitite Lake Trail*

Mindy Duncan and Courtney Jackson \*\*\*  
*Trick or Treat Safety*

Alexander Earhart \*\*  
*Colonial Relatedness and Adaptability to Tropical Microhabitats in the Caribbean Termite, *Nasutitermes acajutlae*: Adapting Genetic Markers*

Kaylyn Evans and Gloria Alverio \*\*\*  
*Angel's Attic Shoe Drive*

Kate Fore \*\*  
*Optimal Control Applied to Real World Models*

Christy Jo Harber and Kacie Kemp \*\*\*  
*Punpkin' Paintin' Palooza*

Sarah Hargis \*\*  
*Brca2 and Chemotherapy Combinations*

Katie Heierman, Dustin Herron, and Rebekah Kaplin \*\*\*  
*Ninja Tournament*

Michael Gallagher  
*Grandchildren Reports of Their Relationship with Grandparents: Relationship to Attitudes Toward Aging, Attachment, and Filial Piety*

Kristen Garcia \*\*

*Fourth Order P-V Characteristic Curves for Maximum Power Point Tracking*

Morgan Geile and Jeffrey Young \*\*

*A Mathematical Approach to Polyphenisms in *Ambystoma tigrinum nebulosum**

Lauren Gibson \*\*

*Thermal Properties of Ionic Liquids Consisting of Phosphonium Cations and Alkyl Sulfate Anions*

Stephanie Gray

*Acceptability of Flax Meal as a Partial Substitute for All-purpose Flour in Chocolate Chip Cookies*

Randy Grayson and Christian Hayes

*The Acceptability of Substituting Sucrose in Cookies with Alternative Sweeteners*

Shirley Powell Green

*Lecithin Granules as an Alternative to Butter/Margarine*

Ashleigh Guynn, Sophie McDonald, and Victoria Martin \*\*\*

*Uniquely Me Self-Esteem Program*

Kristina Herrera \*\*

*Analysis of the Chemical Methylation of Peptides by Liquid Chromatography-Mass Spectrometry*

Brittany Herring \*\*\*

*Murray Calloway Animal Shelter*

Mary Ann Hodge \*\*

*A Search for Pulsars in Binary Star Systems*

Brian Jarvis, Robert Stuard, and Joseph Kelly

*Evaluation of Dark-Air Cured Tobacco Varieties*

Dan Jenkins \*\*

*Analyzing ACT Composite Score Averages in Kentucky with GIS and Statistical Analysis*

Ramakrishna Katta \*\*

*PCB Aroclor Mixtures: GC-ECD Analysis and Pattern Recognition in Environmental and Biological Samples*

Kacie Kemp \*\*\*

*Y's Guys After School Program*

Sooyeon Kim \*\*

*Synthesis and Thermomechanical Analysis of Michael Addition Polyesters*

Kaitin Knaszak \*\*

*The Influence of Fire on Organic Matter Resources of Arctic Headwater Streams*

Dan Knight \*\*\*

*Poster Board Project*

Kari L. Koester \*\*

*Environmental Memory: The Effect of Scent on Long-Term Memory*

Aaron Lattin \*\*

*nPDF Algorithm Run-time Analysis Using Java Versus C#*

Katie LeBlanc \*\*

*Soil Quality Responses to Farming Practices in Western Kentucky*

Xiaojing Liu

*Soil Properties Improvements Following Broiler Litter Applications*

Aaron Lowe \*\*

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Jessica Marshall \*\*

*Mapping Urban Sprawl in Atlanta, Georgia using Landsat Imagery*

Jennifer Martin \*\*

*Reconstructing the Deposition & Paleogeography of the Coffee Sands*

Ashley Matula, Amanda Ray, and Abby Clark \*\*\*

*Need Line Hocus Pocus Hygiene Drive*

James McCallon \*\*

*Using Landsat TM Imagery to Determine Chlorophyll Concentrations in Kentucky Lake*

Lori Meadors and Justin Nash

*Effects of Hi-maize substitute for Flour in Muffins*

Jacob Meadows \*\*

*Monitoring of Migration of Mountain Pine Beetle in North American Boreal Forest Using Landsat Imagery*

Trina Merrick \*\*

*Comparison of Multispectral and Hyperspectral Imaging and Classification to Map Sand Types on Perdido Key, Florida*

Jared Militello \*\*

*Alligator Gar Restoration in the Clarks River of Western Kentucky*

Morgan Miller \*\*\*

*Murray Calloway County Animal Shelter*

Amber Mills

*Previously Unknown Species of Archaea in the Sediments of Kentucky Lake*

Tommy Mills \*\*\*

*Laker Pride*

Basma Mohamed \*\*

*Modeling of Urban Sprawl Using Remote Sensing and GIS*

Eric L. Morris \*\*

*Evaluating Oceanic-terrestrial Groundwater Intrusions Utilizing Remote Sensing Monitoring Techniques*

James Ralph Norwood \*\*\*

*Nature Station Sensation*

Alyssa Oberdorf, Kayley Lott, and Patricia Fisher

*Small Wind Turbine Design*

Ajadi Olaniyi \*\*

*Integration of Remote Sensing, Geographic Information System and Geophysical Techniques to Delineate the New Madrid Seismic Zone*

Hanna Oliver \*\*

*Detection of Nitrogen Deficiency in Corn using Remotely Sensed Data*

Justin Lee Parrish, Trent Murdock, and John Michael Puckett

*Evaluation of Herbicide Treatments for Dark Fired Tobacco 2011*

Lucas Pohlman \*\*\*

*Murray Club Baseball*

Briona Posey

*What is the Relationship Among Organizational Assimilation, Co-worker Communication, and Work-life Balance for Minority Mothers in the Workplace?*

Sijin Ren and Austin Jameson \*\*

*Extraordinary Strong Interactions between Nucleotide Bases and Reactive Species*

Kayla Reynolds, Anita Spaulding, and Jordan Roberts

*Murray Calloway County Animal Shelter*

Kristen Trenis Reynolds \*\*

*Quantification of the Historical Sediment Transport Capacity of the Buffalo National River*

Chris Ringstaff \*\*\*

*Student Government Counsel*

Nissa Rudh \*\*

*Identification of Sound-Producing Freshwater Invertebrates in Recordings using Digital Signal Recognition*

Kristen Ruga \*\*

*Cohesion among Sport Fans in the Athletic Arena Setting*

Kristen Ruga \*\*

*Measuring Cohesion: Validating the Generalized Cohesion Scale (GCS)*

Tyler Saltsman \*\*\*

*West Kentucky Mentoring*

Caroline Schmidt and Caitlin Nichols

*Microartifact Analysis on Mound C, Poverty Point Site*

Taylor Sheridan \*\*\*

*Mills Manor Health and Rehab*

Ryan Slaton \*\*\*

*Summary of Service project Need Line*

Jeromy Slayden \*\*\*

*Family Fitness Feels Fantastic*

James Smith \*\*

*Using Social Media to aid Emergency Management*

Ramona Stalls, Nicholas Vaughn, and Melanie Thomas \*\*\*

*Take a Stand...Help Your Neighbor*

Chris Staten \*\*\*

*Family Fitness Center*

Nathan Truax \*\*

*Mapping Turbidity of Kentucky Lake Using Landsat ETM+*

Mara S. Varvil \*\*

*Differential Gene Expression of the Lux Operon of Vibrio harveyi by mRNA Processing*

Jonah Waggoner

*Acceptability and Nutritional Advantage of Molasses as a Sugar Replacement*

Ryan T. Walls \*\*\*

*Need Line in Murray*

Ruojing Wang (Audrey)

*Comparing and Contrasting Relational Closeness and Distance between Chinese and Americans*

Chelsea Watkins and Sarah Sunderman

*The Acceptability of Blueberry Muffins using Flour, Gluten Free Product and Homemade Gluten Free Mix*

Thomas Werfel \*\*

*Remotely Ignited, Flexible and Non-thermal Micro-plasma Jet for Endoscopic Surgery*

Thomas Werfel \*\*

*Proximity Activated Smart Nanoparticle for the Delivery of siRNA to Metastatic Tumor Cells*

Dora White and Madolyn Parker

*Acceptability of Chocolate Pudding Using Various Purred Fruits as a Substitution for Milk*

Brandon Wicks \*\*\*

*Track and Field*

Robert Willmoth

*Hester Athletics*

Ashanti Wilson and Anteneshia Sanders \*\*\*

*Protein Harvest*

Yuchen Zhang \*\*

*High Level Correlated Ab Initio Investigations on the Intermolecular Potential of the Superoxide-HF Complex*



## Oral Sessions



### Research Symposium

Barkley Room, Curris Center

Session Chair: Dr. Howard Whiteman

9:00 a.m. - 4:00 p.m.

Ann Gilmore

*The Combined Effects of Atrazine and Predation on the larval dragonfly Plathemis lydia*

Robert Knopp

*The Effects of Prescribed Fire on Amphibian and Reptile Diversity in an Oak-Grassland Restoration Area*

Tobias Landberg

*Does Egg Size Affect Hatchlings and Metamorphosis in a Polymorphic Salamander?*

Todd Levine

*Natural History and Range Expansion of Plectomerus Dombeyanus*

Santiago Martin

*Indiana Bat (Myotis sodalis) Habitat Improvement: Production of Roost Trees and Foraging Areas*

Theresa Martin

*You are What you Eat: A Stable Isotope Study of Kentucky Lake*

Michael P. Moore

*The Role of Maternal Effects on Life-History Variation in the Facultatively Paedomorphic Mole Salamander, Ambystoma talpoideum*

Charles Morgan

*Long Term Monitoring and Analysis of Kentucky Lake Using in situ and Remotely Sensed Data*

Brahmaiah Patibandla

*Trace Elements and PCB congener Concentrations in Annual Growth Rings of Pine Trees from Western Kentucky*

Scot Peterson

*Patterns of Summer Insect Emergence Along a Degraded Stream in Western Colorado (USA)*

Tricia Ladd Rushing

*Parasite prevalence in the marbled salamander (Ambystoma opacum), the eastern newt (Notophthalmus viridescens), and the slimy salamander (Plethodon mississippi) in Western Kentucky*

Subhash Dasari

*Preliminary Study on the Inorganic Elemental Concentrations in Water Samples Collected from Selected Locations in Kentucky Lake and Clarks River*

## **Politics in Its Many Guises Session I**

Ohio Room, Curris Center

Session Chair: Dr. Ann Beck

9:00 a.m. – 12:00 p.m.

Ashley Adams

*The Social Influence of China compared to the United States within South Africa: Literature Review*

Anna Carlson

*Mexican Drug Cartels: An Incentive for United States to Act*

Danielle Cole

*Foreign Policy and Conflict Management*

Nathan English

*Sustainable Democracy: The Case of Mexico*

Abigail Heard

*The Effects of War in the Ivory Coast: A Study*

Daniel Heil

*Hand Guns and Mayhem: The Influence of Small Arms Trade on Political Violence*

Kelsi Kuykendall

*The Race for Africa: The United States v. China, with a focus on Nigeria*

Krista Mack

*Has CAFTA Hurt or Helped the Caribbean Nations?*

Thomika Jantzen O'Bryan

*Can Democracy be forced into Effect by a Military?*

Jonathon R. Rowland

*Upheaval in Egypt & It's Effect on Israel Relations*

Steven Stewart

*Measuring the Effectiveness of the United Nations' Peace-keeping Operations*

Charles A. Willson

*The Kentucky Triptych: The Art of Democratic Dominance in the Commonwealth*

**Jane, Rochester, and Power: *Jane Eyre* Interpreted**

Mississippi Room, Curris Center

Session Chair: Dr. Staci Stone

9:30 a.m. – 10:30 a.m.

Stuart Ford Ebling

*The Parallel of Charlotte Bronte's "Jane Eyre" and Ovid's Tale of the Nightingale*

Tia Johnston

*Rochester's Character in Jane Eyre: Revealing Negative Traits Through Shakespearean Allusions*

Hannah Leskosky

*Resistance for Happiness: Conflicts of Gender Expectations in Victorian England and Jane Eyre*

Nicole Tuberty

*Girl in the Mirror: Jane Eyre as a Surrogate Mother*

**College of Education: Student Teacher Eligibility Portfolios**

Crows Nest, Curris Center

Session Chair: Ms. Jeanie Robertson

9:30 a.m. – 1:30 p.m.

Kirsten Byrn - Middle School Education, Math/Science

Catherine Crass - Elementary Education

Timothy Hutchens - Music Education/Instrumental

Elizabeth Myers - English Education/Secondary Education

Amanda Perry - Learning and Behavior Disorders/Elementary Education

Tatiana Romanko - Music Education/Instrumental

Helen Winchester- Learning and Behavior Disorders/Elementary Education

## **Liberal Arts Session I**

Ohio Room, Curris Center  
Session Chair: Dr. Barbara Cobb  
1:30 p.m. – 2:30 p.m.

Anna Key

*The Face of Help: Bringing American Volunteerism into Bolivia*

Jamie Booth

*The Start of the Sunrise: The Effect of James Yen's Mass Education Movement on Mao's Communism, 1922-1949*

Nate Brelsford

*Let There Be Light: A Study in Visual Sociology*

Callie Rezek

*The Elizabethan Period as a Transitional Era in English History*

Meg Thompson

*Women in Archaeology: Past and Present*

Sarah Wylie

*The Tudor Queens: A Step Toward Feminism in England*

## **Psychology Session**

Mississippi Room, Curris Center  
Session Chair: Dr. Paula Waddill  
2:00 p.m. – 3:15 p.m.

Kari L. Koester

*The Effect of Orange and Cinnamon Aromas on Test Performance*

Claire Reason

*How Much will a White Bear Share? Effects of Materialism and Ego-depletion on a Consumer Allocation Task*

Zachary Siegel

*Kinesthetic Prototypes in Navigation*

Kim Simmons

*Language and Its Effect on Behavior: Verb Aspect and Its Influences*

Matt Ray

*Looking for Guild: A Qualitative Analysis of Teamwork, Leadership, Member Satisfaction, and Success*

## Other

### **President's *Scholars Week* Luncheon**

Large Ballroom, Curris Center

Moderator: Provost Bonnie Higginson

11:30 a.m. – 1:00 p.m.

Remarks: President Randy J. Dunn

Performance: Dominique Duarte, MSU student, and Kala Dunn, MSU Alumna

Remarks: Dr. William H. Mulligan, Jr., 2012 Recipient of the Alumni Association's Distinguished Researcher Award, "*A Historian's Journey: Studying the History of 'Ordinary' People*"

Recognition of:

1. MSU Alumni Association's Emerging Scholar Award Recipient
2. MSU Distinguished Mentor Award Recipient
3. MSU Service Learning Mentor of the Year

## **Thursday, April 19, 2012**

### **Oral Sessions**

#### **Service Learning Mentor of the Year Session**

Mississippi Room, Curris Center

Session Chair: Ms. Amber Schaudt

10:30 a.m. – 11:20 p.m.

"*The Servant Historian*" a presentation by Dr. Duane Bolin, Professor of History and Recipient of the 2012 Service Learning Mentor of the Year Award

#### **Biological Sciences Session**

Barkley Room, Curris Center

Session Chair: Dr. Howard Whiteman

12:45 p.m. – 1:30 p.m.

Briana Forsythe

*Comprehensive Analysis of Dental Procedures: Extractions, Fillings, Implants*

Sudan Loganathan

*Tudor Protein Interactions with Glycolytic Enzymes in Germline Stem Cells*

Rebecca Raj and Rebecca Cunningham

*Cell Adhesion Properties of Neural Stem Cells*

## **Politics in Its Many Guises Session II**

Ohio Room, Curris Center

Session Chair: Dr. Ann Beck

1:00 p.m. – 4:00 p.m.

Adam Clapp

*The Impact of Montesquieu on James Madison*

Stefoni Orr Beasley

*The Rainbow Vote: The Gay/Lesbian Community in Politics*

Aaron Greene

*Revolutionary Theory and the Arab Spring: Searching for a Preliminary Explanation*

Rebecca Higley

*The Impact of Cable News Networks on Public Political Debate: A Literary Review*

James Hobbs

*Does Decentralization of Education Impact Test Scores? An OECD Exploration*

Martin Jackson

*Does women's experience in office effect reelection: Literature Review*

Laurana “Ronni” McIntosh

*Enforcing Consequences: Implementation of Safety Regulations for Underground Coal*

Michael O'Neill

*Does Democracy Decrease the Likelihood for Interstate Violence?*

Gary Rhea

*The Effects of Political Systems on Incumbency Over the Last Three Elections in Three First World Countries Using Legislative Bodies*

Michael E. Shepherd Jr.

*The Effects of Campaign Spending on Southern Gubernatorial Elections: 1990-2009*

Matthew Thomas

*Will Victorious Gubernatorial Challengers Spend More in Their Subsequent General Reelection Bid Between 1995-2010?*

Kathleen Watson

*The Help America Vote Act and Effects on Kentucky*

## **Liberal Arts Session II**

Mississippi Room, Curris Center

Session Chair: Dr. Barbara Cobb

1:30 p.m. – 2:30 p.m.

Brian Cox

*The Evangelical Nation*

Caitlin McDonald

*City of White, City of Light: Chicag's Two World's Fairs*

Kathryn Moore

*Making the Case Against DOMA*

Keely Rust

*The Benefits of a Nationwide Montessori Approach*

Kim Simmons

*Creating a Secure and Memorable Password: An Integrative Analysis*

Jordan Steiner

*The Effect of Online Piracy on the Music Industry and the Consumer*

## **Conservation Biology Service Learning Symposium**

Barkley Room, Curris Center

Session Chair: Dr. Howard Whiteman

1:30 p.m. – 5:30 p.m.

Evan Anderson

*Increasing Macroinvertebrate Diversity Through the Creation of Fish Habitat on Lake Barkley*

Kathryn Bennett

*Searching for Evidence of the Cougar (Puma concolor) in Western Kentucky*

Krystal Brindley

*Education at the Nature Station*

Meredith Ehrenheim

*Increasing Conservation Involvement on Campus*

Sarah Flarsheim and Morgan Geile

*Population Survey of Crawfish Frogs (Lithobates areolatus) in Western Ky Using Vocalizations*

Phillip Geyer

*Educating Young & Old About Conservation*

Jessica Hepworth

*Tool for Conservation education of Western Kentucky Plant & Animal Species*

Katlyn Hitz

*Creating a Canoe and Kayak Trail on the Clarks River in Paducah, KY*

Brandi King and Michael Leigh

*Stabilization of Feral Cat Colonies in Murray, KY*

Aaron Lane

*Monitoring Groundwater to Determine Wetlands*

David K. Livingston

*Gin Creek Restoration*

Justin Myers

*Effects of a Mixed Media Approach Geared Towards Addressing the Value of Recycling, Clean-up Efforts, and Peaceful Activism Within a University Setting and Local Communities*

Matthew Wallace

*Estimation of Feral Hog Population Within Murphy's Pond and Their Impact of Tree Frog Numbers*

## **Other**

### **Faculty Recognition Banquet**

Large Ballroom, Curris Center

Contact: Ms. Donna Miller

6:00 p.m. – 7:30 p.m.

*(Faculty and Professional Staff Only)*

## **Friday, April 20, 2012**

### **Oral Sessions**

#### **Occupational Safety and Health Session**

Room 155, I & T Building

Session Chair: Dr. Tracey Wortham

9:30 a.m. – 10:30 a.m.

Destiny Ball and Brett Welter

*Ergonomic Risk Assessment of Daily Operations at a Vehicular Battery Distributorship*



Kyle Craig, Michael Vanhooser, and Matthew Phillips  
*Ergonomic Assessment of Tasks Performed By City Of Murray Employee*

Triana Fleming, Benjamin Bowden, and Price Houston  
*Ergonomic Assessment of the Construction Industry*

Tobias Pirkle and Cameron Holeman Shipp  
*A Study of Ergonomics Issues Among Maintenance Personnel in a Public School District*

**Creative Fiction Session**

Thoroughbred Café, Hart College

Session Chair: Mr. Squire Babcock

7:30 p.m. – 8:30 p.m.

Tia Johnson and Kari Shemwell  
*A Reading of Creative Fiction*

## **Special Recognition**

### **2011-2012 Research Scholar Fellows**

<b>Recipient</b>	<b>Faculty Mentor</b>
Kaitlin Cary	Dr. Lynn Patterson
Kari Koester	Dr. Paula Waddill
Jennifer Lambert-Martin	Dr. Lara Homsey
Ruojing Wang (Audrey)	Dr. Tina Coffelt

### **2011 MSU Alumni Association Distinguished Researcher Award Recipient**

Dr. Robert Martin, College of Science, Engineering and Technology

### **2011 MSU Alumni Association Emerging Scholar Award Recipient**

Dr. Juyoung Song, College of Humanities and Fine Arts

### **2011 MSU Distinguished Mentor Award Recipient**

Dr. Iin Handayani, Hutson School of Agriculture

**Ashley Adams – Political Science**

**Mentor: Ann Beck**

***The Social Influence of China compared to the United States within South Africa:  
Literature Review***

This presentation will focus on the social influence of China compared to the United States with South Africa. China is a rising economic super power and many wonder what their impact will be in other regions outside of Asia. The United States has continually been seen as a large source of aid all over the world for decades, and with this influence the United States government has gained social influence in multiple regions. However, China is gaining similar influence from trade relations with both wealthy and poor nations. So strategically I made the decision to compare the influence of both powers within the newly revived country of South Africa. I will do this by reviewing literature from the time period before and after the apartheid.

**Saad Alsahli – Business Administration**

**Mentor: Corky Broughton**

***Family Fitness Center***

I was sealing the fitness area and boxing room.

**Evan Anderson – Biological Sciences**

**Mentors: Everett Weber and Howard Whiteman**

***Increasing Macroinvertebrate Diversity Through the Creation of Fish Habitat on Lake Barkley***

The Kentucky Department of Fish and Wildlife Resources have an ongoing project to provide fish habitat on Lake Barkley, KY. They provide three major types of habitat, which includes brush piles, stake beds, and artificial; of those, I participated in the creation of brush piles. Brush piles are created by going onto the U.S. Army Corps of Engineers property that surrounds the lake and cutting small trees that are loaded onto a boat and tied to cinder blocks. They are then dropped in the water around existing buoy locations. They concentrate fish so anglers can have more success, as well as provide structure for different year classes of fish to increase survivorship. Through sampling the benthic habitat using an Ekman bottom sampler, the richness and diversity of macroinvertebrates will be established. Higher diversity and richness is expected around brush piles, when compared to the other types of habitat created, due to the abundance of habitat and food resources present for macroinvertebrates. Through the creation of fish habitat, many species other than fish benefit.

**Kaitlyn Arant – Nutrition and Allie Darnell - Dietetics**

**Mentor: Kathy Timmons**

***The Effect of Adding Blueberries to Enhance Antioxidant to Full Potential***

When it comes to many foods that are thoroughly enjoyed by Americans, we need to get the most nutritional value we can out of these foods. Most Americans today aren't getting their daily recommended value of many vitamins and minerals. By producing foods with more nutritional benefit and making them power packed with various vitamins and minerals, we can increase this American deficit. The aim of this experiment is to find the best blueberry to batter ratio in blueberry muffins. Blueberries are known to have a great amount of antioxidants which have been shown to produce favorable effects related to neuro-protection and a possible decrease of age-related cognitive and motor decline in a supplemented diet. This project will be advancement in nutritional research by simply adding more blueberries to foods that already use blueberries as an ingredient. Adding extra blueberries will increase the antioxidant value of the muffin and will be a nutritional benefit to consumers. This research project will test the most enjoyable blueberry to batter ratio that can be achieved when adding more antioxidants to the muffin

**Brenton Bailey – Creative Writing**

**Mentor: Joshua Adair**

***Persepolis Essay***

The Persepolis graphic novel uses artwork ineffectively to display one of its themes, stereotypes. This essay shows exactly how the artwork in the novel contradicts this theme.

