Welcome from President Doug Whitlock of Eastern Kentucky University:

Eastern Kentucky University is proud to participate in the 11th annual *Posters-at-the-Capitol* program because we believe it clearly demonstrates the high quality of our public universities, the tremendous value of public higher education in our Commonwealth and the scholarly and creative achievements of some of our best and brightest students.

The projects represented in this exhibit reflect the collaborative efforts of students and dedicated members of our outstanding faculty – men and women who model a passion for excellence and lifelong learning. As the nurture our students to reach deep within themselves and realize their full potential, these faculty mentors bring great honor to themselves, our University and to the teaching profession.

Undergraduate research is an integral component of the teaching-learning process at EKU, where students are encouraged to explore their full potential. As a “School of Opportunity,” we are committed to providing all our students with diverse educational opportunities that enhance their classroom experiences and develop their intellectual curiosity. Each year, our students’ exemplary work is displayed in a week-long Undergraduate Presentation Showcase. This discovery and application of new knowledge is exciting for the student participants and uplifting to our entire University community.

I applaud all the faculty mentors in the *Posters-at-the-Capitol* program for providing such quality learning experiences for their students. To all the students, I offer my heartfelt congratulations and this challenge: let this experience mark only the beginning of your educational journey and a life committed to personal excellence.

Educator Marva Collins once said, “Success doesn’t come to you – you go to it.” Students, I am pleased to see that already you are living your life by that truth. Congratulations, and keep up the good work!

Welcome from President Michael B. McCall of the Kentucky Community and Technical College System:

The Kentucky Community and Technical College System is delighted to take part in this celebration. I applaud the efforts of the *Posters-at-the-Capitol* Organizing Committee and our university partners in promoting innovative student research and scholarship.

Engaging students in substantive research projects stimulates critical thinking and builds a strong foundation for advanced research and professional development after graduation. Undergraduate research opportunities also provide student-scholars the added benefits of faculty expertise and mentorship. Moreover, college students with solid research skills typically achieve greater educational outcomes and are also more likely to pursue postgraduate studies than those without these valuable skills.
President McCall’s Welcome Cont’d.

I am extremely pleased that KCTCS students will have the opportunity to showcase their accomplishments in the research arena. KCTCS, where higher education begins for most Kentuckians, is committed to improving the quality of life for Kentuckians and the pursuit of applied research is one of the myriad ways KCTCS students can enhance economic development within the Commonwealth. Congratulations to the Posters-at-the-Capitol scholars. I wish each of you continued success on your journey of scholarly achievement.

Welcome from President Mary Evans Sias of Kentucky State University:

The Posters-at-the-Capitol event is a wonderful opportunity for Kentucky’s college students and faculty to annually present their work. When we can get students excited about research, we plant the seed for a better tomorrow.

Students engaged in research gain insight into careers in science and math, and they develop new skills along the way. Undergraduate research gives them an edge in applying for graduate schools and jobs. It is no longer just about a high GPA. Graduate schools and employers look for students who have hands-on research experience.

Students engaged in undergraduate research could become part of the next generation of Ph.D.s and professionals in the competitive fields of science, technology, engineering and mathematics (STEM). Perhaps, they could play a leading role in the next big scientific discovery. The sky is the limit.

Best wishes and much success for another great year of Posters-at-the-Capitol.

Welcome from President Wayne Andrews of Morehead State University:

I am very pleased that the members of the General Assembly will have the opportunity to meet and interact with our undergraduate students participating in the 11th Annual Posters-at-the-Capitol event. These student projects, completed in collaboration with faculty members outside the traditional classroom setting, provide an excellent example of the personal, value-added educational opportunities available at Morehead State University. I take great pride in the high priority that we have placed on faculty-mentored student-engagement activities in basic and applied research, artistic and other creative endeavors, and community and regional stewardship.

In an age of declining budgets, larger classes, and an increasing emphasis on less personal forms of instruction through the Internet, it is critical that we continue to recognize the importance of one-on-one faculty-student mentoring relationships in the educational process.
President Andrews' Welcome Cont'd.

The involvement of undergraduate students with faculty in research, scholarship, and other creative endeavors provides the type of rich academic environment necessary for the development of leaders with the intellectual skills and vision to guide the future social and economic development of our Commonwealth and the Nation.

Morehead State University is committed to the continued expansion of these scholarly opportunities for students in all academic programs through initiatives such as our unique Undergraduate Research Fellows program and our Celebration of Student Scholarship Week.