**Destiny Ball and Brett Welter – Occupational Safety and Health**

**Mentor: Tracey Wortham**

***Ergonomic Risk Assessment of Daily Operations at a Vehicular Battery Distributorship***

This presentation will include an analysis of ergonomic issues at a battery distributorship (marine and vehicular) in Western Kentucky. Two members of OSH 663 Applied Workplace Ergonomics visited the site to evaluate potential ergonomic risk factors for musculoskeletal disorders in changing batteries on customer's vehicles, preparing rotation batteries and preparing junk batteries using techniques such as the NIOSH Lifting Equation, 2D Biomechanics, Liberty Mutual's psychophysical manual handling tables, Rapid Upper Limb Assessment, Strain Index and ergonomic checklists. An overview of the findings along with recommendations for reducing ergonomic hazards will be presented.

**Stefoni Orr Beasley – Political Science**

**Mentor: Ann Beck**

***The Rainbow Vote: The Gay/Lesbian Community in Politics***

This specific research studies the participation of the gay and lesbian community in politics. The topic of discussion was chosen, due to previous polls taken from Gay/Lesbian voters, dealing with their opinions of American government, and even the roles in which they take to be represented. This became a topic of interest, because I wanted to understand why they held these opinions. The reasons for voting for a party (or against a party) were both shocking, yet understandable. By doing this research, many questions were answered, including; why do individuals within the Gay/Lesbian community vote for a party, what influences their vote, what credentials are sought when choosing a candidate, and which party (Democratic/Republican) does the most to support the rights of this specific group. The research was a success due to the peer review articles, polls, and testimony of individuals that are homosexual, and vote on a regular basis. One thing that the student has learned from doing this project is; there is no set group for which a vote is cast. Many people would be surprised that there is a large group within the homosexual community that vote Republican, have their own Republican party that caters to them specifically (The Log Cabin Republicans), even though the Democrats cater more to their rights, and rally support for the issues within their community.

**Kathryn Bennett – Wildlife Conservation / Emphasis in Zoological Conservation**

**Mentor: Howard Whiteman**

***Searching for Evidence of the Cougar (Puma concolor) in Western Kentucky***

The cougar, *Puma concolor*, is referred to by many names including mountain lion, puma, catamount, painter and ghost cat. The ghost cat reference is in mention to the cougar's ability to travel quickly without being noticed or leaving any evidence behind. The presumed subspecies, the Eastern cougar, was declared extinct on March 2, 2011. However, confirmations of cougar killings, trappings, and trail camera photographs in the Eastern U.S. since that date have placed doubt on the extinction status. Kentucky is one of the states in the Eastern portion of the U.S. that has yet to have a confirmation of a cougar sighting. Columbus, Kentucky was chosen as an optimal place to set up trail cameras due to high numbers of personal cougar sighting stories and the opportunity to place trail cameras on untouched property with a large population of deer and many trails and trenches that are frequently used by game. Four trail cameras were placed on trees facing large, open areas and game trails. Cougar urine was sprayed on trees near the vicinity of the trail cameras. The cameras were checked every two to three weeks to avoid placing human scent on the surroundings. Cougar urine was also reapplied during these times. The areas around the camera were also searched for evidence of cougar presence such as scat, prints or hair. Confirming cougar sighting stories and having a positive confirmation for Kentucky would be the desired result from this project.

**Pamela Blaylock – Nutrition**

**Mentor: Kathryn Timmons**

***The Effects of the Use of Splenda as a Replacement for Sugar in a Cheesecake***

A sensory test was completed by a trained panel of six to determine the effects of using Splenda as a replacement for sugar in a cheesecake. Variables tested included color, taste, texture and aftertaste. An objective test was completed to determine if replacing Splenda for sugar would affect the volume of the cheesecakes. A second objective test was completed by finding the nutritional value of the cheesecake to determine if replacing sugar with Splenda would lower the calorie content of the cheesecake.

**Jamie Booth – History**

**Mentors: Charlotte Beahan and Warren Edminster**

***The Start of the Sunrise: The Effect of James Yen's Mass Education Movement on Mao's Communism, 1922-1949***

James Yen, an American educated Chinese citizen, started the Mass Education Movement in the 1920s with the goal of teaching illiterate Chinese, who made up 80% of the population, to read. Yen's aim was to make China a modern, democratic nation by working with and educating the lowest classes of society. While the Mass Education Movement was fairly successful in China, my paper argues that Mao, who worked with the Movement in its early years, took ideas from the Movement and used the structure that Yen laid out to build his Communist Party.

**John J. Bratton Jr. – French**

**Mentors: Janice Morgan and Meg Brown**

***Baudelaire and Impressionism: The Relationship***

Impressionism is one of the most studied genres of art, however the general public is usually lacking in understanding of this important era in art. With the ideas of Charles Baudelaire as the background for this study, the main focus is to show how his writings and ideas were related to the art produced during nineteenth-century France to provide a better understanding of the context upon which this genre was created. Through a careful analyzation of prose and poetry by Baudelaire this study will show the relationship between the paintings and the ideas of Baudelaire. This study will relate the core ideas of modernity and impressionism to specific works of art created during the impressionist era in France, including, "Rue Mosnier avec Drapeux" by Edouard Manet, "Gare St. Lazare" by Claude Monet, and "Examination Medical, Rue des Moulins" by Henri de Toulouse-Lautrec.

**Nate Brelsford – Liberal Arts**

**Mentors: Barbara Cobb and Warren Edminster**

***Let There Be Light: A Study in Visual Sociology***

Even among sociologists, few scholars are aware of Visual Sociology. Yet, since digital media ended the monopoly of the printing press, visual imagery has inundated our lives - from television to the Internet, from Facebook to our own scrapbooks and burdened hard drives. Rapid technological advancement in recent years has drastically increased the production rate of culturally-shaped and culture-shaping visual images. Maximizing our knowledge of society requires sociologists to more fully understand the impact of these visual artifacts and utilize visual technologies in their studies. That is the aim of the young and growing sub-discipline known as Visual Sociology. This project offers a working definition of Visual Sociology, along with an outline of its history and contemporary methods. An original, phenomenological study of an individual's work follows. The individual is a piano technician, musician, and maker of smoking pipes. This project resembles Douglas Harper's 1987 study, *Working Knowledge*, in which Harper examines a versatile auto and farm mechanic in a rural society. The report concludes with observations concerning the strengths and limitations of the methods used in these studies and how the most recent technological innovations may impact future study.

**Krystal Brindley – Zoological Conservation**

**Mentor: Howard Whiteman**

***Education at the Nature Station***

I am volunteering at the Nature Station in Land Between the Lakes. I am doing interpretations over endangered species specifically the red wolf and what people can do to help. I am also helping give the daily owl program when I am in attendance. The goals of the project are to educate people on endangered species and to move them to take more action towards protection of these species and to make more conservational aware choices.

**Shannon Brooks – Spanish**

**Mentor: Susan Drake**

***The African Diaspora and its Effect on the Cuban Cultural Identity: An analysis of the Film, Guantanamera***

During the trans-Atlantic slave trade, Latin American and Caribbean regions were the first areas to be populated by Africans. An estimated eight to fifteen million Africans were brought to the Americas between the sixteenth and nineteenth centuries. Although they endured an extremely harsh life of slave labor, their cultural contribution to the Americas is undeniable. Cuba is one of the countries that possesses a strong African cultural identity. These influences can be seen in the 1997 film, *Guantanamera*, directed by Tom's Guti'rrez Alea.

**Elizabeth A. Brown – English/Literature**

**Mentor: Joshua Adair**

***Marji's Veil: Power and Responsibility***

This is a short essay in which I explain an important issue in the Novel Persepolis by Marjane Satrapi. Through the characterization of the main character Marji, Satrapi shows that those that have power in Iran use religion to control the population and this affects the people by desensitizing them to the laws that control them.

**Hailey Buth – Youth and Nonprofit Leadership, Ashley Wiseman - Spanish, and Courtney Carlton – Organizational Communication**

**Mentors: Roger Weis and Robin Esau**

***Stay Beautiful Bash***

This program was designed to enhance health, education and character development for middle school and high school girls. It addressed the issues of loneliness, social influences, and dating and promoted the concept of abstinence.

**Susan Camp – Agriculture, Carey Boggess-Story - Agribusiness, and Charlton Story – Agricultural Sciences**

**Mentors: David L. Ferguson and Andy Bailey**

***Methods of Sucker Control for Dark Fired Tobacco with Over-the-Top Applications***

Tobacco, a labor intensive cash crop produced in Kentucky, is harvested for its leaves. The topping step directs the most nutrients into the leaves instead of producing a flower. The flower is broken off (topped) and when this happens, sucker growth is promoted. Chemicals are then applied to control sucker growth. Tobacco traditionally uses drop-line applications requiring much time and labor to spray each plant. Research conducted at Murray evaluated sucker control treatment alternatives without drop-line applications. Chemicals are applied over-the-top using a sprayer. All plots received Off-Shoot-T (fatty alcohol compounds) applications one week pre-topping. Treatments 1,3,5,7 and 9 were treatments with three nozzles producing a mist directed at each row. Treatments 2,4,6,8 and 10 had three nozzles in a funnel shaped conveyor allowing rain-like droplets to fall over each row. Treatment 11 was a check plot with no additional chemical treatments. Treatments 1-10 received an Off-Shoot-T application at topping. Treatments 1&2 received MH-30 (maleic hydrazide) and Flupro (flumetralin) 7 days post-topping (DPT). Treatments 3&4 received a reduced rate of MH-30 and a normal rate of Flupro. Treatments 5&6 received MH-30 at a regular rate and no other chemicals were applied. Treatments 7&8 received Off-Shoot-T and Flupro treatments together at both 7 and 14 DPT. Treatments 9&10 received Off-Shoot-T and Butralin (butralin) together at both 7 and 14 DPT. Data collected includes sucker biomass and yield for all treatments which will be analyzed statistically.



**Anna Carlson – Spanish and International Affairs**

**Mentor: Choong-Nam Kang**

***Mexican Drug Cartels: An Incentive for United States to Act***

Mexican drug cartels are an increasing issue within Mexico. Not only is this issue domestic, but it has begun to take an international toll considering the amount of drugs and resulting violence crossing into the United States' borders. Being that these cartels have an incredible impact on Mexico's current economy and political policies, the Mexican government seems to be weakening in comparison to the growing cartels. With that being said, since the United States suffers the results (though not as drastic) of these cartels as well and the relations between the United States and Mexico could be strained because of these cartels, is it possible that the United States will see it in its best interest to directly intervene with these cartels assuming the Mexican government will support the action? This project explores the probability of this outcome under the growing pressure placed upon neighboring countries by the Mexican drug cartels.

**Tyler Carson – Business Administration**

**Mentor: Corky Broughton**

***Zumba Fitness - Service Learning Experience***

Over the course of my Service Learning Experience, I have participated in a Zumba fitness class with a local instructor. I've learned the ins and outs of Zumba fitness as it pertains to local residents. I aided in the creation of a website for the class where they may go and exchange ideas. I've also aided in the promotion and ongoing recruitment of new class-members and musical selection. Zumba is a work-out. Don't let anyone tell you differently.

**Kaitlin Cary – Elementary Education**

**Mentor: Lynn Patterson**

***Opening Communication Between Parents of Silent Victims and Educators***

“Silent Victims” and their families, like any other vulnerable population in the world, need a voice. The purpose of this project is to help open communication between educators and the parents of “Silent Victims” in order to create the best possible learning environment for their children. The research found in this project could help to improve the quality of education and life for “Silent Victims” and their families all over the nation. By providing tools for teachers to identify, understand, and support these children, learning in the classroom will improve. This research could also help to improve the quality of the important teacher/child/parent relationship. It is my hope to develop a quality program that will prepare educators to identify, support, and encourage children who witness domestic violence in their homes. As the project data is further analyzed, I anticipate other needs of “Silent Victims” will be uncovered. Additionally, this research will be relevant to other counseling and psychological professionals in the community. Overall, this project has the potential to improve the quality of life for “Silent Victims” and their communities.

### **Catherine Chambers – Pre-Veterinary Medicine**

**Mentor: William Dewees**

#### ***Cytauxzoonosis in Domestic Cats in Southern Illinois and Western Kentucky***

Cytauxzoonosis is a serious illness in domestic cats caused by the protozoan organism *Cytauxzoon felis*, a blood borne parasite naturally carried by bobcats. Cytauxzoonosis is fatal in nearly 100% of cases. The domestic cats at the highest risk are those that live in areas containing both bobcats (the natural reservoir) and ticks (the vector). Cats who contract Cytauxzoonosis show a number of nonspecific symptoms including high fever, lethargy, and, in some cases, jaundice. These symptoms usually occur within 10 days of contracting the parasite. Death usually follows within a week of these symptoms appearing. No medications have proven to be particularly effective in treating this illness. This project was designed to determine whether cytauxzoonosis is likely to become a threat to areas of Western Kentucky and Southern Illinois. Very few, if any, cases have been reported in the area which seems odd considering that both the reservoir species and the vector species are known to inhabit these areas. Through surveys of local veterinary clinics, this project has been designed to determine if this is emerging disease is a serious threat to both Southern Illinois and Western Kentucky.

### **Chelsy Chambers and Nadia Miodrag – Chemistry / Pre-Pharmacy**

**Mentors: Meave McCarthy and Christopher Mecklin**

#### ***Review of the Model for Acetaminophen-induced Liver Damage***

Acetaminophen is an analgesic and antipyretic and is predominantly used in pain relief and reducing fevers. An average of 500 people each year die of liver failure due to an overdose of acetaminophen. With early response, any harmful damage can be avoided by treatment with N-Acetylcystine (N-Ac) and minor hospitalization. In order to detect the severity of damage done, numbers from AST, ALT, and INR evaluations are applied to the Model of Acetaminophen-induced Liver Damage to assess what further treatment will be needed.

### **Adam Clapp – Political Science**

**Mentor: Ann Beck**

#### ***The Impact of Montesquieu on James Madison***

In this paper I attempt to determine how much influence Montesquieu had on James Madison. This is done by examining primary sources, namely the English translation of Montesquieu's *Spirit of the Laws*, and the *Federalist Papers* that were written by Madison. There is also analysis of secondary sources, as other scholars have also treated this subject. These are all from scholarly peer reviewed journals. I expect to find that while Montesquieu clearly had some influence on Madison, I believe the degree of this influence is often overstated. Montesquieu obviously influenced Madison on the idea of Separation of Powers, but the political theories of the two men do not seem much in concert after this. Even their ideas about separating power in different branches of government seem to differ.

**Danielle Cole - International Affairs**

**Mentor: Choong-Nam Kang**

***Foreign Policy and Conflict Management***

This paper will be investigating conflict management more in-depth and will look further into the foreign policies of the United States and China. The influence in Africa that both of these countries possess will be the primary focus of the research. Also, I will discuss how the competition over Africa will or will not create more conflict in the regions that both countries are trying to influence and what should be done to amend these conflicts.

**Brian Cox – Liberal Arts**

**Mentors: Barbara Cobb and Dan Shope**

***The Evangelical Nation***

Evangelical Christians are viewed as a polarizing force within American Society. This project will dissect the principles and definition of Evangelicalism. Through studying Tim Tebow this project will gain insight into why Americans have an aversion to Evangelicals and how the aversion to Evangelicals presents itself in society and politics. Finally, how the aversion to Evangelicalism will affect Rick Santorum's bid for the Republican nomination and the White House.

**Sara M. Cook – Consumer Nutrition**

**Mentor: Kathy Timmons**

***Consumer Acceptance of Nut Substitute Butters in Chewy Peanut Butter Cookies***

Nuts lend a nice texture to baked goods, as well as allow an excellent source of protein and other nutrients. But nuts, especially peanut can be a dangerous food for some people consume, affecting thousands of people with nut allergies. What is the solution for this? Other nut products surprisingly can be used in favorite peanut butter dishes including baked good and sweet favorites. Therefore this experiment will determine consumer acceptability on sensory objectives of different peanut or peanut free product cookies, for people with specific allergies or likes. Regular peanut butter will be the control, there will be 3 variables, and each will make a batch of the cookie recipe. The only difference in each recipe will be the peanut butter or peanut replacement.

**Kyle Craig, Michael Vanhooser, and Matthew Phillips – Occupational Safety and Health**

**Mentor: Tracey Wortham**

***Ergonomic Assessment of Tasks Performed By City Of Murray Employee***

This presentation will include an analysis of ergonomic issues of different tasks performed by workers employed by the City of Murray in Western Kentucky. Three members of OSH 663 Applied Workplace Ergonomics visited the site to evaluate potential ergonomic risk factors for musculoskeletal disorders in a lab technician, a worker at the central garage, and an employee of the department using techniques such as the NIOSH Lifting Equation, 2D Biomechanics, Liberty Mutual's psychophysical manual handling tables, Rapid Upper Limb Assessment, Strain Index and ergonomic checklists as well as basic observation techniques using still photos, video and measurements using a tape measure, goniometer, and push pull meters. An overview of the findings along with recommendations for reducing ergonomic hazards will be presented.

**Kayla Crusham and Samantha Durbin – Nutrition / Dietetics**

**Mentor: Kathryn Timmons**

***Acceptability of Substituting Green Tea for Water in Four Increments in Milk Chocolate Cupcakes***

The purpose of this experiment is to determine the effects of substituting brewed green tea for water, in four increments, during the preparation of milk chocolate cupcakes. Brewed green tea will be replaced for water in 25%, 50%, and 75% increments. A control cupcake prepared with no brewed green tea will be used for comparison. For the sensory evaluation, the cupcakes will be analyzed using a 7-point Hedonic scale measuring color of surface, interior color, flavor, texture and overall acceptability. The Hedonic scale ranges from dislike extremely to like extremely. For the objective evaluation, a wettability test will be used to measure the moisture of the cupcakes.

**Subhash Dasari – Chemical Manufacturing Management**

**Mentors: Bommanna Loganathan and David White**

***Preliminary Study on the Inorganic Elemental Concentrations in Water Samples Collected from Selected Locations in Kentucky Lake and Clarks River***

Inorganic elements such as Na, K, Ca, Mg, Mn, Cu, Zn are beneficial to aquatic and terrestrial animals including humans. However, at elevated concentrations these elements may cause toxic health effects in the organisms. In this study, water samples were collected from selected locations in Kentucky Lake (Cruise #477) and Clarks River and analyzed for inorganic elements. Standard analytical procedures were followed including field sampling, sample preparation and analysis using Atomic Absorption Spectrophotometer and Inductively Coupled Atomic Emission Spectrometer. In general, detectable concentrations of various inorganic elements were found in almost all samples analyzed. Elemental concentrations ranged from  $\mu\text{g L}^{-1}$  to  $\text{mg L}^{-1}$  in depending on analyte type and sampling locations. Among the various elements analyzed calcium contained highest concentrations (Range: 7-18 mg/L) in almost all samples. Copper was barely detected/below the detection limit ( $< 0.1 \mu\text{g/L}$ ) in all samples tested. The concentration pattern followed the order of  $\text{Ca} > \text{Na} > \text{Mg} > \text{K} > \text{Mn} > \text{Zn} > \text{Cu}$ . Considering the inorganic elemental concentrations in other rivers and natural lakes, the calcium levels in Kentucky Lake waters were relatively low. Based on calcium-based invasion risk assessment report, calcium level is considered low range to enable zebra mussels to establish population in the Kentucky Lake waters.

**Lindsey Hope Dean and Alexander Green – Nutrition and Dietetics**

**Mentor: Kathy Timmons**

***Effects of Tofu as an Egg Replacement in Brownies***

Heart disease is the number one cause of death in the United States. One factor that is known to contribute to heart disease is a diet that is high in saturated fat. Eggs, a source of cholesterol and saturated fat, are common in the American diet. This study is an examination of the acceptability of an alternative to eggs in baked goods, specifically brownies. Soft tofu was chosen as the alternative to experiment with because of its absence of cholesterol and saturated fat and high levels of protein. Four variations were used in the experiment by replacing the eggs with soft tofu in increments of 25%, 50%, 75% and 100%. Participants of the experiment completed a blind taste test evaluating the acceptability of the different brownies. We also measured the height of the brownies at specified areas to see the affect of altering ingredients.

**Lara Delahunt – Nutrition**

**Mentor: Kathy Timmons**

***Effects of Substituting Apple/Pear Fruit Puree for Fat on the Sensory Properties of a Blueberry Muffin***

The purpose of this experiment is to determine the effect on volume, texture, flavor, moisture, and overall acceptability when an apple/pear fruit puree is substituted fat at three different levels in a blueberry muffin. Variables: Variables in this experiment will be substituting the fruit puree at 33, 66, and 100 percent compared to a controlled version of a blueberry muffin. The expected product of this experiment will produce a healthier muffin while still keeping the “ideal” sensory properties that consumers enjoy. Planned Objective Evaluation Method: I intend to do a Drying Oven objective evaluation. I will weigh the muffins before baking them and then again after baking (will weigh each variable three times) and calculate the difference to determine the moisture difference between muffins.

**Felicia Dihel – Physical education**

**Mentor: Corky Broughton**

***Hemitite Lake Trail***

This project entailed volunteering at Land Between the Lakes. My job was to clean up Hemitite Lake Trail. Weekly I would hike Hemitite Lake Trail and clean up any trash on the trail. I also took inventory of repairs needed on the trail. I found parts of the trail blocked by fallen trees or parts of bridges that are broken. I reported all of my findings to my liason and repairs will be made as soon as funding is found.

**Mindy Duncan and Courtney Jackson – Public Relations**

**Mentor: Roger Weis and Robin Esau**

***Trick or Treat Safety***

The program was designed to provide children at Main Street Youth Center with tools to have a safe experience while "trick or treating" on Halloween. Participants decorated pumpkins and bags and during that time they were instructed on precautions to take while trick or treating and the value of doing it safely.

**Alexander Earhart – Biological Science**

**Mentor: Claire Fuller**

***Colonial Relatedness and Adaptability to Tropical Microhabitats in the Caribbean***

***Termite, *Nasutitermes acajutlae*: Adapting Genetic Markers***

Termites are one of the most important organisms contributing to the overall well-being of a tropical ecosystem. Like other tropical animals, termites have a limited physiological toleration for variations in abiotic conditions (i.e. temperature and relative humidity). Excessive changes in these conditions threaten the overall survivability of termites in tropical habitats. In order to understand the effects of climate change on tropical termite species - specifically the *Nasutitermes acajutlae* species common in the Caribbean – understanding their adaptability to their microhabitats is paramount. We will use polymorphism in microsatellite DNA markers in termites from the various microhabitats to determine whether they are adapted to their specific habitat. However, in order to assess microhabitat adaptability using this method, we must first optimize genetic primers developed for related species for use in *N. acajutlae*. Thus far, we have examined three primers that are commonly polymorphic in other tropical nasute termites (Ncor3, Ncor6, and Ncor8). We optimized proper conditions for microsatellite DNA amplification. All three primers amplified *N. acajutlae* DNA, while both Ncor6 and Ncor8 resulted in some variability; Ncor8 showed dimorphism.