The 11th Anniversary of the Posters-at-the-Capitol student showcase clearly demonstrates the commitment of Morehead State University and Kentucky’s other public institutions of higher education to faculty-mentored undergraduate research and the pursuit of academic excellence.

I offer my sincere thanks to the faculty mentors who go the extra mile to meaningfully involve students in their scholarship, and my hearty congratulations to these student scholars for their outstanding research and creative accomplishments.

Welcome from President Randy J. Dunn of Murray State University:

This year marks the eleventh anniversary of Posters-at-the-Capitol. Murray State’s involvement in this worthy event is both a testament to our students, who are seeking out these kinds of scholarly activities in growing numbers, and to our University as we all work to provide a greater number of high quality, research-based teaching and learning opportunities for MSU students.

Murray State University places a high premium on programs that promote one-on-one interaction between our faculty and students. Through our Undergraduate Research and Scholarly Activity office and our system of Residential Colleges, Murray State continuously supports faculty-student interaction. By providing our students with these kinds of learning opportunities, Murray State is meeting the objectives of the Kentucky General Assembly by ensuring that our graduates are well prepared for life and work.

I join the Posters-at-the-Capitol Organizing Committee in inviting all of our Commonwealth’s citizens to visit and review the work of Kentucky’s most gifted students. These undergraduates are contributing ideas that are impacting communities and changing lives. Also, Murray State University is honored to play a key organizing role for this event each year. Congratulations to all those students and faculty whose hard work has made Posters-at-the-Capitol possible.
Welcome from President James Votruba of Northern Kentucky University:

Two of the Strategic Goals of Northern Kentucky University are to "Strengthen our commitment to 'up close and personal' as a defining quality of the NKU experience," and to "Expand student participation in undergraduate research and other forms of creative activity as a defining characteristic of NKU." These goals point to the very important role that undergraduate research plays in the fabric of our university life. Direct interaction between faculty and students in undergraduate research and creative activities results in development by the students of critical thinking and analytic skills as well as oral and written communication skills needed to present their work. These interactions also foster the deep intellectual bond between faculty member and student that is a defining characteristic of our students' education.

We are proud and pleased to present our students' work at this, the eleventh Posters-at-the-Capitol. We have observed the growth of this event and conclude that the quality of work has increased each year. These posters and presentations are the culmination of much effort by our students and their faculty mentors and exemplify the high quality work by undergraduate researchers at Northern Kentucky University. We know that the students displaying their work here are future leaders in the development of the intellectual infrastructure of the Commonwealth and we are therefore confident of Kentucky's future.

Welcome from President Eli Capilouto of the University of Kentucky:

Undergraduate research – the creation of knowledge – is so closely tied to our mission as the state’s flagship institution. The interplay between research in the lab and academic preparation in the classroom provides a rich educational experience for our students.

Now in its 11th year, Posters-at-the-Capitol is a welcome opportunity to recognize undergraduate research as an essential part of the educational experience; one that benefits students, faculty and, ultimately, the Commonwealth. Our students work side-by-side with world-class researchers and experts in their field, thereby enhancing, through practical application, what they learn in the classroom. Through undergraduate research, students experience personally the intellectual passion that is the foundation of scholarship at the University of Kentucky.

For faculty, there is no more rewarding teaching opportunity than to serve as a mentor for an eager young mind. They build unique connections with students that may inspire their scholar-protégé to commit their career to critical research. Igniting curiosity in the next generation of leaders enriches our faculty’s experience and is at the core of our noblest profession.

The University of Kentucky is deeply committed to a culture of undergraduate research and creative discovery for the inherent value it brings to the Commonwealth of Kentucky. By engaging in innovative research activities, we position ourselves to address our state’s most intractable problems and create a better future for all Kentuckians.
Welcome from President James Ramsey of the University of Louisville:

The University of Louisville has a legislative mandate to be a “premier metropolitan research university.” That means quality research is at the top of our agenda and involving students in that research is part of our mission. In many cases undergraduate students, including sophomores and juniors, are participating in research at UofL. They’re getting a chance to work on cures for cancer, heart disease and other health care dilemmas. They’re also working on solving social and energy problems. Our students are working with some of the top researchers in the country, UofL faculty members who are mentoring them and exposing them to “real world” problems and solutions. Through the Posters-at-the-Capitol program, our undergraduate students share their experiences, ideas and discoveries with Kentucky’s elected leaders. The Posters-at-the-Capitol program gives our students a chance to show off their great work while validating UofL’s commitment to their educational experience. It’s proof to our government officials that the state’s financial support of public universities and research and development is paying off.