**Alexander Earhart – Biological Science and Andrew Thompson - Mathematics**

**Mentor: Maeve McCarthy**

***Evaluation of Statistical Modeling of HIV Infection Progression***

Human immunodeficiency virus (HIV) is an extremely aggressive virus that causes the progressive destruction of cell-mediated immunity in the human body by destroying CD4+ T-cells. As the virus proliferation destroys enough of these immune cells over time, the infection becomes Acquired Immune Deficiency Syndrome (AIDS), in which the body is incapable of fighting against infections. Estimating the progression of HIV infection in the body is important in clinical evaluations of patients, and statistical modeling of this progression based on CD4+ cell counts is invaluable. There are three basic statistical models used to evaluate HIV infection progression; however, only one of them incorporates extra parameters aside from HIV infection in the body. This model is an extension of a previous growth curve errors-in-variables model that incorporates not only the estimated time of infection (as does the most basic model), but also random health effects in the progression of HIV infection and the time of seroconversion in which the virus can be detected in the bloodstream. This paper evaluates these models in terms of viability in estimating HIV infection progression.

**Stuart Ford Ebling – English, Creative Writing**

**Mentor: Staci Stone**

***The Parallel of Charlotte Bronte's "Jane Eyre" and Ovid's Tale of the Nightingale***

When Edward Rochester first proposes to Jane Eyre, Jane notes that there is a nightingale singing in the garden. The nightingale calls to mind a number of myths, stories, and poems. One such legend in Ovid's tale of the nightingale, the story in which Tereus, husband of Procne, rapes his sister-in-law Philomela, and cuts out her tongue. Philomela and Procne take revenge on Tereus, and in the end are transformed into are transformed into a nightingale and a swallow. This essay examines the parallel between Charlotte Bronte's novel "Jane Eyre" and Ovid's poetic narrative of betrayal and revenge.

**Meredith Ehrenheim – Biological Science**

**Mentor: Howard Whiteman**

***Increasing Conservation Involvement on Campus***

According to the U.S. Environmental Protection Agency, over 243 million tons of waste was generated by Americans in 2009 and over 54% of this was dumped into landfills. It is important to educate the public on the necessity of minimizing the waste produced and ways that this can be done, such as through recycling and composting. In doing so, the rate garbage is added to landfills can be reduced. For my project, I worked with several campus organizations in order to increase awareness of the importance of minimizing waste through recycling and composting. Members of each organization were able to actively participate in trash pick-up days followed by sorting and recycling of this trash. Members were also invited to learn how to create and maintain a compost pile. Signs and collection bins were added to the buildings of some of these organizations in order to encourage the students to continue reducing waste. The students were encouraged to educate their friends and families to decrease their generation of waste as well. Not only did this minimize garbage and litter, it also created other positive effects. For example, carbon dioxide emissions will also be reduced due to less trash that needs to be incinerated, recycled material will allow more natural resources and water to be conserved, there will be fewer contaminants in the soil, and many other effects of the project will benefit the planet.



**Nathan English – Political Science****Mentor: Ann Beck*****Sustainable Democracy: The Case of Mexico***

The sustainability of democracy in Mexico is a crucial issue for the entire Latin American region and, more specifically, the United States, due to its proximity, trade relations, and influence this nation has upon its surrounding neighbors. Despite the categorization of Mexico as a democracy, the field of political science has shown concern with the duration that democratic government will have in this country. Thus, the central premise of this research is to determine if indeed democracy is a sustainable element of Mexican governance. Through analysis of scholarly work upon this issue, examination of the Mexican Constitution and data collection of various democratic indicators that will identify Mexican prospects of sustaining democracy, an answer as to whether sustainability is possible will be arrived to. In order to conclude with a viable answer, each section will be analyzed with due diligence to ensure that the question of sustainability does not rely too heavily upon one aspect of research. The following research will deem Mexico's possibility of sustaining democracy either positively or negatively, therefore to give a straightforward answer to a very complex situation.

**Kaylyn Evans and Gloria Alverio – Communication Disorders****Mentor: Roger Weis and Robin Esau*****Angel's Attic Shoe Drive***

The project goal was to collect 100 shoes to donate to Angel's Attic in order to raise awareness for Angel's Attic and promote their mission of raising money for the community's free clinic, Angel's Clinic. Collection boxes were placed at each dormitory and signs clearly stating the purpose of the collection. Flyers were posted across campus and the shoe drive project was also shared students in a variety of settings. A total of 68 pairs of shoes were collected.

**Liz Fiero – Economics****Mentors: David Eaton and David Brasfield*****The Charity Bowl: Examining Big Bowl Games and Nonprofit Correlation***

College athletics are an important part of the University environment. Many Universities generate significant revenue from athletics. One of the largest revenue generators is the Bowl Championship Series (BCS) football games which take place each January. Many of the Bowl games are non-profit organizations that distribute part of their revenues to charity. This project used an event study format and time series data to examine the economic impact bowl games have as a donor. In particular, the project examines giving to the American Cancer Society, the National Football Foundation and the local YMCA, three charities which receive money from the Fiesta Bowl. An outcome of this project is the determination of how donations from the game organizers compare to increased donations due to increased awareness brought about from publicity from the game and individual donors.

**Liz Fiero - Economics, Sara Wright – Animal Health Technology, and Eric Daniels  
– Art**

**Mentors: Roger Weis and Robin Esau**

***Halloween Dog Walk & Costume Contest***

The project was designed to be a community event and fundraiser to help raise awareness and funds for the Humane Society of Calloway County. The project provided entertaining events for community members and their dogs, as well as raised \$200 to support the work of the Humane Society. Activities for the event included a costume contest, photographer, dog walk, micro-chipping and dog tags, as well as refreshments for both dogs and their companions.

**Sarah Flarsheim and Morgan Geile – Conservation Biology**

**Mentor: Howard Whiteman**

***Population Survey of Crawfish Frogs (*Lithobates areolatus*) in Western Ky Using  
Vocalizations***

*Lithobates areolatus* (crawfish frogs) are native to Kentucky and are listed as near threatened by the International Union for Conservation of Nature. It is therefore critical to contribute to the surveying of *L. areolatus* within their preferred habitat to record their current population numbers. As part of this effort to accurately survey and estimate crawfish frog populations in western Kentucky, frog calls were recorded from rural western Kentucky ponds, and population was estimated with 6 second counts of accurately identified crawfish calls. Ponds were marked with GPS while temperature, time of night, and relative location of the pond to the road were recorded. Population results from surveyed ponds are still under analysis.

**Triana Fleming, Benjamin Bowden, and Price Houston – Occupational Safety and  
Health**

**Mentor: Tracey Wortham**

***Ergonomic Assessment of the Construction Industry***

The industry being reviewed for the OSH 663 ergonomic assessment project is the Department of Transportation. We strive to assess the everyday tasks of workers and their exposure to certain risk factors that could lead to musculoskeletal disorders. These risk factors include but are not limited to high force, awkward postures, and contact stress. We seek that the results from this assessment will not only raise awareness of safety in this workplace environment but also help in the reduction/prevention of the development of musculoskeletal disorders.

**Kate Fore – Computer Science and Mathematics**

**Mentor: Maeve McCarthy**

***Optimal Control Applied to Real World Models***

In mathematics, models can be used to both describe and predict the behavior of a number of real world phenomena. Mathematical models have been used in operations research to model various decision making processes, in finance and economics to predict fluctuations in the stock market, in biology to model population growth and decay, and in several other fields as well. Much of the value in these models comes from the application of optimal control theory. Optimal control theory uses the known functions and seeks to find the conditions that optimize a particular outcome. Using its application one may not only observe the scenario as it happens, but actually take steps to optimize the result. Therefore, this project seeks to understand optimal control theory and automate parts of the process in order to hasten the progress of the professionals seeking optimal control solutions. Namely, the software will solve ordinary differential equations numerically and find the optimal control of a system. Solutions will be displayed in both graphical and tabular form. This software is created to be generic enough that anyone from any discipline may enter a system and get their results. A biologist may have a model representing population growth, while an economist has one representing fluctuations in the stock market. The specifics of what is being modeled are immaterial to the program so each may use the same software without issue. This versatility will hopefully prove allow the software to aid as many researchers and professionals as possible.

**Briana Forsythe - Pre-Dental Biology**

**Mentor: Timothy Johnston**

***Comprehensive Analysis of Dental Procedures: Extractions, Fillings, Implants***

For my senior honors thesis I have decided to investigate the origins of the following dental procedures and the evolution of these procedures over time: extractions, fillings and implants. The present practice of these methods, including current technological advances, will be examined as well, culminating in a survey of Western Kentucky dental practices and the techniques they employ.

**Jeffrey Frye – Spanish**

**Mentor: Mica Garrett**

***Psychological and Social Effects of Single or Dual-identity of Puerto Ricans in America***

Puerto Rico and the United States have maintained a unique relationship ever since the conclusion of the Spanish-American war which began in 1898 when it became a self-governing commonwealth in association with the U.S. In 1917 the Jones Act gave Puerto Ricans American citizenship, meaning they could travel to the United States without a passport. A mass a mass migration of Puerto Ricans to the United States, New York in particular, after World War II resulted in many Puerto Ricans settling in New York and forming Puerto Rican communities. These migrants faced a new hardship as they had to maintain their mother culture, but also develop some of American culture in order to mitigate discrimination and better their chances for economic success. (For example, learning of the English language). This paper will examine the psychological effects of complete assimilation versus alternation, the adopting of both cultures. The author takes the position that a Puerto Rican who embraces both cultures will be psychologically healthier than those who assimilate completely or totally resist all American culture. Because biculturalism shows to have great social consequences, such as reduced disorderly conduct, in comparison to the assimilation or rejection, it is the preferred route. Esmerlda Santiago's *When I was Puerto Rican* will be drawn from as a testimony to the findings.

**Michael Gallagher – Psychology**

**Mentor: Keith Dooley**

***Grandchildren Reports of Their Relationship with Grandparents: Relationship to Attitudes Toward Aging, Attachment, and Filial Piety***

The purpose of this research was to examine how family history, grandparent role, and quality of the grandparent-grandchild relationship individually or jointly influence attitudes toward aging. Students aged 18-50 (n=188) were surveyed regarding demographics, family structure, relationship with grandparent(s), attitudes, and filial piety beliefs. Age and SES were not related to key outcomes. Grandparent health, activity level, communication style, and caregiving role predicted stronger grandparent-grandchild bonds. Grandparent level of involvement during childhood and adolescence predicted higher relationship quality, more positive attitudes toward aging, and more secure attachment bonds with grandchildren. Stronger filial piety beliefs were related to grandparent health, relationship quality, attitudes toward aging, and more secure attachment with grandparents. Findings could be useful to researchers and practitioners interested in how young people's attitudes toward older adults are shaped by early life experiences, particularly the nature of their relationships with their grandparents.

**Kristen Garcia – Engineering Physics**

**Mentor: Aleck Leedy**

***Fourth Order P-V Characteristic Curves for Maximum Power Point Tracking***

A curve fitting method that approximates the P-V characteristic curve of a given solar array with a fourth order polynomial is presented. The coefficients of the approximated P-V characteristic curve are strongly dependent on cell temperature. The strong dependence of the P-V curve on cell temperature allows the P-V characteristic curve of a given system to be written as a function of both panel voltage and cell temperature. The curve fitting method presented can be used in an indirect maximum power point tracking algorithm for use with solar powered systems. Experimental results are presented to confirm the validity of the method.

**James Gardner – French Education P-12**

**Mentor: Therese Saint Paul**

***Surreal Belgium***

Surrealism and Belgium go hand in hand. The movement surfaced in the 1920s and was short lived in most areas around the world with the exception of Belgium. Surrealist artists and writers revolted against all aspects of society, and expressed a non-conformist attitude towards logic, reason, and control. This is well portrayed in works by Rene Magritte, Paul Delvaux, Paul Nogue, and many others. The main focus of this presentation is to demonstrate how this movement was not only seen as a revolution in art but how the movement became a hallmark for the Belgians and gave a sense of identity to a “surreal culture.”

**Xinyi Ge – Advertising****Mentor: Joshua Adair*****Woman, Show Yourself***

My work's name is "Woman, show yourself". It is a t-shirt drawn by me. The idea comes from the book "Persepolis". The t-shirt contains a muslin scarf, a painted bathing suit and several jasmine flowers attached to the bathing suit. What I'm trying to say is that women should take off their scarfs and be free to show themselves.

**Morgan Geile – Conservation Biology and Jeffrey Young – Mathematics****Mentors: Renee Fister and Howard Whiteman*****A Mathematical Approach to Polyphenisms in *Ambystoma tigrinum nebulosum****

Phenotypic plasticity is a phenomenon found in many organisms, and modeling the life histories of these organisms helps us better understand the process. We used 22 years of data collected from a population of *Ambystoma tigrinum nebulosum* (tiger salamanders) found at the Mexican Cut, CO to look at the production and fitness of alternative morphs. Life history data of salamanders from the 1988 cohort were evaluated with a capture-recapture analysis in MARK, to obtain the necessary parameter values (probabilities of survival and recapture) for the “popbio” package in R. Within R, stochastic matrix models were created that incorporate fecundity and allow for the evaluation of population dynamics and morph fitness. Results showed a lambda (the dominant eigenvalue) of slightly over 1, indicating a stable, though slightly increasing population overall.

**Phillip Geyer – Biological Sciences****Mentor: Howard Whiteman*****Educating Young & Old About Conservation***

I had to do a project for Conservation biology that involved either conservation work or education about conservation. I choose to educate. My project was that I volunteered at my local nature station at their special event day called Sid the Science Kid Day. On this day about 1800 kids, parents, and grandparents came and met Sid the Kid ( an educational PBS cartoon character) as well as did a bunch of educational activity. It was a great way for kids to learn about local animals and how they can help protect them. I believe by providing positive and fun educational experience will help people be more informed and realize that they can make a difference.

**Lauren Gibson – Chemistry**

**Mentor: Daniel Johnson**

***Thermal Properties of Ionic Liquids Consisting of Phosphonium Cations and Alkyl Sulfate Anions***

This research analyzes the thermal properties of ionic liquids. The materials under investigation contained tetraalkylphosphonium cations and alkylsulfate anions. Ionic liquids containing both anions and cations with varying alkyl chain lengths were compared. It was found that, by changing the length of the alkyl chain on the anion, the materials' thermal stabilities, freezing/melting points, and supercooling behaviors were affected. In addition, when the lengths of three of the alkyl chains on the cation were decreased, the melting points of the ionic liquids increased. This result is expected because the use of a smaller cation causes the ionic interactions to increase since the charges are brought closer together. However, when the lengths of all four alkyl chains on the cation were decreased, the melting points of the ionic liquids decreased dramatically. This observation is contrary to what is expected based on the size of the cation and shows that Van der Waals forces play a significant role in these materials behaviors vis-à-vis ionic interactions. Liquid crystalline behaviors were also observed in several of these ionic liquids.

**Ann Gilmore – Water Science**

**Mentor: Claire Fuller**

***The Combined Effects of Atrazine and Predation on the larval dragonfly Plathemis lydia***

Freshwater communities embedded in agricultural landscapes are highly susceptible to atrazine exposure via surface water runoff. The lethal effects of atrazine have been well studied and research consistently reports acute sublethal effects across a range of taxa. Recent work in the field of ecotoxicology has shifted from single-species lethality studies towards understanding the interaction of toxins with natural community processes, such as competition and predation. Much past research has focused on zooplankton and amphibians, largely ignoring the intermediate trophic level of aquatic macroinvertebrates. Using dragonfly larvae as a representative of the aquatic macroinvertebrate community, my research will examine the combined effects of atrazine exposure and non-consumptive predation on life history traits and immune investment. At present, research is occurring in mesocosms at the Hancock Biological Station; this technique allows us to replicate natural systems and control for environmental variation. My research will examine the extent to which combined sources of stress impact traits related to individual fitness, population growth, and community interactions. I am testing the hypothesis that while both predation and sublethal atrazine exposure will negatively impact these traits, the combined results will be compounded.

**Stephanie Gray – Dietetics**

**Mentor: Kathy Timmons**

***Acceptability of Flax Meal as a Partial Substitute for All-purpose Flour in Chocolate Chip Cookies***

An experiment involving ratios of flax meal at 0%, 25%, 75%, and 100% was used in order to determine the overall acceptability of this particular all-purpose flour substitute. The planned objective of this experiment was for testers to find flax meal substitutes as or more acceptable than all-purpose flour cookies. The sensory evaluations performed included flavor, texture, and moisture. The objective evaluation performed was a wettability test to determine the moisture of the cookies.

**Randy Grayson - Consumer Nutrition and Christian Hayes – Dietetics**

**Mentor: Kathy Timmons**

***The Acceptability of Substituting Sucrose in Cookies with Alternative Sweeteners***

The purpose of this experiment is to determine sensory effects and overall acceptability of sugar cookies when using the alternative sweeteners SUSTA Bowl and Xylitol, which add healthy benefits. The sensory evaluations will be based on a 7-point hedonic scale using five characteristics: Appearance, Color, Taste, Texture, Aftertaste and an overall acceptability category. The objective evaluation used will be the Line-Spread test to compare the viscosity of the control batter and the variations.

**Shirley Powell Green – Nutrition and Dietetics**

**Mentor: Kathy Timmons**

***Lecithin Granules as an Alternative to Butter/Margarine***

The purpose of this experiment was to test liquid lecithin granules with various seasonings as an alternative to margarine or butter on a bagel. Taste panelists evaluated taste, texture, color, flavor and acceptability. The lecithin product could be used for people avoiding animal fats and processed margarine.

**Aaron Greene – Political Science and Sociology**

**Mentor: Ann Beck**

***Revolutionary Theory and the Arab Spring: Searching for a Preliminary Explanation***

The 2011 uprisings across the Arab world, collectively referred to as the Arab Spring, have become a hot topic for debate and speculation among the media, the public, and academics alike. While it is still too early to discern an all-encompassing explanation for these events, it may be useful to begin testing them against earlier theories of revolution in order to lay the groundwork for future study. The purpose of this paper is to examine the Arab Spring within the context of a few influential theories of revolution in order to determine which theory offers the best preliminary explanation of the uprisings. A cursory guess would lead me to expect relative deprivation theory, brought on by the interconnectedness of an increasingly globalized world, to be the best explanation for why the uprisings occurred at the time and place that they did.



**Ashleigh Guynn – Youth and Nonprofit Leadership, Sophie McDonald – Journalism, and Victoria Martin – Psychology**

**Mentors: Roger Weis and Robin Esau**

***Uniquely Me Self-Esteem Program***

The program was designed to help address the psychological needs of self-esteem and social support for adolescent girls. The Uniquely Me program objective was to fight the physically-degrading lies whispered to elementary, middle and high school girls; reaching young girls and equipping them with the knowledge and tools to have a positive and healthy outlook on themselves and life in general.

**Christy Jo Harber and Kacie Kemp – Youth & Nonprofit Leadership**

**Mentor: Roger Weis and Robin Esau**

***Pumpkin' Paintin' Palooza***

The event was planned for Hickory Woods Senior Living Community with a goal of offering residents a sense of respect, community, and self-worth by interacting through a hands-on activity of painting pumpkins to be used throughout their facility for fall decorations. The residents who participated enjoyed the socialization of painting pumpkins with their neighbors and were also excited to give back to Hickory Woods by making the pumpkins for decorations to be put on display.

**Sarah Hargis – Applied Mathematics**

**Mentor: Justin Grieves**

***Brca2 and Chemotherapy Combinations***

Two classes of chemotherapy commonly used to treat cancer are nucleoside analogues (ie. 2[INSERT MISSING ITEM]-C-cyano-2[INSERT MISSING ITEM]-deoxy-1-  
&#946;-D-arabino-pentofuranosylcytosine [CNDAC]) and platinum agents (ie. cisplatin, oxaliplatin). Both drug classes inhibit DNA replication and are sensitive to homologous recombination. We studied the combination of CNDAC with platinum agents, as well as the role of Brca2 in repair of double strand breaks and cross-links. We hypothesized that: (1) Combining CNDAC with a platinum agent results in decreased tumor cell survival, and (2) Adding CNDAC to Brca2 deficient cells results in more chromosome breaks than in wild type cells. For these tests, we used Chinese hamster lung cell lines. The cells were exposed to various concentrations of drug with constant ratio and the clonogenicity was measured. To determine the importance of Brca2 on the effect of CNDAC, cells were exposed to the drug for 1 and 2 cell cycles, and chromosomal aberrations were quantified on metaphase spreads. Clonogenicity of wild type cells was not greatly affected by CNDAC, oxaliplatin, or cisplatin. However, Brca2 deficient cells demonstrated a significant decrease in clonogenicity. The combination of cisplatin/oxaliplatin and CNDAC was additive. Wild type cells did not show chromosomal aberrations after exposure to CNDAC, whereas Brca2 deficient cells demonstrated several breaks after only 1 cell cycle. Consequently, we concluded that inadequate Brca2 function results in the inability to repair chromosomal aberrations caused by CNDAC and/or platinum cross-linking agents. Furthermore, CNDAC in combination with platinum agents may be beneficial in the treatment of cancer, particularly in patients with Brca2 deficient tumors.

**Hannah Hayden and Katherine Bell – Nutrition**

**Mentor: Kathy Timmons**

***Acceptability of Replacing Fat with Inulin in Cookie to Add Fiber and Decrease Fat Content***

Cookies are a favorite snack among many American. However cookies are a high calorie snack. Therefore, in the present study replacing the fat in cookies with inulin is evaluated. Various amounts of inulin were used in place of the fat. Inulin is versatile but lacks flavor and adds a pleasing mouth feel. It has a sweet taste and creamy texture, is completely fat free, while serving as a prebiotic fiber and promoting calcium absorption. An affective test was given to participants to rate the following characteristics on a 9 point hedonic scale with 1=dislike extremely and 9= like extremely; texture, tenderness, flavor, moisture content, and color of surface.

**Abigail Heard – Political Science**

**Mentor: Choong-Nam Kang**

***The Effects of War in the Ivory Coast: A Study***

The Ivory Coast has recently made many new headlines concerning its rise in corruption within its own government. However, the most incredible longstanding topic is how long their civil war has lasted within their own country. Civil War is because the diversity within the Ivory Coast has meant that the people have questioned their citizenship and do not know who is a legitimate citizen and who is a native. This question has led to war among themselves and the government who does not seem to have any interest in resolving this issue. I desire to study the most common question asked about the Ivory Coast: very recently, how does a stable economy suddenly take a negative turn and turn to civil war within its own borders? Also taking into consideration a more in depth nature of the Ivory Coast civil war and the causes of war. How does a country, once strong, experience civil war? These questions will lead me to research and determine the nature of war and how each country can fall apart differently especially on its impact on global importance. It is my understanding that to research of the causes of war within the Ivory Coast is highly important to the economy because the research shows trends that point towards how wars are started and created and what truly needs to change within this specific nation to ensure peace.

**Daniel Heil – Political Science and Criminal Justice**

**Mentor: Ann Beck**

***Hand Guns and Mayhem: The Influence of Small Arms Trade on Political Violence***

The object of this research is to discover what correlation the trade of small arms has on political violence. The information found is based upon secondary research which provides data from a wide variety of scholars on the subject of small arms effect on political violence and presented in a literature review. The research found will be analyzed and compared to determine each work's significance. The results of this research are expected to demonstrate a significant positive correlation between the amount of small arms acquired and occurrence of political violence.

**Katie Heierman, Dustin Herron, and Rebekah Kaplin – Organizational Communication**

**Mentor: Roger Weis and Robin Esau**

***Ninja Tournament***

The Ninja Tournament was planned in order to raise funds for West Kentucky Mentoring, Inc. Along with the tournament, a bake sale was also organized to provide an additional way to raise money. In addition to raising \$128.75 for WKYM, we were able to raise awareness of this valuable mentoring program.