The University of Louisville is proud to participate in the Posters-at-the-Capitol program. We’re also proud of our students. We hope you will take a look at their work and ask them questions. We think you’ll find they’re smart, talented and ready to do their part to improve the quality of life for all Kentuckians.

Welcome from President Gary A. Ransdell of Western Kentucky University:

Western Kentucky University takes great pride in the fact that highly credentialed faculty from a wide array of academic disciplines involve undergraduate students in meaningful research activities. The comprehensive university in America has as its primary responsibility, the applied use of its intellectual capacity to identify and solve problems that exist in its region. At WKU, scholarly collaborations utilize the concepts learned in classrooms and laboratories to prepare students for the workforce and graduate/professional schools. WKU research projects also address issues important to constituents outside the University, thereby impacting the social and economic development of our community, counties, state, and nation.

As in previous years, it is gratifying to see the number and diversity of student scholars, along with their faculty mentors participating in this eleventh annual Posters-at-the-Capitol project. It is vitally important that our legislators meet these students and witness the tangible benefits accruing from ongoing student research at our universities and its potential impact on an improved quality of life for all Kentuckians. WKU is proud to participate in the Posters-at-the-Capitol project.
Welcome from the Posters-at-the-Capitol
Organizing Committee

David Eaton
Jody Cofer
www.murraystate.edu

Darrin Smith
www.eku.edu

George Antonious
www.kysu.edu

Bruce Mattingly
www.morehead.edu

Dan Curtin
www.nku.edu

Diane Snow
Evie Russell
www.uky.edu

Pamela Feldhoff
www.louisville.edu

Blaine Ferrell
www.wku.edu

Mary Janssen
www.kctcs.edu
Proclamation

by

Steven L. Beshear
Governor

of the

Commonwealth of Kentucky

To All To Whom These Presents Shall Come:

WHEREAS, The public universities of Kentucky and the Kentucky Community and Technical College System emphasize the importance of research and the pursuit of in-depth knowledge in higher education for students; and

WHEREAS, The Council on Postsecondary Education strongly encourages Kentucky universities to emphasize research initiatives, thereby increasing the opportunity for undergraduates to engage in research and scholarly work; and

WHEREAS, Undergraduates who participate in research and scholarly activity are more likely to pursue advanced degrees which better prepare them for future challenges; and

WHEREAS, The Commonwealth commends the undergraduate students participating in these life-changing educational opportunities and the 11th annual Posters-at-the-Capitol activity;

NOW, THEREFORE, I, STEVEN L. BESHEAR, Governor of the Commonwealth of Kentucky, do hereby proclaim January 26, 2012, as

UNDERGRADUATE RESEARCH DAY

in Kentucky.

DONE AT THE CAPITOL, in the City of Frankfort this 15th day of November, in the year of Our Lord Two Thousand Eleven and in the 220th year of the Commonwealth.

STEVEN L. BESHEAR
GOVERNOR

Elaine N. Walker
Secretary of State
The *Posters-at-the-Capitol* Organizing Committee asks all participants to work with our photographers to ensure we capture a diverse record of our 2012 program. A photo album will be posted on the program's website shortly following the event.
Schedule of Activities

9:00 a.m. to 11:00 a.m. ................................................. Poster Setup

9:00 a.m. to 1:30 p.m. ............................................... Legislative Visits

10:15 a.m. .......................................................... Group Photograph (Senate Staircase)

11:00 a.m. ......................................................... Welcoming Remarks (Rotunda)

11:00 a.m. to 3:30 p.m. ........................................... General Poster Session Viewing

1:30 p.m. to 3:00 p.m. ........................................... Reception (Senate-side Mezzanine)

4:00 p.m. ............................................................ Conclusion