**Emily Hensel – German/Teaching Certification**

**Mentors: Meg Brown and Reika Ebert**

***Bertolt Brecht: Revolutionary Theatrical Theories***

"Bertolt Brecht" is a name well known in both the theatrical and political worlds. His work as a playwright, director, and a theatrical theorist revolutionized 20th century theater and its purpose. His plays were some of the earliest and most successful examples of the marriage of theater with political motivations. Brecht's strong Marxism became the fueling message for a majority of his works. He is most well known for the invention of epic theater and the alienation effect, which both propose that the purpose of theater is not to entertain, but rather to make the audience think and decipher the message which is trying to be conveyed by the playwright. Through looking at two examples of his works of epic theater, "Mother Courage and Her Children" and "The Threepenny Opera," it is possible to see just how his theories were implemented.

**Jessica Hepworth – Biological Science**

**Mentor: Howard Whiteman**

***Tool for Conservation education of Western Kentucky Plant & Animal Species***

The online e-Museum of Western Kentucky's Natural History has served as a tool for learning amphibian, fish, mammal and plant species of Western Kentucky for 11 years. Since its creation no changes have occurred to update or build upon existing material. This service learning project focuses on updating this webpage by adding updated range maps, conservation status to every species, and providing other supplementary materials. With these improvements, an increased acknowledgement of biodiversity and species conservation status will aid in learning this regions' biota. A site hit counter will aid in determining how often this site has been accessed in comparison to the 2001 version.

**Kristina Herrera – Chemistry**

**Mentor: Daniel Johnson**

***Analysis of the Chemical Methylation of Peptides by Liquid Chromatography-Mass Spectrometry***

This ongoing research concerns the chemical methylation of a 13 amino acid peptide. Methylation, as performed by enzymes in the body, is an important gene modifier and epigenetic gene activator or silencer. Utilizing liquid chromatography-mass spectrometry (LC-MS), we are determining the effectiveness of a chemical methylation procedure, with the intent of eventually comparing it to enzymatic methylation. With the LC-MS, we are able to evaluate the extent of peptide methylation as a function of various reaction parameters. In addition, we can identify patterns of methylation on various amino acids.

**Brittany Herring – Art, Photography**

**Mentor Corky Broughton**

***Murray Calloway Animal Shelter***

For my Service Learning Experience I decided to go to the local Murray Calloway Animal Shelter. My time there was spent walking the dogs and giving all of the pets individual attention, sometimes checking for ticks and praising them. The business solely relies on the community, meaning it is run off of donations and works with the Humane Society. For my poster i decided to focus on the impact that volunteering and spending time with the animals has on the future lives of the animals. Most of the pets are timid and take time to become comfortable, and if they become more comfortable around people they have a higher chance of being adopted. Volunteering also means that if something is wrong with a pet, someone working for the shelter or Humane Society will be notified sooner. Because they are funded by donations, they sometimes run low on cleaning supplies which can affect the animals' health. Volunteering insures the health of the animals, since unsanitary conditions can result in Parvo. Also, posting flyers and pictures up gets the word out there since the shelter isn't exactly noticeable. As a result, my time there has shown me the impact I can make on the well-being of the animals, and they have a positive impact on a person's day. Adopting a pet could mean always having a companion to some.

**Rebecca Higley – Political Science**

**Mentor: Ann Beck**

***The Impact of Cable News Networks on Public Political Debate: A Literary Review***

It will be explored in this study if the news media has the ability to influence public debate and if that influence sets the primary platform of information from which voters gain their knowledge about political candidates. The hypothesis that will be tested by analyzing case studies will be that people who watch television political news coverage will consider the issues set by the news media to be the same as the candidate's actual platform on the issues. It is expected to be found that the media does politically influence voters as far as reinforcement of already held beliefs of the voter. Because of the presumed ability of the media to reinforce political beliefs, the media is often attributed with shifting the vote decision of the individual. Therefore, it is also expected that this study will show that the news media does not play a direct role in influencing voter decision, but it will have an indirect role on impacting voter decision through the news media influence on public political debate.

**Katlyn Hitz – Conservation Biology****Mentor: Howard Whiteman*****Creating a Canoe and Kayak Trail on the Clarks River in Paducah, KY***

For my Conservation Biology class we were asked to select a service learning project and describe its importance to conservation. For my project, I worked in conjunction with the Four Rivers Basin Team to create a canoe and kayak trail with focus on the lower end of the Clarks River where it meets the Tennessee River. This project is important in promoting environmental conservation. The project has the potential to generate public appreciation for the environment. For instance, it is going to be used as a teaching tool to inform the community about the important roles native plants and wildlife play within the Clark's River ecosystem. The trail will also be used to educate the public on the importance of water quality in maintaining a healthy environment. My contributions to this project included creating a water quality report on the Clarks River to show that the River is safe for the implementation of this project and gain project support. I was present throughout the project planning process and participated in several fundraising events.

**James Hobbs – Political Science****Mentor: Ann Beck*****Does Decentralization of Education Impact Test Scores? An OECD Exploration***

This paper explores international education systems to discover if there is a positive correlation with higher levels of decentralization and higher math and science test scores. Other scholars work and international OECD studies are evaluated. This paper is going to rank the United States, Canada, France, Germany, Czech Republic and United Kingdom by level of decentralization and compare each countries PISA scores. The expectation of this paper is that countries with higher levels of decentralized education systems have higher test scores internationally.

**Mary Ann Hodge – Physics****Mentor: Joshua Ridley*****A Search for Pulsars in Binary Star Systems***

Pulsars are dense stars that rotate at incredible speeds. By studying them, astronomers and astrophysicists can learn more about how they are formed and the different ways they can produce electromagnetic radiation. The purpose of this project is to detect pulsars in binary star systems within the Large and Small Magellanic Clouds, therefore contributing to the database of known pulsars. This is being done through the use of radio wave detection and analysis of data received from large-scale computer processing.

**Martin Jackson – Political Science****Mentor: Ann Beck*****Does women's experience in office effect reelection: Literature Review***

My central research question is does a woman's experience in office effect reelection. I use the method of analyzing scholarly written literature. I expect to find that it does effect a women's reelection into office.

**Brian Jarvis, Robert Stuard, and Joseph Kelly – Agronomy**

**Mentors: Iin Handayani, Robert Miller, Andy Bailey, and Bobby Hill**

***Evaluation of Dark-Air Cured Tobacco Varieties***

Every year, tobacco producers are interested in raising new varieties that offer higher yields and better disease resistant to black shank, blue mold, and others. Therefore, variety trails are important in order to meet the growing demands of tobacco producers. The objective of this study was to evaluate the performance of 15 different varieties of air-cured tobacco. The experiment uses 15 varieties of dark tobacco that were air cured. The varieties used were NL Madole, VA 309, Little Crittenden, DT 538, KT D4, KT D6, KT D8, PD 7302, PD 7305, PD 7309, PD 7312, PD 7318, PD 7319, DT 558, ms D2601R. The study was conducted on the west farm of Murray State University during the 2011 growing season. The tobacco was transplanted on June 18th. There were 30 plants per plot in two rows with 5 feet between replications. There were four replications for each variety with 32 inch plant spacing and 40 inch row spacing. The tobacco was grown for about four months and then harvested on October 10th. Results will be evaluated in total yield, leaf, seconds, and lugs in terms of lbs/acre. The data will be statistically analyzed and the results will be presented in the poster.

**Dan Jenkins – Geoscience**

**Mentor: Haluk Cetin**

***Analyzing ACT Composite Score Averages in Kentucky with GIS and Statistical Analysis***

This project involved investigating ACT composite scores for Kentucky counties with Geographic Information Systems (GIS) to identify spatially significant clusters of low and high scores. Eight variables were tested for correlation and explanation of any spatial clustering. Three four year trends of ACT composite scores were averaged into a four year composite score average for each county. The ACT composite score average was the dependent variable in statistical analysis using ArcGIS 10.0. The independent variables were: median income, percent of children from female head of households, percent of counties population with a bachelor's degree or higher, counties average elevation, counties average slope, counties distance from urban areas, counties distance from a university, and the counties road density. Hot Spot Analysis was performed. Principle Component Analysis and Geographically-Weighted Regression Analysis will be performed on the eight independent variables. Results: Hot Spot Analysis found statistically significant clusters of high and low Average ACT Composite scores. The principle component analysis and geographically weighted regression is not yet complete. The expected results are to find positive correlation with higher median incomes, counties with higher percentage bachelor's or higher degree, and higher road density with higher ACT composite scores. Negative correlation is expected between counties with higher percentages of children from female heads of households, higher slopes, elevations, and longer distances from urban areas and universities.

**Tia Johnston – English / Creative Writing**

**Mentor: Staci Stone**

***Rochester's Character in Jane Eyre: Revealing Negative Traits Through Shakespearean Allusions***

Charlotte Brontë uses the device of literary allusions to Shakespeare's plays Much Ado About Nothing, King John, Macbeth, and King Lear, to remind the reader of Rochester's negative traits and his deception of the heroine, Jane.

**Tia Johnson and Kari Shemwell – English / Creative Writing**

**Mentor: Squire Babcock**

***A Reading of Creative Fiction***

Kari Shemwell and Tia Johnston will be hosting a reading of their own creative fiction works. The works have been written during the semester for the Honors Thesis course. The works have literary substance and themes and motifs that are explained in another analytic piece, which will not be presented at the reading. The reading will most likely take place in the evening at the coffee shop as it is a more welcoming place for such an event.

**Ramakrishna Katta – Chemistry**

**Mentor: Bommanna Loganathan**

***PCB Aroclor Mixtures: GC-ECD Analysis and Pattern Recognition in Environmental and Biological Samples***

The objective of this study was to determine elution pattern of various Aroclor mixtures using GC-ECD equipped with DB-5 capillary column. Selected Aroclor standards including Aroclor 1016, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, Aroclor 1260, and Aroclor 1268 were obtained from Ultra Scientific were prepared and analyzed. A GC-column oven temperature program was developed to determine all of the Aroclors using the same method. NIST Calibration standard containing representative congeners (mono to deca chlorobiphenyls) was also analyzed and calibrated (LOD, LOQ, MDL) these GC-ECD. Representative samples including freshwater mussel, shrimp and fish sample extracts were analyzed using the same method. Results revealed that each Aroclor mixture had a specific elution pattern of peaks. Although marked difference in this elution pattern of peaks between lower percent Chlorine Aroclor to higher percent Chlorine Aroclors, There were overlapping of peaks within the Aroclor mixtures. Environmental and biological samples chromatograms were compared with standard Aroclor mixtures. The composition of peaks including number of peaks, its abundance varied widely with Aroclors. No distinct Aroclor pattern is observed in these samples. However, presences of certain signature peaks for each Aroclor were observed, indicating environmental samples contain mixtures of several Aroclors.

**Kacie Kemp - Undeclared**

**Mentor: Corky Broughton**

***Y's Guys After School Program***

My service learning project was conducted through the Mayfield-Graves County YMCA.

The program I was assigned to work with was called Y's Guys. This program provides after school care for children K-6 in every elementary school in Graves County. The school I was assigned to was Central Elementary. The program has two paid employees who provide, not only child care, but homework supervision, snack time, arts and crafts, games and free time. during my time at Central, there were around 17-25 children every afternoon from 2:50p.m. to 6:00 p.m. There was an emphasis put on hygiene. Every child had to line up to wash hands before and after snack and no sharing was allowed to prevent the spread of germs. The first thirty minutes after snack were spent on homework, with anyone who had no homework helping those who did. After homework time, there was usually a planned activity for about thirty minutes. After the activity, everyone had free time to do whatever game or activity they liked, such as reading, arts and crafts, or games. This was the part I really liked because it gave me the opportunity to really interact with the kids one-on-one. I think the kids really liked having me there, too. They always asked a lot of questions and always asked if I was coming back.

Overall, it was a great experience and I think both the kids and I benefited. I hope to continue volunteering there.



**Brandi King – Zoological and Michael Leigh – Biological Sciences**

**Mentor: Howard Whiteman**

***Stabilization of Feral Cat Colonies in Murray, KY***

The domestic cat is a longstanding predator of small mammals, birds, and reptiles. They can wreak havoc on individual populations and can even cause extinction on islands.

Because the domestic cat is polyestrous, the overall reproduction rate is very high, which can cause a rapid increase in these predators. Therefore in order to prevent such rampant increased population, we are conducting a study that may potentially control such extensive numbers. Our study aims to expand a current attempt by the Humane Society of Calloway County to keep Murray, KY's feral cat colonies at bay. In this study, we will capture wild male and female cats, spay or neuter them, then release them back into their original territory. We will trap these cats in Central Park using various trapping methods including humane live traps. We expect our results to not only illustrate a high number of feral cats captured, but to immediately result in a lower population. We expect to see a significant stabilization in the feral cat population after one year.

**Dan Knight – Undeclared**

**Mentor: Corky Broughton**

***Poster Board Project***

I chose to do my volunteer work at the Family Fitness Center in Murray, Kentucky. This facility is a gym (complete with nautilus machines and free weights), a tanning parlor, an MMA room, and child care center, and a Zumba room. Every day when I went in, I would first sweep the entire parking lot and empty the trash. After that I would walk around in the gym area and pick up bars, re-rack weights, organize weights, wipe down machines, put things back where they belonged, etc. I also would assist other people in the gym if they needed it. I would spot people who did not have a lifting partner when they were maxing out or just lifting a heavy amount and would just talk and meet people who used the gyms facilities. On some days there were not too many people lifting, but there would a sizeable amount of people using Zumba. Many of these people were stay at home mothers would have to bring their children with them while they worked out.

Sometimes I would go and hang out and play with some of the kids that came into the child care center if there was nothing for me to do in the gym. After my hour and a half for the day (and for the week) was finished, I would ask if they needed me to do anything before I left and then I was on my way.

**Robert Knopp – Biological Science**

**Mentor: Howard Whiteman**

***The Effects of Prescribed Fire on Amphibian and Reptile Diversity in an Oak-Grassland Restoration Area***

Historically, natural wild fires often swept through forests and grasslands, reducing plant biomass and affecting surrounding faunal communities. Prescribed fire management is a frequent tool in habitat restoration, yet the effects of such management on herpetofauna need to be better understood, because herpetofauna are a significant but underappreciated component of forest communities. We predicted that species adapted to drier and warmer environments would be more abundant in fire-managed habitats, outcompeting and filling niches at a higher rate than water dependent species, due to higher light levels, lower leaf litter, and less coarse woody debris (CWD) in such areas. Our study focused on eight wildlife ponds within a restoration burn area and eight similar ponds in an adjacent non-restored forest within Land Between The Lakes National Recreation Area. All ponds were sampled using dip-nets and minnow traps during June-August 2011. Drift fences were checked daily for captured animals from September-October 2011 and January-May 2012. Amphibian larvae were captured and identified to species, and all herpetofauna found at fences were recorded. Data analysis is ongoing; we are currently using Shannon diversity indices in conjunction with the bootstrapping method to compare diversity between burn treatments and control treatments. Higher diversity was observed in burn areas for minnow traps and drift fences. The long term goal of this study is to determine what factors are contributing to these differences in diversity.

**Anna Key – Liberal Arts**

**Mentors: Barbara Cobb, Kathy Callahan, and Duane Bolin**

***The Face of Help: Bringing American Volunteerism into Bolivia***

American volunteerism is successful and beneficial in Bolivia. Volunteers are needed in Bolivia to supply physical help, as well as education, agricultural advancements, health improvements and additional non-physical needs. Research provided this through the history of volunteerism in Bolivia including current volunteer groups: religious and non-religious groups such as the Peace Corps, Habitat for Humanity, the Catholic Church and others. Research also focused on the positive and negative aspects of American volunteerism in Bolivia, including a discussion of Ivan Illich; a leader in Catholicism who stirred up controversy because of his beliefs, among religious commentators. Humanitarian and Christian efforts have helped the Bolivian people to understand that education and its application are the ways in which to make Bolivia a better environment for the Bolivian people. Today, the need to continue volunteerism, in all of its aspects, is even greater in the changing culture of Bolivia.

**Sooyeon Kim – Chemistry****Mentor: Kevin M. Miller*****Synthesis and Thermomechanical Analysis of Michael Addition Polyesters***

The use of charged-polymers has become increasingly important due to their potential applications in electronic devices, fuel cells and electrode membranes. Here we present a set of preliminary results which investigate the thermomechanical properties of imidazolium-containing charged polyesters which are prepared through the use of the Michael Addition. For comparison, a set of aliphatic and aromatic non-ionic polymers were also synthesized. The Michael Addition polymerization involves the reaction of difunctional acrylates and acetoacetates in the presence of a base catalyst. Once the polymer samples were prepared, gel fraction analysis, swelling measurements and thermomechanical analysis were performed on the polymers in order to characterize their properties. Two trends emerged and will be presented here. First of all, we observed an linear enhancement in the glass transition temperature when the diacrylate concentration was increased due to the presence of physical crosslinking between polymer chains. The glass transition temperature also increased when the charged imidazolium group was incorporated into the polyester backbone when compared with the two non-ionic systems. This signifies the presence of ionic bonding between polymer chains, something that is not present in standard non-ionic polyesters.

**Kaitin Knaszak – Geographic Information Systems****Mentor: Michael Flinn*****The Influence of Fire on Organic Matter Resources of Artic Headwater Streams***

In the summer of 2007, the Anaktuvuk fire occurred in the Tundra of Alaska covering a 1000 km<sup>2</sup> area. Surber samples were collected in rivers within the burn site and a river outside the burn parameters as a reference site. In the years of 2010, and 2011 samples were taken from the North River, South River, and Shrew River during the months of June, July and August. Each of the samples was separated into coarse and fine segments that were then examined to remove all of the insects from the sample. The samples were placed in a drying oven for a minimum of 48 hours. The samples were weighed, placed in a muffle furnace heating to 550oC for a time of two hours. The samples were reweighed and the difference was calculated to determine the amount of organic matter in the samples.

**Kari L. Koester – Psychology**

**Mentor: Paula Waddill**

***Environmental Memory: The Effect of Scent on Long-Term Memory***

Teachers look for ways to improve students' recall. Marketing professionals want to make their products more memorable to consumers. Gerontologists seek strategies to enhance patients' memory. Could the answer be as simple as diffusing certain scents into the air? Scents and memories can become easily connected. Our sense of smell is directly linked to areas of the brain that process associative learning and studies show ambient scent affects recall, cognitive performance, alertness, and reaction time. People also frequently remember better when study and test contexts are similar. This research investigated the effect of scent (neutral, orange, or cinnamon) on free recall and recognition memory after a 48-hour delay under multiple conditions. Previous studies have examined memory effects after 24 hours but not after longer delays. This study also used aromas that have little (cinnamon) or no representation (orange) in current literature. It was expected that learning with a scent would produce better recall and recognition than learning with a neutral odor, and recall would be best when the learning and retrieval scents were the same. Participants studied a list of words, and then returned after 48 hours for testing. Scent had no significant effect on free recall but recognition was better when both encoding and retrieval occurred in a scented environment. In addition, when encoding was in a neutral environment, retrieval was better in a scented environment compared to a neutral environment. Thus, it appears that an ambient scent can improve memory under certain circumstances.

**Kari L. Koester – Psychology**

**Mentor: Paula Waddill**

***The Effect of Orange and Cinnamon Aromas on Test Performance***

Teachers and students are always looking for ways to improve test scores. What if the answer is as simple as having a particular aroma present during testing? Scents and memories can become easily connected. Our sense of smell is directly linked to areas of the brain that process associative learning and studies show ambient scent affects recall, cognitive performance, alertness, and reaction time. This study investigated the effect of the presence of an ambient aroma (orange or cinnamon) on free recall and recognition test performance when memory was tested 48 hours after encoding. Previous studies have examined memory effects after 24 hours but not after longer delays. This study also used aromas that have little (cinnamon) or no representation (orange) in current literature. The presence of an ambient aroma (orange or cinnamon) significantly affected test performance compared to no aroma at test, and the pattern of the effect depended upon test type.

**Kelsi Kuykendall – Political Science**

**Mentor: Ann Beck**

***The Race for Africa: The United States v. China, with a focus on Nigeria***

China has quickly emerged as an international superpower because of its rapid economic growth. Much of this growth has to be contributed to China's involvement on the African continent. There the Chinese seek mostly the same things as their biggest competitor, the United States. Both powers are looking to secure access to vital resources, compete for markets, and expand their influence in the resource-rich but largely underdeveloped continent. A vast amount of literature has been published concerning the possibility of conflict between the U.S. and China over the recent scramble for Africa. However, that dispute is not the purpose of this text. This paper will examine the foreign policies of both the United States and China in regard to Africa in order to determine which nation is applying the most effective and successful policies throughout Africa and why. Because the respective foreign relations with Africa as a whole could not possibly be amply covered within the framework of this text, this essay will focus on Nigeria as somewhat of a case study to reflect Sino- and U.S.- African relations in their entirety.

**Tobias Landberg – Biological Sciences**

**Mentor: Howard Whiteman**

***Does Egg Size Affect Hatchlings and Metamorphosis in a Polymorphic Salamander?***

Egg size variation is ubiquitous in amphibians, varying across habitat types, between populations, and females within a population and between eggs in a clutch. This variation is correlated with a suite of hatchling traits, but the degree to which egg size variation evolves at different levels and has cascading effects through to subsequent life stages is poorly understood. This study is designed to sample across populations of a facultatively metamorphic salamander. The mole salamander, (*Ambystoma talpoideum*) may either mature in the larval form and breed as a gilled aquatic adult or metamorphose into a terrestrial adult. We examine two ponds with paedomorphic adults and two with only metamorphic adults. Within each clutch we surgically removed yolk during the embryonic period to mimic and extend the effects of within-clutch egg size variation. Survival was lower, development was slower and hatching was earlier in the yolk-reduced group compared to the sham-operated control group. After hatching, individuals were sorted into treatments by the largest and smallest clutches as well as a treatment composed of mixed clutches for each pond. The early effects of egg size variation on hatchlings are expected to affect the decision to metamorphose or breed as an aquatic paedomorph.

**Aaron Lane – Wildlife & Conservation Biology**

**Mentor: Howard Whiteman**

***Monitoring Groundwater to Determine Wetlands***

State and County road departments damage many wetlands a year, due to bridge installation, ditch drainage, and levee building for roads. The State and County receive credits for the amount of wetland damage to buy property to conserve the wetland they altered. In return these sites are called mitigation sites. The sites are monitored for five years by well depth and vegetation. The monitoring process will determine if the site can be classified as a wetland. I was in charge of measuring 10 wells from March 23, 2012 through April 5, 2012 on an every other day basis.

**Aaron Lattin – Geosciences**

**Mentor: Haluk Cetin**

***nPDF Algorithm Run-time Analysis Using Java Versus C#***

Today, supervised and unsupervised classifications are highly used techniques in remotely sensed data. Unfortunately, there are inherent problems that arise when using supervised and unsupervised classification. The main problem of using supervised and unsupervised classification is their use of statistical calculations to provide results. The goal of the n-Dimensional Probability Density Function is to overcome these limitations, but include an interactive classification in the process. The overall goal for re-development of the n-PDF classification algorithm was simply to enhance the processing speed, while upgrading the algorithm to a current programming language. The programming language that was chosen is Java. The study will also include a run-time comparison between C# versus Java. The methodology used in the development process involved the study of advanced programming concepts. Concepts that are studied are: pointers, binary trees, and dynamic allocation of memory using linked lists. Once development is complete, a simple run-time comparison is performed between the updated and older programs. This comparison will provided the results as to which language is faster and if any enhancement to the algorithm affected the overall processing speed. In conclusion, the n-PDF algorithm is faster no matter which programming language is used and does not require as much memory as required by other classification methods.