All times listed are Eastern Standard Time.
### Eastern Kentucky University

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1) Susan Ahmadi, Sarah Emeterio, Ashley Ruggiero, Victoria Adkins, Kate Bomar, Christin Lail, Damion Jones, and Jeanelle Pridemore
Morehead State University
Mentors: Christine McMichael and Stephen Lange
A Community Indicator Project for Morehead-Rowan County, Kentucky
This project focuses on better understanding what factors contribute to community quality of life and economic development in Morehead-Rowan County in eastern Kentucky. While several factors have been identified in the literature and through prior student research, we still do not have a clear answer to the question “Why is this area so persistently distressed?” Moreover, there are very few studies in the literature that have focused on this question with particular reference to the eastern Kentucky region and/or our local community. What we have realized is that the greatest obstacle to answering this question is the lack of appropriate scholarly data to serve as the foundation for such studies. Therefore, we are working closely with officials and other leaders in our community to identify, collect, and analyze key data from local, regional, state and federal sources that they need to help them understand and improve the community’s economic condition and quality of life. Specifically, we are conducting a Community Indicator Project that will serve as the foundation for an ongoing initiative to collect and make available information that is useful to area citizens and community leaders as they work toward their shared long-term objectives for building a more sustainable community. The long-term objective of this research, which future students will continue, is to identify definitively the causal factors at work that account for the persistent distress of this community and the eastern Kentucky region.

2) Jordan Andrew
University of Louisville
Mentor: Sara Kowalczyk
Examining Vitamin D in Latino Patients: A Chart Review
The purpose of this study was to ascertain serum vitamin D levels in Latinos who visited the Kentucky Racing Health Services Center between October 2009 and July 2011 and to determine if the subjects were sufficient (>30.00ng/mL), insufficient (<30.00ng/mL), or deficient (<20.00ng/mL) in serum vitamin D at the time of specimen collection. Data was obtained from 85 medical charts of non-pregnant adult Latino patients between the ages of 18 and 65. Patients with known cancer, liver or kidney disease, and/or hyperparathyroidism were excluded. Data obtained included age, height, weight, gender, self-reported ethnicity, serum calcium level, serum vitamin D level, vitamin D supplementation, and comorbid conditions. Findings indicated 83.5% of the total subject population is insufficient or deficient in serum vitamin D and requires supplementation. Mean serum vitamin D level for the sample is 23.49ng/mL, which is insufficient. Serum vitamin D level 25th percentile is 19.00ng/mL and 75th percentile is 27.00ng/mL. An independent t-test confirmed female subjects had an overall lower mean serum vitamin D level than males regardless of other factors. The impact on practice is that if providers know Latinos are generally low in serum vitamin D, screening can be instituted as part of routine health maintenance and disease prevention. Culturally specific care ensures better outcomes for patients and reduced health care costs in the long term, given the relative ease and affordability of treatment for vitamin D insufficiency and deficiency.
3) Lindsey Austin  
University of Kentucky  
Mentor: Buck Ryan  
Coming to Public Judgment: An Analysis of Young Voters in Election 2010 in Kentucky  
A content analysis of front-page newspaper headlines in the landmark 2010 election campaign for U.S. Senate in Kentucky showed student journalists “bowling alone” (Putnam, 2000), publishing only one front-page election headline for every six published by a professional newspaper in the same city. Meanwhile, the professional journalists continued a “horse race” approach to coverage focusing on conflict, polls, and fund-raising totals, an approach long-criticized by public journalism reformers (Rosen, 1999). A related case study revealed that front-page newspaper headlines, framed either in traditional-elite or public journalism ways, were not key determinants in young voters “coming to public judgment” on which candidates to support (Yankelovich, 1991). For this study, headlines were analyzed in The New York Times; Wall Street Journal; USA Today; Courier-Journal of Louisville, Ky.; Lexington Herald-Leader of Lexington, Ky.; and the Kentucky Kernel student newspaper at the University of Kentucky. In the two weeks leading up to the November 2 election, the professional seven-day-a-week newspaper, the Lexington Herald-Leader, published seven front-page election headlines in fourteen issues for a frequency rate of 50%. The student five-day-a-week newspaper, the Kentucky Kernel, published zero front-page headlines out of ten. All the newspapers mentioned above used traditional-elite “horse race” journalism for campaign coverage over public journalism coverage focusing on solutions, issues, and public forums. In a compilation of front-page headlines related to the 2010 midterm election from October to November, 92% of the headlines were framed in a traditional-elite “horse race” style and only 8% were framed in a public journalism style.