**Katie LeBlanc – Agronomy**

**Mentor: Iin P. Handayani**

***Soil Quality Responses to Farming Practices in Western Kentucky***

To ensure the quality of our soil we must take notice of the land management practices enacted upon the land over time. Modification of farming practices from conventional tillage to no till and organic based farming practices may change soil quality indicators. Soil characteristics such as soil organic matter (SOM), water holding capacity (WHC), bulk density (BD), total porosity, and aggregate stability (AS) are considered vital soil quality indicators. This study was analyzed the effects of farming practices on soil characteristics. Soil samples were collected from the Murray State University farm in Calloway County, Kentucky. In August 2010, surface soil (0-7.5 cm and 7.5-15 cm) were taken collected from five fields: (1) sod as a control field, (2) 3 years of organic farm (OF3), 5 years of organic farm (OF5), (4) 15 years of no-tillage systems (NT), and 15 years of conventional tillage (CT) systems. The results show that organic farming and no tillage practices improved SOM, BD, porosity and AS. The highest values of these properties were found in 5-yr organic farming and the lowest were in 15-yr conventional tillage systems at the depth of 0 to 15 cm. Soil compaction, as indicated by bulk density, reduced up to 15% and the ability of soil to hold water increased about 22% after 5 years of organic farming when comparing to 15-yr of conventional tillage farming practices.

Better soil quality under organic farming and no till practices indicates that organic matter input can improve soil properties and regenerate degraded lands.

**Hannah Leskosky – English Literature**

**Mentor: Staci Stone**

***Resistance for Happiness: Conflicts of Gender Expectations in Victorian England and Jane Eyre***

Charlotte Bronte s *Jane Eyre* (1847) depicts the well-defined, prescribed gender and behavioral expectations associated with Victorian England through character narrative in the novel. During the period of Queen Victoria s reign (1837-1901), there was great emphasis on three behavioral traits: eagerness, moral responsibility, and domestic propriety. Men and women (notably the middle and upper classes) were expected to maintain these traits for the betterment of English society (Greenblatt 980). A detrimental tenacity to fulfill these requirements is seen in several of the characters of *Jane Eyre*. The differences between these women are due to their differing placements in society. Indeed, Mrs. Reed, Miss Temple, Helen Burns, Blanche Ingram, and Bertha Mason all maintain different ideals of femininity, ideals that Jane either embraces or rejects in her search for personal femininity. Jane s journey throughout the novel is a pilgrimage to achieve a state of autonomy and true self, alleviated from the influence and expectations of society. Importantly, the impacts of societal presumptions are also significant in the development of Jane s relationship with Edward Rochester. Rochester is a product of the pressures to maintain Victorian standards; his pre- arranged marriage to Bertha Mason places him outside of British society, causing a disruption in his ability to uphold proper behavior and propriety, thus inducing an assortment of masculine insecurities. However, the struggle for Jane and Rochester to place themselves comfortably in Victorian society is the catalyst for their happiness; their relationship at the close of the novel signifies their successful alleviation of Victorian values and expectations.

**Todd Levine – Biological Sciences**

**Mentor: Howard Whiteman**

***Natural History and Range Expansion of Plectomerus Dombeyanus***

Many species of freshwater mussels are critically endangered and conservation efforts are common. Mussels expanding their ranges may serve as case studies to understand the conditions under which mussels colonize new territory. *Plectomerus dombeyanus* was first reported in Kentucky Lake in 1981 and spread into the Ohio River. We described the natural history of *Plectomerus* using data from 5 general mussel surveys over 20 years in Kentucky Lake, mark-and-recapture of *Plectomerus*, and ex situ experiments to determine larval host fishes. Sites with high mussel density and species richness were most likely to contain *Plectomerus*. *Plectomerus* populations were dominated by relatively old individuals by 2002. We tagged 580 individuals and recaptured 51 of them over 3 years at one site; in 2011, 51% of captures were gravid. In laboratory experiments, *Plectomerus* metamorphosed on 12 of 15 fish species, particularly drum, bass, walleye and black crappie, which produced, on average, more than twice as many juveniles as other species. Although successful in Kentucky Lake and other newly colonized areas, *Plectomerus* may now have lower recruitment in some initially invaded areas.

**Xiaojing Liu – Agriculture**

**Mentor: Iin Handayani**

***Soil Properties Improvements Following Broiler Litter Applications***

In the United States the production of broiler in the year 2010 was 79 billions kg. As a result, 18 billion cubic foot broiler litter was produced. This phenomenon leads to several environmental problems, such as air and water pollution. Using broiler litter as a nutrient resource to support crop growth and soil is one solution to this problem. This research examined how broiler litter applications improved soil properties. The study was conducted at the Pullen Farm, Murray State University in spring 2011. The objective of this study was to measure soil macro-porosity, soil organic matter content, and soil water content at field capacity. There are eight treatments consisting of 0, 1, 2, 3, 4, 5, 6, and 7 tons of broiler litter applied per acre which replicated four times. The data showed that soil organic matter content increased 21% following broiler litter applications. Additionally, the ranges of soil water content at field capacity and macro-porosity were 20% to 25% and 22% to 37%, respectively. This research confirmed that an appropriate amount of broiler litter improved soil properties.



**David K. Livingston – Conservation Biology**

**Mentor: Howard Whiteman**

***Gin Creek Restoration***

Aquatic ecosystems, streams, rivers, wetlands, and estuaries are under considerable pressure from human activities, including the incorrect disposal of trash. Sources of aquatic debris come from several categories; litter from recreational activities and fast food consumption, fishing related items from recreational and commercial fishermen including nets, fishing line, and bait boxes; litter from smoking; illegal dumping activities including appliances, building and construction waste, tires, and cars; and items that come from sewer overflow. Whether these items enter the aquatic environment from dumping, litter, or accidental routes, debris not only is aesthetically unpleasant, it is economically costly, and it harms the animals and plants that reside there. Gin Creek Wildlife Management Area located in southeastern Henry County, Tennessee has not been spared from the influence of human activities. Illegal dumping, littering by vehicles traveling on US 641, shells, beverage containers, bait boxes left by hunters and fishermen, and the debris that comes from the Big Sandy River when it overflows, as well as the trash that comes from upstream Gin Creek have taken its toll on the WMA. To relieve the stress on the area, all of the debris from Gin Creek's point of origin to the area where it flows into the Big Sandy River was removed. All recyclable items removed were recycled. The Tennessee Wildlife Resource Agency was notified about the illegal dumping.

**Sudan Loganathan – Biology, Biomedical Sciences and Chemistry**

**Mentor: Alexey Arkov**

***Tudor Protein Interactions with Glycolytic Enzymes in Germline Stem Cells***

Understanding of the many various and unique components of stem cells is a vital aspect. Using the fruit fly (*Drosophila melanogaster*) as a model system, we are studying germline stem cells so that their development may be better understood. Germline stem cells have been called the ultimate stem cells because of their ability to differentiate into any type of cell. By using various genetic and biochemical approaches we are able to classify and characterize protein interactions, localization, and enzymatic activity during oogenesis. Our research revolves around the Tudor protein and the associated proteins which may interact directly to Tudor. The direct interaction between Tudor and one of the glycolytic enzymes, Pyruvate Kinase, is the main focus of our investigation. In particular, we would like to determine whether Tudor plays a role in the enhancement of glycolytic pathway in germ cells. Our study suggests that germ cells preferentially use glycolysis for energy production similar to other types of stem cells and tumor cells.

**Aaron Lowe – Agriscience with an Emphasis in Emerging Technology**

**Mentor: Haluk Cetin**

***Mapping of Leaf Area Index (LAI) Change in the Tri-county Area of Corbin, Kentucky Using Landsat Imagery***

The main purpose of this study is to estimate the Leaf Area Index (LAI) change of the tri-county area of Corbin, Kentucky using Landsat imagery of 1990 and 1999. The counties included in the Corbin area are Laurel, Whitley, and Knox counties. LAI is the projected area of leaves per unit of ground area, which can be estimated using remote sensing techniques, such as normalized difference vegetation index (NDVI). For this study, the multispectral datasets of 1990 and 1999 have been enhanced and classified using ERDAS Imagine image processing software to map LAI change in the region.

**Matt Luken – Economics**

**Mentor: David Brasfield**

***Bailouts and the Effectiveness of TARP***

Study of the effect of government bailouts on the financial and banking sector of the U.S. economy.

**Krista Mack – Political Science**

**Mentor: Ann Beck**

***Has CAFTA Hurt or Helped the Caribbean Nations?***

This paper is a literary review on several works about the Central American Free Trade Agreement, or CAFTA and how it has affected the economy of the countries that are involved with the agreement. The paper looks at the development of Costa Rica, Dominican Republic, Honduras, El Salvador, Nicaragua, and Guatemala before and after the agreement was put into effect. The documentation of what is the importance of this research, what are the outcomes of nations that do not have free trade agreements, what are the positives and negatives of having free trade agreements, and how will it affect the future of trade agreements around the world. The hypothesis is that with the opening of the trade of Central America and the United States will increase the economy of all the countries involved, and move toward a more democratic government in the Central America and the Caribbean nations.

**Jessica Marshall – Geographic Information Science**

**Mentor: Haluk Cetin**

***Mapping Urban Sprawl in Atlanta, Georgia using Landsat Imagery***

As our world becomes increasingly urbanized, monitoring and mapping land use and land cover change caused by urban growth is of rising importance. Landsat images collected over the past several decades reveal spatio-temporal growth trajectories of the Atlanta, Georgia metropolitan area in the United States. The loss of forested area and change in temperature and air quality are revealed by the analysis of Landsat imagery as the major problems of Atlanta's accelerated urban development.

**Jennifer Martin – Geosciences, Earth Science**

**Mentor: Lara Homsey**

***Reconstructing the Deposition & Paleogeography of the Coffee Sands***

During the Cretaceous geologic period, a vast inter-continental seaway stretched from the Gulf of Mexico to the Arctic Sea. The rivers flowing toward this seaway created a vast network of river channel sediments, known as the Coffee Sands, in northwestern Tennessee. Despite their potential for informing geologists about the geologic history of the Jackson Purchase region, the Coffee Sands have been poorly studied and not quantitatively described. This project examined an extensive outcrop of the Coffee Sands, located near Paris, Tennessee, by analyzing particle size distribution and cross-bedding direction. Preliminary results confirm a fluvial origin from a fairly proximate source rock and suggest a predominantly east-flowing river current direction.

**Santiago Martin – Biology**

**Mentor: Terry Derting**

***Indiana Bat (*Myotis sodalis*) Habitat Improvement: Production of Roost Trees and Foraging Areas***

Knowledge of the biology of the endangered Indiana bat (*Myotis sodalis*) is essential for its recovery. My research has two objectives: 1) how to create roost habitat that meets the need of the Indiana bat and 2) how forest management can enhance foraging areas for Indiana bats. Trees with exfoliating bark, cracks, or crevices are essential as roost trees for many bat species, including the Indiana bat. My first objective is to determine the onset and duration of suitable roost tree characteristics in white oak (*Quercus alba*), shagbark hickory (*Carya ovata*), silver maple (*Acer saccharinum*), and green ash (*Fraxinus pennsylvanica*) after being killed with herbicide. My alternate hypothesis is that tree species has an impact on bark sloughing; softwood trees, like green ash and silver maple, develop greater amounts of sloughing bark, and do so more quickly compared with hardwood trees such as white oak and shagbark hickory. My second objective is to determine if timber stand improvement (TSI) has a positive effect on Indiana bat foraging activity. My null hypothesis is that creation of openings within closed forests does not affect Indiana bat foraging activity, as measured using acoustic recordings. The results of my project will help state and federal agencies protect and enhance habitat for the Indiana bat and, potentially, other bat species.

**Theresa Martin – Biological Sciences**

**Mentors: David White and Howard Whiteman**

***You are What you Eat: A Stable Isotope Study of Kentucky Lake***

Stable isotopes can provide information about the origin of the organic matter in aquatic systems of aquatic or terrestrial origin (e.g., autochthonous or allochthonous). Isotopes are forms of the same element that have different numbers of neutrons in their nucleus. Mass spectrometry is used to separate and identify isotopes of a number of common elements. Carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) isotopes, in particular, are used to estimate the trophic positions of consumers in food webs, as well as the carbon flow to those consumers. Carbon and nitrogen isotopes are being analyzed in the study of two bays on Kentucky Lake: Panther Bay and Ledbetter Bay. The primary goal of this study is to assess where stable isotopes can assist in defining the primary driving inputs in the ecological processes of the two bays. I compare the isotopic variations between benthic organisms (*Hexagenia bilineata* and *Chironomous major*), sediments, and organic matter inputs to define each bay as an allochthonous or autochthonous system. Where tributaries enter reservoirs, there should exist gradients of autochthonous and allochthonous matter from tributary mouths out into deeper parts of the lake. Isotopic signatures of benthic invertebrates should reflect the signatures of the organic matter they consume. Therefore, benthic invertebrates nearest tributary inputs should reflect organic matter signatures of the tributary while populations further away from the source should reflect primary production in the reservoir. By sampling and finding the stable isotope signatures of the organic matter in both sources and in the benthic invertebrates, the origins of food resources potentially can be determined.

**Ashley Matula, Amanda Ray, and Abby Clark – Organizational Communication**

**Mentor: Roger Weis and Robin Esau**

***Need Line Hocus Pocus Hygiene Drive***

This project was organized in collaboration with Calloway County Middle school with the goal of collecting 300 hygiene items to support the work of Need Line. The project helped the middle school students see how they could make a positive difference in their community by providing necessary hygiene products for those in need. The class who collected the most items was rewarded with a pizza party provided by Pagliai's Pizza and Snappy Tomato Pizza. The project far exceeded its goal by collecting a total of 800 items.

**James McCallon – Geoscience**

**Mentor: Haluk Cetin**

***Using Landsat TM Imagery to Determine Chlorophyll Concentrations in Kentucky Lake***

This research is designed to determine how well the chlorophyll concentrations of Kentucky Lake can be determined using remotely sensed data. Most of the focus in this study is placed on studying pixel values of Landsat Enhanced Thematic Mapper (ETM+) data that contain the water quality stations. Several techniques including NDVI index are used. This index can help determine vegetation conditions using remotely sensed imagery. The second band of the ETM sensor has also shown to have a positive correlation between spectral reflectance and chlorophyll concentrations, so this method is also used extensively. By using an integrated approach, a chlorophyll map of Kentucky Lake is developed.

**Kyle McClary – Mathematics and Chemistry and Derick Thomas – Biological Science**

**Mentor: Maeve McCarthy**

***The Naturalization Hypothesis***

Charles Darwin, in his treatise *On the Origin of Species*, proposed that introduced species may be less likely to successfully compete for resources in areas where congeneric native species are predominantly present than in areas where congeners are relatively less abundant. This notion has been given the name “Darwin’s Naturalization Hypothesis.” The term “introduced species” is very general; it refers to any species which has been transferred to a region other than its native habitat by some form of human mediation. Our group investigates Darwin’s naturalization hypothesis by reviewing two studies of the naturalization of flora in the Hawaiian and Mediterranean Islands.

**Caitlin McDonald – Liberal Arts**

**Mentors: Barbara Cobb and Bill Mulligan**

***City of White, City of Light: Chicag's Two World's Fairs***

In 1893, Chicago hosted its first world’s fair, with the intent on celebrating the 400th anniversary of the discovery of America by Christopher Columbus. Forty years later, Chicago again hosted a world’s fair, title. *A Century of Progress* that ran for two years - 1933 to 1934. Both fairs left an impact on American culture and urban planning. In Chicago and the surrounding area today, remnants from the two fairs can be seen through buildings, parks and monuments. Two well-researched brochures will be presented: the first on the Columbian Exposition and Chicago-area attractions related to it; the second over the Century of Progress fair and related sites.

**Jacob Meadows – Geographic Information Systems**

**Mentor: Haluk Cetin**

***Monitoring of Migration of Mountain Pine Beetle in North American Boreal Forest Using Landsat Imagery***

Since the 1990's the mountain pine beetle *Dendroctonus ponderosae* has been rapidly increasing its range in the boreal forest of North America. These infestations affect the forest productivity and health of natural ecosystems. Purpose of this project is to monitor the spread of the mountain pine beetle in UTM 10 region of Eastern British Columbia.

Two data sets one from Landsat7 imagery taken in 1999 and one from Landsat5 imagery taken in 2006 were analyzed to reveal forest damage due to the expanding range of the mountain pine beetle in Eastern British Columbia.

**Laurana “Ronni” McIntosh – Political Science**

**Mentor: Ann Beck**

***Enforcing Consequences: Implementation of Safety Regulations for Underground Coal***

Using analysis of available literature and research on government regulation of safety for the coal industry, this paper attempts to examine the causes of poor implementation of safety standards. This paper also examines the potential outcome of harsher enforcement of penalties for non-compliance of safety standards. Fines, closures, and other penalties are frequently fought, ignored, or otherwise poorly enforced. The following research explores the possibility of strengthening the enforcement of fines and orders for closure as a means of improving regulation implementation and reducing mining accidents and fatalities. Current literature on coal regulation suggests that many of the causes of poor implementation are long term problems, and that one of the most immediate roadblocks to implementation is the low enforcement rate of consequences. Creating an environment in which it is more time and cost effective to adhere to standards may be a more immediate solution to the many problems facing poor implementation.

**Lori Meadors and Justin Nash – Dietetic**

**Mentor: Kathy Timmons**

***Effects of Hi-maize substitute for Flour in Muffins***

This experiment is testing the flavor, texture and appearance of muffins that had 15%, 20% and 25% of flour replaced with Hi-maize. The test consists of a certain number of random participants that volunteer to taste the different types of muffins in order to fill out a scorecard.

**Joshua Mercer – Mathematics and William Huddleston – Biological Sciences and Theatre**

**Mentors: Maeve McCarthy and Christopher Mecklin**

***Modeling the Biological Processes of Epidermal and Dermal Wound Healing: Predicting Healing Rate and Geometry of a Wound Space Over Time***

This paper examines the processes involved in the healing of wounds in the epidermal and dermal layers of the skin. Our preliminary mathematical model represents the cell density per unit area of the wound as a differential equation where the rate of cell density increase is equal to the mitotic generative activity added to the cell migration, controlling for biochemical factors. Because the epidermis and dermis exist in steady-state equilibrium, once the cellular matrix that acts as the protective barrier is broken, this equilibrium point becomes unstable, signaling the onset of biochemical processes that produce the need for a more comprehensive model to account for the chemical levels and how they affect the stability of the equilibrium. We then discuss the foundation and mathematics of the two-process model, in which the nullclines shift over time due to the levels of activation or inhibition chemicals. Once these nullclines shift past the fixed points of the function, a bifurcation occurs which signals the onset of either activation or inhibitory chemicals to start or stop the processes, depending upon whether the body has received a wound, the wound is healing, or the wound is completely healed.

This method has allowed us to test quantitative data against this model, showing whether the model is a statistically significant tool to deduce the healing time, rate, and even the geometry of the wound space throughout the healing process.

**Trina Merrick – Geographic Remote Sensing**

**Mentor: Haluk Cetin**

***Comparison of Multispectral and Hyperspectral Imaging and Classification to Map Sand Types on Perdido Key, Florida***

The dynamics of any coastal zone are very complicated and often expensive or difficult to study, yet the economic and environmental importance of these areas is beyond dispute. In recent years, the development of satellite and airborne imagery, specifically multispectral and hyperspectral imagery, has given researchers a new tool that could change the methods used to study the coastal zone and provide much needed data on issues impacting them, such as erosion and deposition patterns, sea level changes, and urban development impact. As Remote Sensing Technology has improved, scientists have been able to distinguish land cover types with ever greater accuracy and precision, and do so from an increasing collection distance. The objectives of this study were to 1) classify sand types on Perdido Key, Florida, using multi spectral and hyperspectral imaging and 2) determine the best imagery and classification methods to distinguish land cover of such a minimal spectral difference. Results showed that Multispectral Imaging (Landsat) did not have sufficient spectral resolution to map the barrier island sand types. Hyperspectral data from Hyperion in 2006 and AVIRIS in May 2010 (17m spatial resolution) yielded better results, but did not have sufficient spatial resolution to differentiate beyond wet and dry sand. AVIRIS data from an over flight in July of 2010 (4m spatial resolution), however, resulted in classifying multiple classes of sand accurately when compared to field samples taken from the island.

**Jared Militello – Biological Science**

**Mentor: Michael Flinn**

***Alligator Gar Restoration in the Clarks River of Western Kentucky***

Alligator Gar (*Atractosteus spatula*) populations are endangered, threatened, or extirpated from much of their native distribution across the United States, which includes the Ohio River and associated tributaries. In October 2010, 20 juvenile alligator gar (hatchery raised, age-0, approximately 25 inches) were surgically implanted with acoustic telemetry tags by the Kentucky Department of Fish and Wildlife Resources, and stocked in the Clarks River in northwestern Kentucky. GPS recorded locations were used to determine spatial and temporal movements and this data has been analyzed using geographic information systems (GIS). Home ranges were calculated using the linear sum (km) of the difference between the farthest upstream and downstream points of each individual gar relocated during weekly tracking. The mean home range exhibited by fish tracked in this study was 10.49 km, with values encompassing an interval between .96 km and 16.06 km. Initial results show that no distinct orientation patterns or immediate dispersal distances were exhibited by the gar after release. Results also suggest that the juvenile alligator gar will utilize the habitats available in the Clarks River, and tributary access seems to play a role in migration and behavior. Finally, data strongly indicates a seasonal shift in spatial distribution, rate of movement and extent of travel.

**Morgan Miller – Liberal Arts**

**Mentor: Corky Broughton**

***Murray Calloway County Animal Shelter***

My poster is about the Murray Calloway County Animal Shelter. It includes information about the shelter, their mission statement, and contact information. Also, I have listed the history of the shelter beginning with its founding day. My poster includes the daily procedures of the shelter and a brief summary of my experiences there.



## **Amber Mills – Biological Sciences**

**Mentor: Timothy Johnston**

### ***Previously Unknown Species of Archaea in the Sediments of Kentucky Lake***

DNA, extracted from sediment samples of Kentucky Lake, was used as template in PCR reactions with primers that specifically amplify Archaeal 16S rRNA genes. The amplified fragments were cloned and the inserts sequenced. Sequences were then compared to the EMBL database by BLAST search. Of 134 clones examined, 29 were most similar to sequences of 1 of 5 unknown, uncultured archeons. Of those 29 only 3 were above 98% identity to the sequence in the database (the cutoff at the species level).

The only known Archaea that live under "non-extreme" conditions of temperature, salt, or pH are methanogens. The term "methanogen" indicates only that the organism produces methane as a product of metabolism and while these organisms are all strict anaerobic Archaea, they reduce a variety of organic and inorganic molecules and belong to 5 different orders: Methanobacteriales, Methanococcales, Methanomicrobiales, Methanosarcinales, and Methanopyrales. To determine which order these sequences came from a phylogenetic analysis was performed using PHYLIP. All but one sequence clustered together outside other known clusters, and were most closely related to organisms in the order Methanosarcinales. These data suggest that these organisms are methanogens and belong to a new genus, if not a new family, within the order Methanosarcinales.

## **Tommy Mills – Recreation**

**Mentor: Corky Broughton**

### ***Laker Pride***

The Laker Pride identifies at risk students and barriers preventing them from being successful. It helps each kid realize their potential and overcome barriers. Some barriers are death of a parent, living situations, teen pregnancy. Pride stands for Program recovery in disciplined environment. I relate to this program because I participated in it during my high school career. I would not be who I am today or where I am without this program. I am just one of many students this program has helped over its 14 years in operation.