4) Shyanne Bacon, Whitney Rae Browning, Jamie Crowley, Britten Peek Rickard, and Stephanie Noel  
Madisonville Community College  
Mentors: G. Michael Shifflett and Aseem Talukdar  
Verifying Hooke's Law and Finding the Young's Modulus of Elasticity of a Steel Wire  
Elasticity is the physical property of a material that returns to its original shape after the stress that made it deform is removed. The relative increase in deformation with stress applied is called the strain. Hooke's law states that, within the elastic limit, the stress applied to a material is proportional to the strain, i.e., that more stress will produce greater strain. The constant, or slope of the plot of stress and strain, is called Young's modulus. In this experiment, the Young's modulus of a steel wire was determined. Since variations of the external stress applied produce very small deformation on the wire, an optical level using laser magnification was used. A plot of the stress and strain so produced in one experimental test gave a straight line verifying Hooke's law of elasticity. However, using a second wire, the plot of stress and strain (and therefore Young's modulus) did not agree within experimental uncertainty with the published value for a standard steel wire. Possible factors contributing to the discrepancy may have been the age and wear of the steel wire, or the fuzziness of the laser beam used in the experiment.
5) Azita Bahrami  
University of Kentucky  
Mentor: Diane Snow  

*Can Sensory Neurons Produce Their Own An Anti-Inhibitory Factor To Promote Regeneration?*

Following spinal cord injury (SCI), chondroitin sulfate proteoglycans (CSPGs) are up-regulated by reactive astrocytes of the glial scar, leading to failed regeneration and a subsequent loss of motor and/or sensory function. CSPGs consist of a protein core to which glycosaminoglycans (sugar chains) are covalently attached, and represent a large, extracellular matrix barrier to neuronal regeneration. Previous data from our laboratory has shown sensory neuron outgrowth is density dependent. Extrapolating from this observation, we asked, “Might a group of sensory neurons be able to lure other neurons through a region consisting of inhibitory CSPGs?” To test this hypothesis, sensory neurons were cultured (on laminin) on either one side, or both sides, of a strip of adsorbed CSPG (150 ug/ml; 48 hrs). Images were taken of the regions of outgrowth and the CSPG stripe. Neurons were identified with anti-neuron specific beta-III tubulin, and the CSPG stripe was identified using an anti-CSPG antibody. A Merz grid was used to quantify outgrowth under each condition. Results of this study showed that when neurons were plated on only one side of the inhibitory CSPG stripe, the neuronal processes grew to the edge of the CSPG border and turned, i.e. they were inhibited, mimicking the behavior they exhibit at the CSPG-producing glial scar *in vivo* following SCI. However, when sensory neurons were grown on BOTH sides of the CSPG stripe, there was significant outgrowth ACROSS the typically inhibitory CSPG, and toward the adjacent group of sensory neurons. This preliminary data suggests that sensory neurons may secrete a factor(s) that promote their own elongation, and that potentially, strategic placement of such factors may be used to overcome CSPG inhibition and promote regeneration. [Support: NIH/NINDS NS053470 to DMS and TMH; *faculty mentor].
6) Aaron Bell  
Western Kentucky University  
Mentor: Steven Gibson  
Dust Infrared Emission in an H2-Forming, Perseus-Arm Cloud  
The birth of a star is a heavily studied and complex process. Much has been done in the past few decades to outline the steps involved, but there are still crucial gaps in our understanding. An essential step in the formation of new stars is the condensation of ambient neutral atomic hydrogen (HI) into the molecular phase (H2). It is well known that molecular clouds collapse to form the precursors to stars, but less understood is how molecular clouds themselves begin to form. The process is difficult to study because the transition from HI to H2 is not very energetic and is thus difficult to detect. This limits direct observations. We studied this process indirectly, by examining the interstellar dust within these H2-forming clouds. Although dust absorbs and scatters visible light, it emits infrared heat radiation that we could observe. We used data from NASA's IRAS and Spitzer Space Telescopes to investigate a target cloud in the Perseus spiral arm in which the HI-to-H2 transition appeared to be underway. We have sampled the dust spectral energy distribution at many positions on and off this cloud in all IRAS and Spitzer wavelengths. We interpreted these data by comparing them to data generated by the DustEM computer model, which simulates dust emission according to certain assumptions. We used this information to constrain the composition and evolutionary status of the dust grains in this H2-forming cloud and others like it.

7) Daniel Bell  
Northern Kentucky University  
Mentors: Joseph Nolan and David Agard  
Estimating NBA Playoff Success Probabilities  
The National Basketball Association (NBA) is a multi-million dollar industry in the United States. Success on the court can make a substantial difference in the amount of profit for each team. In 2011, the Miami Heat brought together several “All-Star” players in an attempt to win the NBA Championship. This project investigated, statistically, how NBA team success may be related to individual player successes. Team success for each year was measured by depth of playoff advancement on an ordinal scale (0 – No Playoffs, ..., 5 – Win Championship). Individual player success was measured by looking at a player’s history of All-Star appearances. For any particular year, each previous All-Star appearance of a player’s career is assigned a weight (several different weighting schemes were considered). These weighted appearances are summed to create a player’s individual contribution; the contributions of all players on a team are summed as a measure of Team All-Star Composition. Results indicated statistically significant, positive associations between playoff success and each measure of Team All-Star Composition. Binary logistic regression procedures were applied to estimate team chances for simply making the playoffs. Additionally, ordinal logistic regression procedures were applied to estimate probabilities of different levels of team playoff advancement based on their Team All-Star Composition. A comparison of the different weighting schemes also indicated that the most recent timeframe of All-Star appearances is of greatest importance.
8) Jacob Bell  
University of Louisville  
Mentor: Carolyn Klinge  

*DHEA Stimulates miR-21 Expression in Breast Cancer Cells*  
MicroRNAs (miRNAs) regulate the expression of genes at the post transcriptional level by inhibiting the translation of messenger RNAs (mRNAs) into protein and/or stimulating their degradation. miR-21 is an oncomiR that is overexpressed in various cancers including breast cancer. miR-21 expression in MCF-7 human breast cancer cells is suppressed by estradiol (E2). In postmenopausal women, breast cancer growth is stimulated by non-ovarian estrogen sources including dehydroepiandrosterone (DHEA), an adrenal androgen that is metabolized into androgens and estrogens. The goal of the research was to determine if and how DHEA regulates miR-21 levels in breast cancer cells including estrogen receptor α (ERα)-positive and negative cell lines and endocrine-sensitive and resistant cell lines. Breast cancer cells were treated with various concentrations of DHEA, DHEA metabolites or E2. DHEA increased miR-21 expression in certain ERα+ cell lines; however, the DHEA induction in T47D cells was not inhibited by ICI, an antiestrogen, suggesting that DHEA operated through a non ER-mediated mechanism. E2 induced miR-21 in T47D and MDA-MB-231 cells. Since MDA-MB-231 cells are ERα-negative, the mechanism for E2-induced miR-21 is unknown. The DHEA metabolite 3β-adiol increased miR-21 expression in MDA-MB-231 cells that were co-treated with ICI. Because DHEA is a precursor to androgens, DHEA metabolites activate AR-mediated miR-21 transcription. Western blots examined AR expression in MCF-7 and HepG2 hepatic cells. HepG2 expressed AR but MCF-7 did not, which indicates that that DHEA must operate though a non AR-mediated pathway(s) in MCF-7. Further studies are needed to dissect DHEA’s effect on miR-21 in breast cancer.

9) Savannah Bell and Jimmy L. Easton  
Owensboro Community and Technical College  
Mentors: Timothy T. Dick and Kathy Hoffman  

*A Community College Survey for Community-Acquired Methicillin-resistant Staphylococcus aureus (MRSA)*  
Staphylococcus aureus is considered normal flora of the anterior nares, nasopharynx, perineal area, and skin. This organism is responsible for a number of infectious diseases at the tissue level (boils, folliculitis, wound infections) and systemic level (endocarditis, osteomyelitis, septicemia). Staphylococcus aureus (S. aureus) can be introduced into a sterile body site through injury, or transmitted from person to person via fomites or direct contact. The person-to-person transmission has made this organism a leading cause of nosocomial infections in the United States. Methicillin-resistant *Staphylococcus aureus* (MRSA) is a strain of S. aureus resistant to the beta-lactam antibodies and potentially, other antibiotic groups. Hospital-acquired MRSA has been increasingly found in the community and is termed community-acquired MRSA. This spread into the community is in part due to the discharge of hospital patients with MRSA, the presence of MRSA in long-term care facilities, and individuals who have contact with these groups. This study examined fomites of the facilities on a community college campus. Samples were collected from fomite surfaces with sterile cotton-tipped applicators and subsequently inoculated onto Mannitol Salt Agar (MSA) plates. All sites positive for Staphylococcus on MMSA were re-tested on media selective for MRSA. The distribution of MRSA on the campus was summarized.
10) Dylan Benningfield  
Murray State University  
Mentor: Bommanna Loganathan  