**Basma Mohamed – Geosciences**

**Mentor: Haluk Cetin**

***Modeling of Urban Sprawl Using Remote Sensing and GIS***

To estimate geographic situation and determine the consequences of urbanization in rural space, the urban sprawl in Austin, Texas from 1987 up until 2010 is assessed by use of remote sensing. The urban pressure exposed on the rural territories can be characterized by diverse types of land cover changes and of land use alteration. Austin is among the highest developed urban area in the USA, which is a major concern particularly regarding to the clean water availability to meet growing needs. The goal of this work is to determine a reliable method of detecting change, through the use of multi-temporal imagery, a method that would best work to identify urban suburban growth along the Austin metropolitan area, in Texas. The Imagery used in the identification process includes Landsat Thematic Mapper (TM) Image obtained on October 11th 1987 and a Landsat Improved Thematic. The two change detection techniques, which can be divided into pre-classification and post-classification techniques. The first category, pre-classification, generates general classes, such as change" versus no-change" maps. A post-classification comparison technique provides more detailed results. The result revealed a great deal of the growth had taken place since 1987. Change detection result indicates that 8168.39 acres have been converted into open space developed area that was forest in 1987. This work focuses on the urban growth and the understanding the process including estimating the forest cover structure. The objective determines the amount of decrease in the agricultural land and forest area in the region is which the result of the urban sprawl.

**Kathryn Moore – Liberal Arts**

**Mentors: Barbara Cobb, Joshua Adair, Lillian Daughaday, and Warren Edminster**

***Making the Case Against DOMA***

On September 21st, 1996, United States Congress adopted the federal Defense of Marriage Act (DOMA). This act was adopted in order to limit the right of marriage to individuals engaged in heterosexual relationships. Gay marriage in the United States is a complex and controversial current issue. The primary focus of this thesis is to explore the legal arguments against DOMA. Through an analysis of prior case law, this paper determines that DOMA is unconstitutional. Marriage is a fundamental right in the United States, and should be protected for all persons regardless of sexual orientation. Many historical cases provide the framework for this assertion. While *Loving v. Virginia* dealt with the legalization of interracial marriage, it conveys the message that marriage between any two individuals is an American right, and denial of such a right is blatant discrimination. Other cases, including *Bowers v. Hardwick*, *Romer v. Evans* and the timely *Perry v. Brown* are strong arguments for the legalization of gay marriage, and are summarized and analyzed within this thesis. The gay rights question may soon reach the Supreme Court, given recent developments in the legal argument. With LGBT individuals already having the right to form a family unit, access to the dignified title of "marriage" is inevitable. The legal argument for same-sex marriage in the United States strongly indicates the unconstitutionality of DOMA, and will soon play a part in challenging it and ending a long and disappointing history of discrimination against the lesbian and gay community.

**Michael P. Moore – Watershed Science**

**Mentor: Howard Whiteman**

***The Role of Maternal Effects on Life-History Variation in the Facultatively Paedomorphic Mole Salamander, *Ambystoma talpoideum****

Females' experiences of their environment are known to have profound effects on offspring life-history, a phenomenon known as maternal effects. Due to their complex life cycles and sensitivity to environmental stress, amphibians are seen as an excellent system for studies of the importance of maternal effects on offspring fitness and previous research has focused on the relationship between egg size and offspring life-history variation. Facultative paedomorphosis is a polyphenism characterized by individuals that either metamorphose into terrestrial adults or retain larval morphology as mature aquatic adults, and could provide an ideal test for maternal effects because of the production of discrete life-history variation based on body size. The facultatively paedomorphic mole salamander (*Ambystoma talpoideum*) is known to increase ovum diameter in favorable environmental conditions, and we therefore expect offspring from larger eggs to be larger and also have an increased propensity for paedomorphosis. Egg size has been manipulated in the F1 generation by reducing the embryonic yolk reserves of an experimental treatment of *A. talpoideum* larvae. Next, larvae will be designated to one of three conspecific densities and reared in experimental mesocosm habitats. Resulting sexually mature individuals will be bred with same-treatment cohorts to create the F2 generation that will be designated to one of three conspecific densities in experimental mesocosm habitats. By comparing morph choice proportions of the F2 generation to conspecific density, parental conspecific density, and parental embryonic treatment, we can observe the extent to which egg size and parental environmental experience influences life-history and fitness.

**Charles Morgan – Biological Sciences**

**Mentor: Howard Whiteman**

***Long Term Monitoring and Analysis of Kentucky Lake Using in situ and Remotely Sensed Data***

Reservoirs serve as important resources for many reasons, namely for water supply and energy generation as well as a means of recreation and freight transportation. As such, reservoirs are important to manage in order to obtain the greatest benefit from them as possible. Information about a reservoir is necessary to properly manage it, especially if this data is long-term and covers numerous parameters such as water quality and all that it entails. In this study, long-term in situ data taken on Kentucky Lake will be correlated with remotely sensed data via the Landsat 5 satellite in an attempt to extrapolate water quality values from discrete points to large areas of the Lake. In doing so, large scale trends for water quality parameters such as chlorophyll or turbidity can be ascertained for the past leading into the present, giving a better idea of how the reservoir is behaving or even changing over the past twenty three years of data recording, and how these trends and changes could affect the Lake in years to come.

**Eric L. Morris - Geosciences**

**Mentor: Sung Ho Hong and Amanda Keen Zebert**

***Evaluating Oceanic-terrestrial Groundwater Intrusions Utilizing Remote Sensing Monitoring Techniques***

The purpose of my research is to examine monitoring seawater intrusions utilizing remote sensing to evaluate the usefulness as a hydrogeochemical tool using compiled examples.

Compiling previous studies regarding pertinent topics aided to corroborate and note interconnectivity. To develop an accurate and concise evaluation involving insight of the principal aspects of remote sensing for coastal ecosystems, the inference of and anthropogenic influence on sea-water intrusions and monitoring the ocean-terrestrial interface biochemical cycles. Remote sensing has proven to be an integral tool in a variety of sciences and projects although monitoring seawater intrusions is difficult using techniques which. Certain factors for hydrogeological models are easily attainable however numerous others must rely on primary or derived data. All implications from this research project will be focused for application on the watershed scale though there is no direct application for these results due to project convention restraints.

**Jacqlyn Murdock – Spanish & Art**

**Mentors: Leon Bodevin and Meg Brown**

***Comparison of the Works of Gaudi and Hispanic Literary Modernisms***

Modernism as a hispanic literary movement liberated poetry and prose from tradition while making innovations in structure and form. This started with Rub'n Dar'o, and was an important movement to many other authors including Juan Ram'n Jim'nez and Ram'n Mar'a del Valle-Incl'n. This movement was shaped through its influences and helped to produce works with creative structure, ornamentation, and beauty along with emotion and meaning. Creative movements are formed by their reactions to the surrounding world and are present not only in modernism as aliterary movement but also artistically in Catalan Modernism shown through the architect Antoni Gaud'. This will be shown through an analysis of the work of all these authors along with the architectural works of Gaud'. This presentation will explore the relation between the form of literary modernism and the emphasis in 'art for art's sake' with the evident forms in the architecture of Antoni Gaud'.

**Justin Myers – Biological Sciences**

**Mentor: Howard Whiteman**

***Effects of a Mixed Media Approach Geared Towards Addressing the Value of Recycling, Clean-up Efforts, and Peaceful Activism Within a University Setting and Local Communities***

Over the past 200 hundred years mankind has made giant leaps with regard to the ability of producing new products on a mass scale. The technological inventions of the Industrial Revolution and the proliferating advancements that carry on into the present have provided a lifestyle of convenience and accommodation. But the comforts and provisions of modern subscriptions have come with a heavy environmental cost. The cost of survival of an exploding global populace has taken a heavy toll on the environment. We are currently experiencing an extinction event, and the diversity lost has already surpassed the extinctions of the age of the dinosaurs. While the causes of our current predicament are a source of volatile debate, there are simple actions that everyone can do to minimize further damage to the whole. The purpose of this research is to measure the effects different peaceful, proactive activism can have on university students and local communities. By illustrating the importance of recycling, clean-up efforts, and not littering, this project aims at effectively placing the responsibility on the consumers directly. If effective, this research will show how spreading positive, truthful, and creative environmental messages can create a ripple effect that benefits the environment on which we all depend. In addition to the research conducted and the measureable impact of the study, this paper will present strong examples of people that have made a major difference by employing a “reduce, reuse, recycle” philosophy. These are the core values to which this project is built upon. Instilling a sense of personal impact, inspiration, and responsibility will be the objective. The extent of the damage that has resulted from pollution and recycled wastes that have been discarded rather than recycled is beyond the scope of this research. However, the evidence of the damage is all around us. This research will hopefully shed some light on the ways that everyone can play a part in helping the healing process on a global scale. All videos that will be used for this project will remain on youtube.com for as long as the website is freely accessible to the public. Depending on the limitations of time, this paper will also publicize the number of hits each video receives and any relevant commentary.

**Michael Newman – Economics**

**Mentor: David Brasfield**

***Bidding for the Big Game***

Should major US cities be bidding for the Super Bowl? This is a careful research into whether or not the Super Bowl has a lasting or just temporary economic impact on its host cities. Dating back to 1990 I will examine the employment rates of the metropolitan areas and test whether or not there is any major effect that shows that the Super Bowl could boost the local economy of a MSA for more than a small amount of time.

**Bryce Norris – Mathematics**

**Mentor: K. Renee Fister**

***Can Math Save Lives?***

Despite ranking sixth in leading causes of death around the world, diarrheal disease goes largely unaddressed by modernized (generally high-income) nations. Cholera is just such a disease. Its name draws blank stares; yet, cholera has caused significant loss of life in nations across the globe for centuries. This research follows a body of work dedicated to investigating the treatment and control of endemic cholera in Bangladesh.

**James Ralph Norwood – Undeclared**

**Mentor: Steve Cox**

***Nature Station Sensation***

My work at the Nature Station located at Land Between the Lakes has been a very enlightening and productive experience. I have been able to work with different people and a wide variety of animals large and small. The work could be called work by some or a fun day for others I enjoyed being around the animals and taking care of them. The project in whole was a wonderful challenge to what I thought of our outdoor friends and how I will treat them in the future.

**Alyssa Oberdorf, Kayley Lott, and Patricia Fisher – Engineering Graphics and Design**

**Mentor: Mehmet Emre Bahadir**

***Small Wind Turbine Design***

Energy is becoming limited or harmful to the environment to obtain. Wind energy is a reusable energy resource and is the least harmful to the environment. Each member of the group designed a helical wind turbine. The three different helical wind turbines will be tested to find the most efficient wind turbine design. The three helical wind turbines are modeled in the CAD software SolidWorks. The models are fabricated by a rapid prototyping machine. The helical wind turbines will be tested in a wooden wind tunnel with a tachometer to see which design was the most efficient in obtaining wind energy.

**Ajadi Olaniyi – Geosciences**

**Mentor: Haluk Cetin**

***Integration of Remote Sensing, Geographic Information System and Geophysical Techniques to Delineate the New Madrid Seismic Zone***

A panchromatic band of Landsat 7 (ETM+) image which includes areas such as New Madrid and Pemiscot Counties in Missouri, sections of Mississippi, Fulton county in Kentucky, and Gibson, Dyer, Lake and Obion Counties in Tennessee was investigated for lineament delineation. The study area will undergo enhancement techniques using ERDAS image processing software to give more visibility during analysis, and enhance interpretation. Different enhancement techniques that were chosen are high pass filters, gradient filtering and Principal Component Analysis (PCA). A test area from the upper part of Missouri was subjected to justify the enhancement techniques by comparing previously mapped faults with lineaments delineated from the area. PCA proved to be the best enhancement techniques, delineating more lineaments than the high pass filters. The lineaments drawn were further analyzed using four statistical tests which includes Watson's two-sample test, Ripley's K(r) function, pair correlation function and the Berman test. Evaluating Watson's two-sample test showed that the mapped faults, and lineaments delineated from the test area are in the same angle of orientation. Ripley's K function and the pair correlation function proved there is a correlation between the mapped faults and lineaments in the test area, and also a correlation between the earthquakes and lineaments in the study area. Lineaments delineated from the study area were seen to be in close proximity with the earthquake epicenters when overlaid with Bouguer gravity and magnetic data. The orientation of the lineaments and earthquake epicenters tends to lie parallel to the gravity and magnetic anomalies.

**Hanna Oliver – Agriculture Science Technology**

**Mentor: Haluk Cetin**

***Detection of Nitrogen Deficiency in Corn using Remotely Sensed Data***

Nitrogen is a vital nutrient in agriculture. This is one of the most important nutrients and crop growth is very poor without it. Since this element is so essential to crop growth farmers need to make sure that it is present in their fields and at the right levels. Ultimately, if farmers do not use and apply this nutrient we will not have enough of a food supply to feed the millions of people. Most farmers do not think of using remote sensing to discover their nitrogen deficiency or abundance. However, this tool is very accurate and efficient. I used different software programs to arrange and analyze data sets in a way to see the deficiency of nitrogen in a field. The nitrogen was applied at a variable rate on a field in Calloway County in 2001. I learned that the procedure of using remote sensing to detect nitrogen deficiency is very useful and accurate. Farmers in this area as well as around the world can now implement remote sensing on their farming operations. This is a foreign idea to many farmers in this area but I believe that this method of detection is so efficient that not only farmers but researchers and agriculture businesses worldwide can utilize process. I hope this research will develop in popularity in the agriculture community within the next few years.

**Thomika Jantzen O'Bryan – Political Science**

**Mentor: Ann Beck**

***Can Democracy be forced into Effect by a Military?***

While it's no surprise that many military dictatorships transition to democracy, the method of how this transition takes place is often the source of question. Can a democratic system be forced upon a nation by a military power? I plan to answer this question through the review and comparison of many scholarly and peer reviewed articles which pertain to this topic. This research will include aspects of influence on a transition between military rule and a democratic system. I expect to find that a military cannot impose democracy but that it must come from sources such as international influences or social shifts within the domestic civilian society.

**Michael O'Neill – Political Science**

**Mentor: Ann Beck**

***Does Democracy Decrease the Likelihood for Interstate Violence?***

Democratic peace has been studied for nearly a century with a focus on the possible conditions for such peace. By examining the reasons why democracies do not fight each other we can draw important conclusions that can perhaps lead to a better understanding of interstate violence. The legitimacy of this theory will be analyzed in order to determine the connection between democracy and interstate violence. A review of expert literature on the topic will be used for the basis of this paper. I believe the consensus exists that political and economic democracy lead to less war, and less fighting among other democracies. I expect to find that democratic regimes do in fact lead to less violence.



**Jeff Wood - Spanish and Business Administration****Mentors: Meg Brown and Neal Messer*****Oviedo's Negative Portrayal of Native Americans: The Motives Behind the Words***

In Latin America, the poor treatment of people who are of indigenous descent is a serious problem. This way of thinking was present in the onset of the colonization of Latin America. Gonzalo Fern ndez de Oviedo y Vald s, the first official Spanish historian of the Americas, wrote the first description of the Americas that many Europeans had ever read, which was instrumental in forming their opinions about the new lands and their inhabitants. As a wealthy noble, who witnessed the return of Columbus from his first voyage, spent many years in the royal courts and met many of the most influential minds of the time, his experiences inspired in him visions of his own superiority. His religious beliefs and relation with the king lead him to believe that God had reserved the newly found lands for the Spanish empire. He spent years observing the cultures and rituals of the indigenous people, which seemed obscene in contrast to his personal background. Oviedo s life experiences lead him to portray the Native Americans as inferior to him and the rest of the Spanish people.

**Hye-jin Park – History****Mentor: Joshua Adair*****Is Marjane's Intention of Writing Properly Delivered?***

“PERSEPOLIS” is a successful cartoon that won great popularity following its release, and the animated version of the film even received an Oscar nomination for Best Animated Feature at the US Academy Awards. So, what makes this work so special? What makes the messages in this work so appealing? Marjane Satrapi, the author, declares her intentions in the preface, namely, to declare that a nation should not be judged by the wrongdoings of a few extremists, and Iranians should not suffer from political aggression anymore. At this point, we need to further examine whether the author's messages have been as well delivered as she intended.

**Justin Lee Parrish – Agricultural Science, Trent Murdock – Agriculture Systems Technology, and John Michael Puckett – Agribusiness Economics**  
**Mentors: C. Gustav Helmers and Andrew Bailey**

***Evaluation of Herbicide Treatments for Dark Fired Tobacco 2011***

In the herbicide trial, the objective of the experiment is to determine which treatment will provide the best results when it comes to weed control throughout the growing season.

To determine this, we looked at the rate combinations of Carfentrazone-ethyl; Sulfentrazone (Spartan Charge) and clomazone (Command 3ME) as they were applied throughout the growing season. The experiment consists of four different herbicide treatments. Treatments 1-3 were incorporated after spraying and treatment 4 is a control with no herbicides applied. Treatment 1 was a combination of carfentrazone-ethyl; sulfentrazone applied at a rate of 12.5 oz/A. Treatment 2 is clomazone applied at a rate of 2 pt/a. Treatment 3 was combination of carfentrazone-ethyl; sulfentrazone and clomazone applied at a rate applied at a rate of 12.5 oz/A and clomazone applied at a rate of 2 pt/a. Throughout the growing season, the control of eight different weeds were observed in the plots. The weeds were morning glories species (*Ipomoea sp.*), common ragweed (*Ambrosia artemisiifolia L.*), carpetweed (*Molugo verticillata*), smooth/spiny pigweed (*Amaranthus retroflexus L. /Amaranthus spinosus L.*), yellow nutsedge (*Cyperus esculentus L.*), Crabgrass (*Digitaria Ischaemum*), Smooth Pigweed (*Amaranthus retroflexus L.*) and L. Crabgrass (*Digitaria Sanguinalis*).

**Pritesh Patel - Economics**

**Mentor: David Brasfield**

***Which Type of Economic Policy Measures Tackle Recessions Better?***

Countries in recession or economic crisis experience weakness in different areas of their economy. While policy makers have various fiscal and monetary policy tools at their disposal, the state of the economy and the causes of the recession may render some tools more effective than others. By studying the causes of previous recessions in the U.S., as well as the impact of various fiscal and monetary policy tools used in those crises, this project will attempt to determine which policy tools are most effective in combating different causes of economic weakness.

**Brahmaiah Patibandla - Chemistry**

**Mentors: Bommanna Loganathan and Everett Weber**

***Trace Elements and PCB congener Concentrations in Annual Growth Rings of Pine Trees from Western Kentucky***

Pollution trend monitoring studies are useful in understanding the historical contamination, present status and to predict future trends. A variety of environmental (sediment, ice cores) and biological matrices (pine needles, bivalve mollusk, fish, human tissues etc.) are used to describe trends of various pollutants. Trees act as biological indicators and help in the assessment of environmental contamination by relating concentration in annual growth rings. The objective of the present study was to understand the trace elemental concentrations including Cu, Mn, Cr, Pb, V, Ni, Zn, As, Ag, Cd, In, Sn and PCB congeners in tree rings of pine trees from Western Kentucky. Pine tree core samples were collected from selected locations including industrial (Paducah Gaseous Diffusion Plant, Calvert City Industrial Complex, West Waco Paper mill), national parks (Murray Calloway City Park, Belmont State Park) and undeveloped areas (Land between The Lakes, Highway 937). Standard operating procedures were followed for tree core sampling and analysis using ICP-MS and GC-ECD. The results revealed that several elements and PCB congeners were found in annual growth rings of pine trees. Temporal trends were not discernible for several elements and PCB congeners detected. However, tendency for increasing trends of Cr, Cu, Zn and declining trends were discernible for Pb and steady state for Mn were observed.

**Sam Pellock and Yanyan Lin – Biological Science**

**Mentor: Maeve McCarthy**

***Analysis of Cancer Cell Populations Using Continuous Models***

Cancer is the uncontrolled growth of abnormal cells, and many cancers can cause serious damage and lead to death. Our focus is to understand how cancer cell populations function as a dynamic system. We are interested specifically in continuous mathematical models that document cell growth using systems of differential equations. Using these models we discuss how they apply to multiple types of cancer including lung and breast cancer. Through the models we have studied we found that nutrition is of critical importance to the activity of cancer cell populations.

**Scot Peterson – Watershed Science**

**Mentor: Howard Whiteman**

***Patterns of Summer Insect Emergence Along a Degraded Stream in Western Colorado (USA)***

Emergent aquatic insects are an important flux of energy and nutrients to riparian consumers. However, increased disturbance of headwater streams due to land-use practices and climate change may negatively alter this dynamic. In 2011, we collected summer insect emergence from 8 reaches along a degraded headwater stream in western Colorado (USA) incorporating a longitudinal disturbance gradient. Although there was little difference in Shannon-Weiner diversity ( $H'$ ) and average taxa richness between the highly disturbed lower sites and the less disturbed upper sites, the maximum taxa richness was nearly twice as high in the upper sites. Total abundance and biomass was highly variable among stream reaches. Dipterans (mainly Chironomidae and Simuliidae) were most abundant (49-97% of total abundance) contributing 16-81% of total biomass. Both abundance and biomass of EPT taxa (mayflies, stoneflies, and caddisflies) decreased in the most disturbed sites (abundance: 51% to 3%, biomass: 83% to 11%). There were significant shifts in the composition of EPT taxa along the disturbance gradient.

Dominant caddisfly taxa shifted from large-bodied Limnephilidae in the upper sites to smaller Hydropsychidae and Hydroptilidae in the lower sites. Emergence of stonefly taxa also diminished in the lowest sites. Disturbance of small streams can alter hydrology and substrate size, influencing timing and patterns of insect emergence. This may have potential impacts on riparian consumers relying on these subsidies and therefore, influence riparian consumer dynamics. Future research will attempt to correlate insect emergence with stream and riparian habitat, as well as riparian bird diversity.

**Tobias Pirkle and Cameron Holeman Shipp – Occupational Safety and Health**

**Mentor: Tracey Wortham**

***A Study of Ergonomics Issues Among Maintenance Personnel in a Public School District***

This presentation will include an analysis of ergonomic issues at the Decatur Public School District in Decatur, Illinois. Two members of OSH 663 Applied Workplace Ergonomics visited the site to evaluate potential ergonomic risk factors for musculoskeletal disorders in tasks such as the installation of heating/air conditioning/ventilation systems, overhead work with replacement of security systems/alarms, and work with the use of scaffolding components. The data will be collected using checklists such as: the Discomfort and Hand Discomfort Survey, the Supervisor and Worker Interview Form, Caution and Hazard Zone Checklist, General Ergonomic Risk Analysis, Task Analysis, and Handtool Selection. The data gathered will then be analyzed using the following tools: RULA (Rapid Upper Limb Assessment), the Strain Index, and the ACGIH Hand Activity Level TLV. An overview of the findings along with recommendations for reducing ergonomic hazards will be presented.

**Lucas Pohlman – Undeclared**

**Mentor: Corky Broughton**

***Murray Club Baseball***

For my service learning project, I worked as a manager/coach for the new Murray club baseball team. As the manager I set up the practice schedules, set up fundraisers, and I attend every game. I would like to show off what I have accomplished as well as what the team has done.

**Briona Posey – Public Relations**

**Mentor: Steve Cox**

***What is the Relationship Among Organizational Assimilation, Co-worker Communication, and Work-life Balance for Minority Mothers in the Workplace?***

Due to the lack of existing research on this topic, more research should be done in connection with retention rate of minority mothers in the workplace. Using organizational assimilation to understand the process in which these mothers are assimilated, as well as using co-worker communication as another variable to understand the dynamics of the organization. This paper offers a continuous view on minority mothers in the workplace by using Communication Accommodation Theory and Social Penetration Theory to relate to factors determining the relationship between them. Lastly, the paper discusses work-life balance as a third variable to the relationships among minority mothers. Seven participants volunteered for an interview where they were asked about organizational assimilation, co-worker communication and work-life balance as it relates to them balancing their life. Interviewees were also asked about their material status along with several other questions that resorted into the final results. Results indicated that in order for companies to be fully understanding of minority mothers they must understand the variables separately then determine how they can hinder or enhance the relationships of their employees.

**Leslie Potts – Wildlife Biology and Devan Buckhalter – Chemistry, Pre-Med.**

**Mentor: Maeve McCarthy**

***A Population Viability Analysis Using a Vortex Model to Estimate the Recovery Rate of Killer Whale Populations in the Prince William Sound, Alaska after the 1989 Exxon Valdez oil s***

On March 24, 1989 the Exxon Valdez oil spill released more than 250,000 barrels of crude oil into the Northwestern Prince William Sound (PWS) along the southern gulf of Alaska. A unique situation where pre-spill data was available on many pods of Killer Whales allowed researchers to model the effects of the spill and the rate of recovery afterwards. We use a PVA, or a population viability analysis, which is used to determine the probability that a population will go extinct along with a Vortex model to predict the Killer Whales' recovery rate.

**Rebecca Raj and Rebecca Cunningham – Biological Sciences**

**Mentor: David Canning**

***Cell Adhesion Properties of Neural Stem Cells***

Stem cells are multipotent cells capable of differentiating into a variety of tissue types. In vertebrate embryos, neural stem cells arise early in development in a region called the neural plate. Cells from the neural plate will ultimately differentiate into all the cell types of the central and peripheral nervous systems. The mechanisms that control how stem cells differentiate are poorly understood, but it is widely accepted that the cellular environment has a substantial influence on the production of specific cell types. In this study, we have attempted to culture neural plate cells to test hypotheses that specific extracellular matrix molecules play a role in neural differentiation. Using the chick embryo as a model system, we have cultured neural stem cell in conditions that either produce neurospheres or monolayers. By conditioning the culture medium with various growth factors in combination with different extracellular matrix molecules, we have found that glycosaminoglycan chondroitin sulfate may have an effect on the adhesion properties of neural stem cells. Changes in cell adhesion properties can be correlated with tissue formation, and therefore may lead to methods of controlling pathways of differentiation of cells of the neural plate.

**Matt Ray - Organizational Communication**

**Mentor: John Spinda**

***Looking for Guild: A Qualitative Analysis of Teamwork, Leadership, Member Satisfaction, and Success***

In this study, we examined whether tasks traditionally associated with the human resource management model (e.g., organizational design/strategy, staffing, performance management/appraisal, employee/organizational development, and reward/benefit systems) are also evident in Massively Multiplayer Online Role-Playing Games (MMORPGs), such as World of Warcraft (WoW), the most widely-played MMORPG internationally. Semi-structured interviews were conducted with 8 active WoW players from both casual guilds (i.e., groups that place priority on the social aspects of the game) and raiding guilds (i.e., groups that place priority on the game's competitive environment). When a thematic coding procedure was used to examine interview transcripts, we found that the emergent themes of the casual guild were: (1) a socially motivated leader, (2) low task consensus, (3) a lack of training and development, and (4) a strong desire by members for recognition. The emergent themes for the raiding guild were: (1) a task motivated leadership, (2) abrasive communication style, and (3) member desire for more social rewards. Our findings supported our hypotheses that the raiding guild would have more task-oriented success in competition with other guilds and that the casual guild would have a longer life span with more socially satisfied members. Our findings imply that WoW guild leaders, as leaders of virtual organizations, can create successful organizational climates by utilizing the human resource management model to empower employees, as well as balance employee needs with organizational needs.

**Claire Reason – Psychology****Mentor: J. Ian Norris*****How Much will a White Bear Share? Effects of Materialism and Ego-depletion on a Consumer Allocation Task***

When people make decisions, they are often faced with two conflicting options. This study investigates the effects of ego-depletion on materialists facing intrapersonal conflict, or the conflict between the “want” self and the “should” self described by Bazerman et al. Materialists tend to value possessions. Previous research suggests that gratitude is negatively related to materialism. Before completing an ego-depletion or control task, we measured participants for materialism and gratitude. After, participants completed a money allocation task between two want and should categories. Replicating previous research, materialism and gratitude were negatively related,  $r(34) = -.44$ ,  $p < .05$ . In the allocation task, males contributed more to things they wanted,  $t(32) = 3.20$ ,  $p < .01$ , whereas females contributed more to charity,  $t(32) = 2.65$ ,  $p < .05$ . Implications for the interaction of ego depletion with individual differences in gender, materialism, and gratitude on allocations to charity and wants will be discussed.

**Sijin Ren- Chemistry and Austin Jameson - Biological Sciences****Mentor: Wafaa Fawzy*****Extraordinary Strong Interactions between Nucleotide Bases and Reactive Species***

Inside DNA and RNA, nucleotide bases form bases pairs (BP) that are held together by hydrogen bonding, stabilizing the DNA/RNA structure. Free radicals produced in biological systems may interact with those nucleotide bases. Disruptions of DNA/RNA functions may be caused by such interactions, so an understanding of these interactions at the molecular level is crucial. In this work, we have investigated intermolecular interactions between uracil (U) and each of the fluoride ion, superoxide anion, and the hydroxyl radical. Interactions between cytosine(C) and the fluoride ion were also studied. Our preliminary results suggest the fluoride-uracil ion complex behave similar to superoxide-uracil ion complex, i.e. the reactive species selectively bind to a specific hydrogen atom in the uracil ring. On the other hand, the OH radical abstracts a specific hydrogen atom from the the uracil molecule and form water. Results of the studies on the fluoride-cytosine ion complex showed that fluoride ion is able to interact with multiple positions in the cytosine molecule and form stable complexes. These results suggest that such strong interactions between nucleotide bases and reactive species may play a major role in disrupting the RNA/DNA functions.

**Kayla Reynolds – Communication Disorders, Anita Spaulding – Recreation & Leisure, and Jordan Roberts – Criminal Justice**

**Mentor: Corky Broughton**

***Murray Calloway County Animal Shelter***

Throughout the semester we have gone to the local animal shelter to volunteer. At the shelter we spent time socializing, and taking care of the animals' everyday necessities.

Examples include walking and playing with the animals, as well as grooming and feeding them. We also helped influence potential pet owners to adopt some of the animals. This whole experience has been rewarding in that it has made each of us appreciate our own pets more and value the time we spend with them.

**Kristen Trenis Reynolds – Geoscience: Environmental Geology**

**Mentor: Amanda Keen-Zebert**

***Quantification of the Historical Sediment Transport Capacity of the Buffalo National River***

In order to identify and quantify changes in historical sediment regime on the Buffalo National River (BNR), an analysis of the the grain size distribution of the modern gravel bar and river terraces throughout the watershed was conducted. The surface grain size distribution of sediments deposited by rivers, reflect the hydrologic conditions at the time of deposition. Located in the Ozark Plateau region of northern Arkansas, the BNR watershed is characterized by a sequence of terraces that were deposited as the channel incised. The BNR has been preserved as a National Park for the past 40 years and provides an ideal study area to investigate fluvial processes in a location that is minimally affected by anthropogenic activities. In quantifying changes in the historical sediment load, this study aims to contribute to a better understanding of the geologic heritage of the region and the park. This research provides unprecedented data necessary for a rigorous analysis of grain size distribution of the modern channel and terrace sediments. Common statistical measures were used to make comparisons between modern and historical terraces in order to discover fluctuation in the sediment load over time and downstream trends throughout the watershed.

**Callie Rezek – Liberal Arts**

**Mentor: Barbara Cobb, Kathy Callahan, and Lillian Daughaday**

***The Elizabethan Period as a Transitional Era in English History***

England during the reign of Queen Elizabeth I was an era of early transition in gender, class, politics, and religion. These changes and their impact on socio-economic standing laid the groundwork for later changes in the country that carried revolutionary impact. Analysis of both primary and secondary sources provides evidence for the Elizabethan period as a transitional period in terms of class and status, conflict, religion, gender, and politics. By applying different sociological theories to individual relationships and changes in Elizabethan England, we recognize that the changes occurring in Elizabethan England were early precursors to later events, such as the English Civil War, Industrial Revolution, and Women's Suffrage.



**Gary Rhea – Political Science**

**Mentor: Ann Beck**

***The Effects of Political Systems on Incumbency Over the Last Three Elections in Three First World Countries Using Legislative Bodies***

Using the election results from the legislative bodies of Canada, The United Kingdom, and The United States I determine if the size of a political system has an effect on the overall incumbency rates that are found in the country.

**Chris Ringstaff – Psychology**

**Mentor: Corky Broughton**

***Student Government Counsel***

I have done a poster over the student Government council that meets in the Curris Center on Wednesdays. They seek to provide the best interest of the student body as a whole. They are a group of chosen students who discuss the issues and questions that students find a problem with or think that will improve the campus of Murray State. My poster shows the rolls of the leaders of the council as well as the audience. It also shows the importance of the council and how it helps bring out the voice of the student body. The council is run as a regular court system with a group of selected officials that lead. My poster has been created to give the most respect and truthfully show their important role in Murray State University.

**Jonathon R. Rowland – History**

**Mentor: Choong-Nam Kang**

***Upheaval in Egypt & It's Effect on Israel Relations***

This past year has seen a multitude of political, economic, and social upheaval in areas of North Africa and the Middle East. Popularly known as the “Arab Spring” these revolutions in the nation states of Tunisia, Egypt, Libya, and Syria have thrown established regional power structures into disarray. My presentation will specifically analyze the the political, economic, and social revolution in the nation state of Egypt and its affect upon relations with its regional rival Israel. My presentation will discuss the following questions. Has the revolution in Egypt thrown off the balance of power between these two major regional powers? If so, will this power vacuum increase the likelihood of decreased cooperation and increased chance of international conflict within the region? These questions are imperative to ask because the future state of relations between these two rival powers will undoubtedly affect US foreign policy, with Israel being the United States most important ally in the Middle East and Egypt being the most important Arab Ally in the Middle East. With this region of the world also being a major global energy supplier, it is important to the global community that the future relationship of these two powers are understood.

**Nissa Rudh – Biological Science**

**Mentors: Michael Flinn and James Hereford**

***Identification of Sound-Producing Freshwater Invertebrates in Recordings using Digital Signal Recognition***

Communication in aquatic insects has been documented in many different taxa. However, little research has been done on the applicability of sound for biomonitoring in freshwater habitats. Using a hydrophone and digital field recorder, we explored the ability to record and differentiate freshwater invertebrate calls using signal recognition. Three study species in the aquatic beetle family Hydrophilidae displayed extensive calls over wide frequency ranges. Recordings were labeled according to sound type and analyzed using a Fast Fourier Transformation in MATLAB. Using features from a generalized call and generalized noise, we created an algorithm which could distinguish between a beetle call and white-noise in half-second intervals. Our classifier algorithm shows that a computer can differentiate between a beetle call and various background noises with a 95% correct classification rate when fed a 35 minute test file containing 4090 half-second intervals. Current work has focused on incorporating more invertebrate calls to our classification system. This could be useful for developing a biomonitoring index based on aquatic invertebrate sounds.

**Kristen Ruga – Psychology**

**Mentor: Daniel L. Wann**

***Cohesion Among Sport Fans in the Athletic Arena Setting***

Social cohesion refers to the degree of interpersonal attraction among a group's members (Wann, 1997). There can be varying types of cohesion such as; unity cohesion which is the degree of interpersonal attraction to the people in one's surroundings, and friend cohesion which refers to the amount of interpersonal attraction between friends of a social group. Cohesion can impact an array of behaviors. Primarily for this study: intent to return to subsequent college basketball games and enjoyment of contest. Participants were recruited at the Murray State Men's Basketball game on February 9, 2012. They were asked to complete a questionnaire packet consisting of three parts; a pregame survey, a halftime survey, and a postgame survey. A usable sample ( $n = 102$ ,  $M$  age = 33.63 years,  $SD = 15.03$  years) provided empirical evidence for researching factor influences on fan cohesion, intent to return to subsequent games, and overall enjoyment. Team identification and affiliation were the only two individual predictors that were significant for unity cohesion ( $p < .01$ ). Affiliation was the only significant individual predictor for friend cohesion ( $p < .01$ ). Team identification level was the only predictor for intent to return to another game ( $p < .001$ ). Unity cohesion and affect were the two independent predictors for enjoyment ( $p < .02$ ). The game used for data collection was the game in which Murray State University (the only undefeated team in the Nation) lost to Tennessee State University. The rare form of this game will lead to subsequent research.

**Kristen Ruga – Psychology**

**Mentor: Jana Hackathorn**

***Measuring Cohesion: Validating the Generalized Cohesion Scale (GCS)***

Current measures of cohesion are inadequate and leave researchers searching for a way to more accurately measure cohesive units. Many current scales explain relationships based on surroundings and various other categories. The current research has begun the path to developing and validating a new measure of cohesion, the Generalized Cohesion Scale (GCS). Results of a factor analysis indicate that the current scale of 8 items contains two subscales: unity and ingroup cohesion. Additionally, findings suggest the reliability of each item is adequate (Cronbach's alphas range from .80 and .97). Results provided evidence of structural validity. Implications, as well as future directions, will be discussed.

**Tricia Ladd Rushing – Biological Science**

**Mentor: Leon Duobinis-Gray**

***Parasite prevalence in the marbled salamander (*Ambystoma opacum*), the eastern newt (*Notophthalmus viridescens*), and the slimy salamander (*Plethodon mississippi*) in Western Kentucky***

The purpose of the project is to assess parasite prevalence, abundance, and diversity between three species of amphibians commonly found in Western Kentucky: the marbled salamander (*Ambystoma opacum*), the slimy salamander (*Plethodon mississippi*) and the eastern newt (*Notophthalmus viridescens*). Parasite prevalence and diversity is believed to vary between species of amphibians and mean parasite abundance within individual specimens is predicted to increase with increasing body size, as well as varying between species of amphibians. Characteristics of preferred living environments, life history traits, and breeding patterns will likely prove the most influential in trends of parasite infestation, as parasite infestation rates are greatly impacted by what the amphibian is exposed to and consumes. Samples of the three species of salamander were collected from the Blood River and New Concord areas of West Kentucky. Salamanders were measured, weighed, and dissected and any parasites found on the surface or within the body cavity of the salamander were isolated and preserved for identification. Parasites were then identified down to genus and species. Results will be analyzed to identify any trends between or within salamander species, sex, and size.

**Keely Rust – Liberal Arts****Mentors: Barbara Cobb and Cynthia Gayman*****The Benefits of a Nationwide Montessori Approach***

What do the founders of Google, the founder of Wikipedia, Thomas Edison, Mr. Rogers, and Sean "P Diddy" Combs have in common? Besides having an impact on people around the world, they are either alumni or strong advocates of Montessori education. Montessori is an alternative method of primary and elementary education pioneered by Maria Montessori, one of Italy's first female physicians, and is based upon the child's drive to learn independently through aid of a trained Montessori instructor. Larry Page and Sergey Brinn, the founders of Google, credit their personal success and that of the Google search engine and empire to their time in the Montessori Classroom, specifically their ability to exercise their creativity and the ability to be self-starters. The purpose of this research is to pinpoint the ideas and techniques from the Montessori philosophy that are most easily transferrable to the American public school system. Montessori students are given the freedom to make more choices both socially and academically, are in turn are given more opportunities to learn and show respectful behavior to their classmates and teachers, and are expected to learn lessons in traditional subjects like reading, writing, and arithmetic as well as practical life lessons such as folding, pouring, and serving. By implementing Maria Montessori's Whole Child approach nationwide, America may start to see more self-starting and well-rounded citizens emerge.

**Tyler Saltsman – Recreation & Leisure****Mentor: Corky Broughton*****West Kentucky Mentoring***

My volunteering hours took place at West Kentucky Mentoring under the supervision of Mrs. Suzy Crook. I chose to do my volunteering at this establishment because I was very interested in her program when she came and spoke to my YNL 351 class one Tuesday night. She told us a story of a young man who turned his troubled life around because of the program, this moved me to participate. While I was at West Kentucky Mentoring I was a help mate to Suzy in her office. A few of my main projects were rearranging her offices, and recycling old ink jet cartridges. I would pack the old cartridges in a box and then they would be recycled, in turn West Kentucky Mentoring received a check. The main reason I chose to volunteer at this establishment is because I someday want to mentor a child at an Elementary school in Murray. I am a Rec and Leisure major so I figured I should go ahead and start my process to becoming a mentor now. This could only benefit me in finding a job later on down the road. This experience helped me realize how a little effort can go a long way. I want to be able to influence troubled youth to see that they too can have a bright future. This organization will eventually give me a chance to do just that.

**Caroline Schmidt and Caitlin Nichols – Geoarchaeology**

**Mentor: Anthony Ortmann**

***Microartifact Analysis on Mound C, Poverty Point Site***

The Murray State University 2011 Archaeological Field School excavated a series of test units on Mound C at the Poverty Point site in northeastern Louisiana. The Poverty Point site is a mound-plaza complex that was constructed in the late Archaic period of prehistoric North America by a non-agricultural society with long-distance trading networks. Little is understood about the hunter-gatherers that built this site, but even less is understood about the activities that took place on Mound C, or Dunbar Mound. This mound is the only earthwork located next to the local bayou and within the artificial plaza and a series of six concentric ridges at the site. The artifacts excavated at this mound differ from those excavated from believed domestic areas, prompting questions about the function of the mound and if that function changed over time. Microartifact samples, or artifacts less than 4 mm diameter, were collected from the Mound C construction floors. Each sample was processed, analyzed and sorted. Due to the lack of information derived from larger artifacts excavated from Mound C, microartifact analysis will possibly provide more information about the activities that took place on Mound C and how those activities related to the overall Poverty Point site.

**Michael E. Shepherd Jr. – Political Science**

**Mentor: Ann Beck**

***The Effects of Campaign Spending on Southern Gubernatorial Elections: 1990-2009***

Based upon the findings of V.O. Key and Earl and Merle Black on the significance of “Friends and Neighbors” voting (voting according to the relative location/distance between a voter and a candidate’s hometown) in Southern Gubernatorial elections, I will examine the significance, if any, of campaign spending on election results in Gubernatorial Elections in the South. My central research question is, if “Friends and Neighbors” voting is a significant predictor of the voting behavior of Southerners, does spending by campaigns have a significant impact on vote share within elections in the South? Using a dataset of campaign expenditures of Gubernatorial campaigns from 1990-2009, prepared by the Gubernatorial Campaign Finance Database, I will test the significance of campaign expenditures on election results in Southern Gubernatorial elections. After performing a statistical analysis of the data, I expect to find that campaign spending is not a significant predictor of total vote share in Southern Gubernatorial elections.

**Taylor Sheridan – Nutrition / Dietetics**

**Mentor: Corky Broughton**

***Mills Manor Health and Rehab***

I went to Mills Manor Health and Rehab in Mayfield, Kentucky. While I was there I volunteered and worked with the staff. During my time there, I found out a lot of information about the facility and what set them away from other nursing homes. My poster includes a lot of information that I obtained from the staff.

**Zachary Siegel – Psychology**

**Mentor: Paula Waddill**

***Kinesthetic Prototypes in Navigation***

Prototypes are abstract generalizations of a concept or category that we use every day in order to learn and apply new concepts. Researchers have investigated prototype formation for visual stimuli like dot patterns (Posner & Keele, 1968) and faces (Solso & McCarthy, 1981) as well as kinesthetic stimuli like simple, guided hand movements (Solso & Raynis 1982). They have found that, when given sufficient category exemplars, people implicitly form a prototype that they then use to guide their later decisions and classifications for that category. The current study extended these investigations to a more complex type of experience: navigation. During navigation we create mental maps of the environment. We use these mental maps in order to find our way at a later time or to combine several routes in order to create a new path, usually a shortcut. This study investigated whether prototypes would be formed during route navigation or if learning would be primarily guided by remembering the individual routes themselves. This study also investigated whether or not formed during walking would affect performance on a recognition test of written maps of the routes.

**Kim Simmons – Liberal Arts**

**Mentors: Barbara Cobb, Paula Waddill, and Micheal Bowman**

***Creating a Secure and Memorable Password: An Integrative Analysis***

The science of secrecy has a long history. Cryptography, or the science of secret writing, has been firmly entrenched in human tradition and continues to play a large role in our daily lives. Technology has become more widespread and, with it, the use of password creation as a way to protect information. Password use for verifying credentials is widely used; however, there is a trade-off between a strong password and a memorable one. Passwords that are easily remembered are not strong and those that are memorable end up being cracked easily. The purpose of this project was to examine the research within information technology about security and password creation while investigating the literature in psychology about memory and its constraints. Based on the review of the literature, a model for creating a secure and memorable password is presented, including the process by which the model was developed.

**Kim Simmons – Liberal Arts**

**Mentor: Paula Waddill**

***Language and Its Effect on Behavior: Verb Aspect and Its Influences***

Can the language we use to describe a behavior affect our motivation to continue that behavior? Hart and Albarrac'n (2009, Exp. 2) reported that describing an anagram task using the ongoing simple past tense (I was solving anagrams) increased the reported willingness to return to that task more than describing it in the simple past (I solved anagrams). They concluded that unlike the simple past that represents a task as already completed, the ongoing past represents the task as unfinished and activates completion-related cognitions. The current study extended that research to include the ongoing present and ongoing future tenses and measured motivation via a rating scale rather than by a dichotomous choice. Since the ongoing past had previously produced greater willingness to resume a task, it was predicted that the ongoing future (I will be solving anagrams) should also increase motivation because it specifically represents the task as needing completed later. The ongoing present (I am solving anagrams) might not increase desire, however, because it represents a task as being in process without a clear implication that completion is necessary. Results indicated that compared to the ongoing present, using the ongoing past or the ongoing future to describe the process of solving difficult anagrams significantly increased desire to return to that task.

**Ryan Slaton – Organizational Communication**

**Mentor: Corky Broughton**

***Summary of Service project Need Line***

The project which I did is a summary of the organization need line and how it helps people who don't have help. Also description of need lines mission and such.

**Jeromy Slayden – Agricultural Systems Technology**

**Mentor: Corky Broughton**

***Family Fitness Feels Fantastic***

Hello, my name is Jeromy Slayden. I chose to do my service learning at Family Fitness Center in Murray, Kentucky. At the fitness center, we showed individuals how to use the new stimu-light program. This program uses light to help the individual sweat while the treadmill elevates. This amount of sweating helps eliminate toxins in the body and cuts body fat. I also helped individuals learn how to use multiple work out machines throughout the gym. I also maintained and cleaned the facility.

**James Smith – Geoscience**

**Mentor: Haluk Cetin**

***Using Social Media to aid Emergency Management***

This project shows how Social Media can be used by Emergency Management personnel to crowdsource a local population in order to gain and maintain real-time information regarding natural and manmade disasters. By utilizing popular applications, such as Twitter and Facebook, the traditional mentality and methods of Emergency Management have been effectively eliminated. This project develops a three tier framework for emergency response; information, location, and visualization. These aspects, when combined, effectively shift the traditional model from static to a more dynamic state. When a disaster takes place the goal of this project is to allow the general public to communicate information through a social media; twitter is the preferred method for this. Harvesting “tweets” allows emergency management personal to development databases of that information. Those events can then be geocoded allowing for their spatial locations to be referenced. Once the information and location portions have been established they will be combined within an interactive map; allowing the information to be visualized. The end result allows anyone to better understand the “what” and the “where” of a disaster in order to make better informed decisions.

**Ramona Stalls and Nicholas Vaughn – Youth and Nonprofit Leadership, and  
Melanie Thomas – Business Administration**

**Mentors: Roger Weis and Robin Esau**

***Take a Stand...Help Your Neighbor***

The project was designed to collect toiletry items to support 10 needy families in Calloway County to be distributed through Need Line. Collection boxes were distributed to local businesses who gave advanced permission for the collection to take place on their site. The project did not meet the desired goal, however, anonymous contributors donated money to purchase additional items and we were still able to have a positive impact on the community.



**Chris Staten – Recreation and Leisure**

**Mentor: Corky Broughton**

***Family Fitness Center***

I was involved in maintaining the cleanliness of the Family Fitness Center in Murray, Kentucky. I cleaned the fitness area and outside in the parking lot. I also spot the people that needed physical help with their certain exercise for safety.

**Jordan Steiner – Liberal Arts**

**Mentors: Barbara Cobb and Julie Robinson**

***The Effect of Online Piracy on the Music Industry and the Consumer***

As computers become more accessible to a greater number of individuals, the legal and illegal downloading of copyrighted music grows. This growth has led to an unprecedented showdown between those who pirate, or illegally download music, and the music industry which seeks to profit from the legal downloading of their product. The losses to the music industry occur in the billions of dollars each year due to online piracy. This loss of revenue is being recouped by higher prices at the expense of all consumers and, in addition, using the respective international court systems to pursue those who illegally download music. Through studying the recent history of music piracy, by exploring the motivations of both the music industry and the individual, and by reviewing solutions sought to quell online piracy, we recognize the damaging effects online piracy has on the individual consumer as well as the music industry itself.

**Steven Stewart – International Affairs and Spanish**

**Mentor: Choong-Nam Kang**

***Measuring the Effectiveness of the United Nations' Peace-keeping Operations***

In my research, I discuss the operations of the United Nations, as well as their role when dealing with international conflict between two or more international actors. The United Nations has separate actions they may take to attempt to prevent war, including peacekeeping actions and Security Council. I focus my research on the question of how effective are the United Nations' international operations and their roles in preventing war in the international environment through peacekeeping and Security Council related action. I use specific case studies, along with empirical evidence and objectivity to reach a conclusion of the measure of their effectiveness.

**Elizabeth Tarter and Cara Bohrman – Biological Science**

**Mentors: Maeve McCarthy and Chris Mecklin**

***Ubiquity of the Michaelis-Menten Model: Applications Across Disciplines***

Mathematical models are beneficial tools in effectively analyzing the dynamic biological world. The Michaelis-Menten model is a classic example of how mathematics can further the understanding of how the biological world operates in numerous fields such as pharmaceutical studies, biochemistry, agriculture, nutrition, biodiversity, etc.

Manipulating the original model encompasses diverse biological applications including the use in artificial immune systems. In measuring the effectiveness of artificial enzymes, this model now poses possible solutions to cocaine overdose and addiction treatment. Overall, the Michaelis-Menten model exemplifies how the biological world, including mathematics, is constantly changing and aiding in the understanding of its dynamics.

**Matthew Thomas – Political Science**

**Mentor: Ann Beck**

***Will Victorious Gubernatorial Challengers Spend More in Their Subsequent General Reelection Bid Between 1995-2010?***

The lack of research in gubernatorial elections only means there is room for further research, and in this case, incumbent reelection bids. I conduct a t-test of a difference of means and Pearson's correlation analysis of campaign spending of gubernatorial victors in the past four elections of 48 states ranging from 1995 to 2000, and analyze per capita spending. While campaign spending itself is not significant, the actual per capita is. I also find that candidates are almost always the victors in their second election, when they are the incumbent. It would be beneficial to for states to have programs that can better level the playing field between incumbents and challengers, at least monetarily-wise.

**Meg Thompson – Liberal Arts**

**Mentors: Barbara Cobb, Lara Homsey, and Kathy Callahan**

***Women in Archaeology: Past and Present***

In the course of studying the cultures and lives of past peoples, archaeologists must sometimes go to extraordinary lengths to obtain data, such as traveling to distant locales and working in harsh conditions. During the late 19th and early 20th centuries, this profession would certainly not have been deemed suitable for women. At that time women were considered to be the fairer, and therefore weaker, sex and better suited to pursuing domestic lives than professional ones. However, there were women during this period who decided to become archaeologists rather than follow a more traditional path. These pioneers include women such as Amelia Edwards, Gertrude Bell, and Dorothy Garrod. This was a time of significant social change, and these women were some of the first to take advantage of growing opportunities for women. In recent years, research has shown that the number of women working in archaeology is growing. However, they still face many challenges, especially in terms of hiring practices, salaries, promotion rates, and productivity. The goal of this research is to contextualize the current climate for women working in archaeology by examining the careers of some of the leading female pioneers in archaeology during the Victorian period. Analyzing the challenges faced by these Victorian women and the way they overcame those obstacles sets the stage for appreciating those encountered by modern female archaeologists. By understanding the historical circumstances, we can better evaluate the degree to which conditions have changed or remained constant for women in the field today.

**Kristen Tinch – Spanish / English Secondary Education**

**Mentors: Mike Waag and Meg Brown**

***American, European and Mexican Perspectives on the Second Mexican Empire (1864-1867)***

The events surrounding the Second French Intervention in Mexico (1861) and the subsequent Second Mexican Empire (1864 - 1867) illustrate the power of the Mexican criollo, or conservative elite class, to deter revolutionized Mexico towards monarchy. Under the influence of the powerful criollo and Napoleon III of France, Austrian Habsburg monarchs Maximilian and Carlota became emperors of Mexico in 1864. In opposition to the imperial forces was Benito Ju'rez, president of the former Republic of Mexico, who is credited with preserving the Mexican republic. This project compares three contrasting points of view concerning these events in Mexican history in order to explore each party's role during this period. From the US-Hollywood perspective is the 1939 film "Juarez" starring Paul Muni and Bette Davis. The European perspective is encapsulated in British historian H. Montgomery Hyde's account, "Mexican Empire: The History of Maximilian and Carlota of Mexico." Finally, this project will explore the Mexican perspective through Rodolfo Usigli's 1959 drama "Corona de sombra."

**Nathan Truax – Geographic Information Systems****Mentor: Haluk Cetin*****Mapping Turbidity of Kentucky Lake Using Landsat ETM+***

Two Landsat Enhanced Thematic Mapper Plus (ETM+) images of Kentucky Lake were used to map turbidity of Kentucky Lake. The ETM+ datasets were collected on September the 17th 2000. Two models, one for each section of the lake (north and south), were created using ERDAS Imagine software. Each individual band (bands 1-5 and 7) collected by the Landsat sensor was stacked. This created a multispectral image of the area. In order to obtain a map of the entire lake, a mosaic of the two images was created to have one continuous image. All land area was blocked out leaving only datasets for the water bodies in the region. In order to create a turbidity map of the lakes the data collected on the lake by the Murray State University Watershed Studies Institute were used.

**Nicole Tuberty – English, Creative Writing****Mentor: Staci Stone*****Girl in the Mirror: Jane Eyre as a Surrogate Mother***

Most girls growing up have a female mentor to guide them into womanhood. Typically, a girl's mother fulfills this role, but if her mother cannot or will not, she oftentimes finds a surrogate mother to be that mentor instead. Many of the female characters in Charlotte Brontë's *Jane Eyre* are looked after by women besides their mothers, and one of the most important examples of this is Jane being hired as governess to the motherless Adèle Varens. Jane herself has never known her mother and instead is raised by Mrs. Reed, Bessie, and Miss Temple, all of whom play important roles in shaping the woman she grows up to be. Because Jane sees a part of herself in Adèle, she goes beyond the normal duties of a governess to become a mother-figure to Adèle and tries to prevent her from growing up in a home feeling like an unwanted outsider, like Jane does. As Jane's relationship with Adèle grows beyond the conventional governess/student relationship into a more maternal one, Jane attempts to give Adèle a better experience with a surrogate mother than Jane had as a child, which ultimately helps Jane come to terms with her own past so she can continue to develop into a happy and well-adjusted adult.

**Mara S. Varvil – Pre-Veterinary Medicine**

**Mentor: Timothy Johnston**

***Differential Gene Expression of the Lux Operon of Vibrio harveyi by mRNA Processing***

Bioluminescence, the ability of an organism to produce light, is utilized in many organisms, such as *Vibrio harveyi*. Bioluminescence is produced by a reaction catalyzed by luciferase, a dimer with alpha and beta subunits encoded by *luxA* and *luxB*, respectively. This reaction is the oxidation of FMNH<sub>2</sub> and aldehyde into FMN, a fatty acid, Water and light. Three other proteins encoded by *luxC*, *luxD*, and *luxE* provide the aldehyde. These five genes are arranged in the *lux* operon in the order: *luxC*, *luxD*, *luxA*, *luxB*, *luxE*. The mechanism by which these genes are differentially expressed has not been studied extensively. The *luxA* and *luxB* genes are expressed at very high levels such that luciferase accumulates to 10% of the total protein in these cells. The other three genes are only moderately expressed, providing and recycling substrate for the bioluminescent reaction. The majority of mRNA has a 3' terminus just downstream of the *luxB* where a region of symmetry exists. In this study mRNA was examined from a log phase culture of *V. harveyi* treated with rifampicin to shut down *de novo* transcription. Samples were taken at fifteen-minute intervals, RNA purified, and *lux* mRNA quantified by a qPCR using primers that amplify RNA upstream and downstream of the stem-and-loop. These data show that *lux* mRNA is transcribed to a terminator downstream of the *luxE* gene and then processed over time to the stem-and-loop resulting in significantly more translation of *luxA* and *luxB* than *luxE*.

**Jonah Waggoner – Nutrition / Dietetics**

**Mentors: Pam Rice and Kathy Timmons**

***Acceptability and Nutritional Advantage of Molasses as a Sugar Replacement***

According to Blomhoff, Carlsen and Phillips's (2009) research, the use of alternatives to refined sugar can add to the cumulative antioxidant content of the diet by replacing refined sugar, and development of recipes and consumer-friendly methods for replacing refined sugar in baking and cooking could increase antioxidant consumption similar to replacement of refined grains with whole grains. Based on this research, I decided to experiment with the acceptability of various sugar alternatives in chocolate chip cookies, namely *truvia*, molasses and blackstrap molasses. I will bake four batches of cookies using the recipe on the back of a Hershey's chocolate chips bag for the control and replace sugar in exact amount for each variable. I will select random numbers for descriptive testing and use a sensory scorecard for color, flavor, and texture and an objective test measuring nutritional quality of each batch. I will also use an affective test for overall acceptability. The test results will be compared to determine the variance between nutritional quality and acceptability.

**Jeremy Vaughn – Economics**

**Mentor: David Brasfield**

***Eco 499 Senior Seminar***

Presentation of Mixed Method Study on the effect of Agriculture Subsidies on per-capita income.

**Matthew Wallace – Zoological Conservation**

**Mentor: Howard Whiteman**

***Estimation of Feral Hog Population Within Murphy's Pond and Their Impact of Tree Frog Numbers***

Feral hogs populations have been on the rise throughout the southern United States as well as expanding northward through Kentucky. Feral hogs have a significant impact on the natural ecosystems as well as causing damage to human inhabited areas. In the Murphy's Pond Wildlife Reserve the hogs have caused much damage to local fauna and flora as well the terrain itself. The appetites of wild hogs result the consumption of most types of small game and forbs. Rooting, wallowing and rubbing tear up the landscape and clear out understory plants by root loss. All of these things have a negative impact on biodiversity in the region. In the summer of 2011 steps were taken to cull the numbers and if possible wipe out the feral hogs. The purpose of this study is to estimate the population of hogs before and after culling actions and compare those numbers to data from the Murphy's Pond Tree Frog Survey. The population estimates will be modeled after the Kipuka Ki model. Twenty transects were taken through the tree frog sampling area using the existing grid set up by that survey. Along those transects I looked for signs of pig habitation such as wallow pits and the rubbing trees that accompany them as well as rooting locations. Habitation signs were categorized using the Kipuka Ki system of Fresh (F), intermediate (I), or Old (O). Once sufficient data has been recorded I will see if there is a correlation between Tree frog population fluctuations and estimated wild hog numbers.

**Ryan T. Walls – Organizational Communication**

**Mentor: Corky Broughton**

***Need Line in Murray***

Within my poster project I will be describing the daily responsibilities that were carried out each visit. Information about the organizations development, progression, and effectiveness will be displayed. I will also inform viewers about my personal passions about doing work within the organization and what it means to me.

**Ruojing Wang (Audrey) – Organizational Communication**

**Mentor: Tina Coffelt**

***Comparing and Contrasting Relational Closeness and Distance between Chinese and Americans***

As essential constructs in the science of relationships, relational closeness and distance have been examined in many studies. Previous research, however, failed to inquire about cross-cultural influences on relational closeness and distance, despite the notable influence of cross-cultural relationships. In particular, relational affiliation patterns of the American and the Chinese cultures remain to be uncovered. The purpose of this project was to compare and contrast the relational closeness and distance between Chinese and Americans in order to understand the similarities and differences between each other and reduce cultural clashes. This study answered the following question using qualitative research methods: How are expressions of relational closeness and distance between Chinese and Americans similar and different? Qualitative interviews were used to answer the research question. Participants included 25 Chinese and 25 Americans. After analyzing transcripts of the recorded interviews, themes emerged that (a) justified relational closeness and distance among Chinese, (b) justified relational closeness and distance among Americans, (c) compared relational closeness and distance between Chinese and Americans, and (d) contrasted relational closeness and distance between Chinese and Americans. Communication between Americans and Chinese is inevitable and intense in today's global marketplace. With this study, Chinese students and scholars coming to Kentucky can learn about the distinct American culture and adapt to the new life with greater ease. Domestic American students and professors can also better prepare themselves for living with Chinese students and colleagues.

**Chelsea Watkins – Dietetics and Sarah Sunderman – Nutrition**

**Mentor: Kathy Timmons**

***The Acceptability of Blueberry Muffins using Flour, Gluten Free Product and Homemade Gluten Free Mix***

To see if blueberry muffins made with flour, purchased gluten free mix, and homemade gluten free mix have different tastes, texture, volume, tenderness, and moisture. Also, to compare nutritional facts of the muffins for people who have celiac disease and the people choosing gluten free products without celiac disease.

**Kathleen Watson – Political Science**

**Mentor: Ann Beck**

***The Help America Vote Act and Effects on Kentucky***

This presentation explains that the Help America Vote Act (HAVA) will decrease the number of Election Day related-errors. By looking at the problems in the voting process and how HAVA requirements are countering those problems, the research suggests that HAVA is in fact, improving the process. The focus of this paper is on four of the main issues that HAVA addresses: the Election Assistance Commission, Voting Machines, Disabilities, and Statewide Databases. Three major research strategies are used: (1) a secondary analysis (2) a quantitative analysis of country-wide voting data and (3) a case study. Data have been collected from archives, newspapers, and published reports. Why HAVA was enacted and the recent history leading up to it is examined. A basic explanation is given of what HAVA is and what the requirements are that it brings forth.

Research is done on the changes that occurred as a result of HAVA in the above categories, followed by an in-depth look at the problems that still exist and what is being done to fix those problems. A brief case study is conducted of Kentucky and the problems that it faces and how HAVA requirements will also be able to accommodate those issues. Last, a critical look is taken at what needs to be accomplished before all HAVA requirements are met and what research can still be done to help with the process. When all HAVA requirements are met, the number of problems in the Election Day process will decrease.

**Thomas Werfel – Engineering Physics**

**Mentor: Halim Ayan**

***Remotely Ignited, Flexible and Non-thermal Micro-plasma Jet for Endoscopic Surgery***

Biomedical applications for atmospheric pressure plasmas (APPs) are increasingly sought after as researchers continue to present promising results of their utilization in bacterial sterilization, tissue regeneration, and cancer therapy, among other applications. In this study, a novel flexible and cold atmospheric pressure micro-plasma jet with potential for use in endoscopic surgery is proposed. The micro-plasma jet system was designed with flexible, biocompatible Tygon S-54-HL tubing. Furthermore, the system is designed to introduce the high voltage source 25 cm from the micro-plasma jet tip (25x farther than any previously reported system) and generate the cold plasma remotely. These design factors are crucial developments in allowing for utilization in endoscopy as previous designs have incorporated non-flexible tubing or introduced high-voltages less than 1cm from the micro-plasma jet tip. Electrical characterizations show the system to produce its optimum plasma plume at 28.5 kHz frequency, 19.2-22.6 kV peak voltage, and 15.33% negative duty cycle. At these parameters, the average power output in the plasma is in the range of 3.6-6.2 W. This output power measurement allows for the determination of treatment times and describes the effective dosage received by patient exposure to the plasma plume. Optical Emission Spectroscopy was performed to identify the active species present within the plasma plume. These spectroscopy results are also discussed here within, and both optical and electrical characterizations help to accurately describe the system. This novel micro-plasma jet system shows ample potential for incorporation into contemporary endoscopic procedures.



**Thomas Werfel – Engineering Physics**

**Mentors: Halim Ayan and Hongmei Li**

***Proximity Activated Smart Nanoparticle for the Delivery of siRNA to Metastatic Tumor Cells***

Permeability-glycoprotein (P-gp) over expression in breast cancer cells desensitizes the tumor to chemotherapeutics and can lead to multiple drug resistance (MDR), significantly worsening patient chance of survival. siRNA presents a powerful tool for silencing P-gp, but in vivo delivery barriers such as endosomal trafficking and tumor-specific targeting must be overcome to make the treatment feasible. MMP-7 plays a significant role in tissue remodeling and cell migration, and its over expression is a hallmark of tumor progression into metastasis. In this study, an MMP-7 responsive peptide and polyethylene glycol (PEG) cloak were incorporated onto a previously designed smart polymeric nanoparticle (SPN). The cationic corona of the SPN can trigger nonspecific cell uptake in normal tissues. The PEG cloak shields the positive surface charge of the SPNs until being cleaved in MMP-7 rich tumor environments, allowing proximity activated delivery of siRNA. Proximity activated SPNs were characterized by dynamic light scattering (DLS) and have a diameter of ~80nm. Zeta potential measurements of the PEGylated SPNs showed a 3-fold increase in surface charge from 4.1 mV to 12.6 mV after being exposed to MMP-7 over time. These preliminary results indicate the potential of this proximity-activated carrier to enable tumor-specific delivery of siRNA in order to overcome MDR and re-sensitize breast cancers to standard chemotherapeutic regimes.

**Dora White and Madolyn Parker – Dietetics**

**Mentor: Kathy Timmons**

***Acceptability of Chocolate Pudding Using Various Purred Fruits as a Substitution for Milk***

The purpose of this study was to determine the palatability and overall acceptability of chocolate pudding using pureed avocado, banana, and pumpkin as a replacement for the milk ingredient, and to compare their sensory attributes with those of a traditional chocolate pudding. The variables are: avocado, banana, and pumpkin. The product is lactose free chocolate pudding. The objective testing is: Line spread test, which is a measure of flow of a viscous liquid by determining the spread of a measured amount of a sample in a specified length of time. All puddings will be at the same temperature for the test to control for accurate results.

**Brandon Wicks – Physical Education**

**Mentor: Corky Broughton**

***Track and Field***

I recently started doing voluntary work at Murray High School helping out their high school and middle school track team. I have a lot of knowledge about track so the coach said that I could help him out around. We have done things such as hurdles and helped come out of blocks. The coach told me with my help his team has gotten better.

**Robert Willmoth – Elementary Education**

**Mentor: Corky Broughton**

***Hester Athletics***

In the past couple of months I have worked with Isaac Caldwell, Athletic director of Hester College at Murray State University. I worked as a second in command to Mr. Caldwell. He mentored me on how to become a good Athletic Director because hopefully next semester I will take over his position as Athletic Director. I worked in conjunction with Mr. Caldwell to set up games for the men and women's volleyball teams. I also helped with general caretaking of the uniforms and other equipment for the teams. I coached a few of the men's games and facilitated practices for them. I also helped to coach the girls B team, which included helping to set up the rotation of the team and mental support. I also brought snack for the Girls B team. I helped to organize the men soccer team by assisting in selecting the team at tryouts and organizing practices.

**Charles A. Willson – Political Science**

**Mentor: Ann Beck**

***The Kentucky Triptych: The Art of Democratic Dominance in the Commonwealth***

The purpose of this research is to identify the causes behind the continued dominance of the Democratic Party in Kentucky state level politics in contrast to the Republican trending of other southern states.. In particular, the focus of this research will center on three factors which account for Democratic partisan dominance; the racial demographics of Kentucky, the closed primary election, and the off year election cycles. The goal of this research is to demonstrate how, through a combination of institutional structures and ethnic makeup, partisan dominance is maintained.

**Ashanti Wilson – Youth and Nonprofit Leadership and Anteneshia Sanders –**

**Psychology**

**Mentors: Roger Weis and Robin Esau**

***Protein Harvest***

This project was designed to collect canned foods which are high sources of protein for Need Line, our local food pantry. We worked in collaboration with the Murray High school student council to coordinate the collection over a two week period. The project was a great success with 615 cans of food donated by the students and delivered to Need Line.

**Sarah Wylie – Liberal Arts**

**Mentors: Barbara Cobb, Kathy Callahan, Cynthia Gayman, and Warren Edminster**

***The Tudor Queens: A Step Toward Feminism in England***

Around 500 years before the Feminist Movement, the Tudor Dynasty reigned over England. Many different queens sat on the throne, from Henry VIII's six wives to the famous Bloody Mary and Elizabeth I. In England's patriarchal society, these women held significant amounts of power and prestige. But it is how these female monarchs used their power, or in some circumstances abused power, that proved either to be steps towards a feminist consciousness, or steps away from it. Most people, including scholars, would not at first conclude that this period included a step toward feminism, but through research it becomes clear that this period saw many significant changes regarding women's power. The Tudor Dynasty included nine queens, some of whom were beautiful trophies on the King's arm, while others were strong reigning monarchs who answered to no one. There are many circumstances to consider when looking at the power these women possessed. Family loyalty, marriage, miscarriages, and favor of the King are just some of the issues that manipulated their ability to possess and retain power. Although these Tudor monarchs would not be described as feminists, the reign of this family may have changed the view of women in England. It is important to look through English history to find roots of the feminist philosophy that eventually fully emerged in the 1900s. Elizabeth I and the other Tudor queens were taking small steps toward the break of feminism that should not be overlooked.

**Yuling Xiong (Alice) – Mathematics and Sewon Park - Statistics**

**Mentors: Maeve McCarthy and Christopher Mecklin**

***Biomathematical Model for Spread Disease***

Epidemic diseases have brought great trouble to humans for millennia, such as measles, smallpox, and H1N1. SIR model describes the transmission process between susceptible, infective and recovery. In model I, we focus on analyzing the realistic meaning of the disease transmission rate  $\beta=0.138$  and the recovered rate  $\gamma=0.46$ . In model II, birth and death rates are added to analyze the spread of disease in a long time period like cholera, and then we compare the equilibrium points between these two models.

**Yuchen Zhang – Chemistry**

**Mentor: Wafaa Fawzy**

***High Level Correlated Ab Initio Investigations on the Intermolecular Potential of the Superoxide-HF Complex***

The superoxide anion radical is the most important diatomic anion which is naturally produced in the atmosphere and in biological systems. The superoxide anion is expected to contribute to the solar energy budget in the earth's atmosphere and to disruption of DNA/RNA functions. Understanding of these activities requires knowledge of the nature of the intermolecular interactions between the superoxide anion and polar/nonpolar molecular species. This work concerns characterization of the nature of intermolecular interactions between the superoxide anion and hydrogen fluoride (HF is a prototype for polar closed-shell molecules). The long range intermolecular potential energy surface (IPES) was examined using highly correlated ab initio calculations. Our preliminary results showed that the lowest energy structure of superoxide-HF complex corresponds to a nonlinear planar geometry, where the hydrogen atom of HF is bonded to one end of the superoxide radical through a strong ionic hydrogen bond. Formation of such a hydrogen bond causes a significant increase in intensities of vibrational transitions of the closed-shell partner in the complex. This result suggests that the superoxide radical forms complexes with other polar closed-shell molecules that may contribute to the greenhouse effect and disruption of DNA/RNA functions.

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