_Tricepsan Levels in Water: Monitoring of Bee Creek, Clarks River and Red Duck Creek, Kentucky_

Rivers and streams provide drinking water, attenuate flood waters, assist in maintaining biodiversity and offer recreational opportunities to our society. Water quality monitoring is essential in maintaining these resources. Western Kentucky has abundant water resources supporting a variety of ecosystems. These aquatic environments are impacted by multiple stressors associated with human activities. Several streams and rivers in this region are not thoroughly monitored. This poster presents monitoring data of triclosan levels in water samples from Murray Wastewater Treatment Plant samples, Bee Creek, Clarks River, Murray and Red Duck Creek at Mayfield, Kentucky. In addition to monitoring the levels of triclosan, total and fecal coliform bacteria counts were also determined. Approved procedures were used to determine the concentrations of triclosan and bacterial population in the water samples. Detectable concentrations of triclosan were found in all water samples analyzed. It can be discernible from the results that there exists inverse correlation between triclosan concentration and bacterial counts. Persistent nature of triclosan and antibacterial property of triclosan may be attributed to this negative correlation.

11) Shelby Blalock and Laura Francisco  
Murray State University  
Mentors: Terry Derting, Renee Fister, and Chris Mecklin  

_Is There Evidence of Trade-offs in Cognitive Development and Parasitism in Adult White-footed Mice (Peromyscus leucopus)?_

Levels of parasitic infections and disease were positively correlated with the intelligence quotient of humans. The relationship may result from reallocation of energy away from brain development and toward energetically-expensive immune responses during early growth. We questioned whether similar trade-offs in energy allocation occur in adults, resulting in a relationship between brain function and incidences of disease or infection. We tested the hypothesis that there is no relationship between cognitive ability and parasite burden or immunocompetence using wild adult white-footed mice (Peromyscus leucopus). Mice were brought into the lab and caged individually. The occurrence and level of parasitic infections was estimated from fecal floats and egg counts. Animal health was assessed using blood cell counts and hematocrit level. Immune system competency was evaluated by applying a T-cell mediated challenge to all mice using 2, 4-dinitro-1-fluorobenzene and a humoral challenge using sheep red blood cells. Parasitic infections were found in 14 of 26 captured mice. Infected mice usually were parasitized by one or two species of parasite. There were no significant differences in measures of health between parasitized and non-parasitized mice. Parasitized mice had lower scores, however, on the spatial memory tests compared with non-parasitized mice. Furthermore, among the parasitized mice a negative relationship existed between spatial memory test score and parasite load and magnitude of the humoral immune response, but not the cell-mediated response. Our results in white-footed mice supported the reported negative relationship between parasitism and cognitive ability in humans; thus further emphasizing the importance of preventative health care.
12) Aja Blair, Phillip Caudill, Chassity P’Poole, David Stubblefield, Matthew Small, Sarah Perdue, and Leighann Harper
Madisonville Community College
Mentor: Pamela Smith
*A Macroscopic and Microscopic Comparison of Plants and Animals from Cleared and Uncleared Forest Floors*
Forest floor with an abundance of decaying vegetation may provide more nutrients and habitat than cleared forest floor. This study examined the diversity of two types of forest floor, cleared and uncleared. Each forest floor type was visually examined by the plot or quadrant method using a standard 12x12-inch plot, recording organisms above the ground in herbaceous plants and organisms on the soil surface. Berlese funnels were used to collect and identify organisms in the soil. Numbers and types of plants and animals were recorded. Greater numbers and more diverse species of plants and animals were present macroscopically and microscopically in the uncleared than in the cleared forest floor.

13) Albert Bolander
University of Louisville
Mentor: David N. Brown
*A Jet Ratio Method for Measuring the Strong Coupling Constant*
The strength of the strong nuclear force in high energy physics is determined by the strong coupling constant, which varies with energy. We use data from the BaBar experiment at SLAC (Stanford Linear Accelerator Center) to measure the strong coupling constant in the 10 GeV energy region, where its value is not yet well-determined. Our method uses the JetFinder algorithm to study hadronic jet production rates. By varying the parameter JetFinder uses to partition energy into jets, we can infer the value of the strong coupling constant from the evolution of the relative fraction of two-, three-, and four-jet events.
14) Rikka Bonnette  
Northern Kentucky University  
Mentor: Vanessa Hunn  
*Military Sexual Trauma in Female Veterans: An Analysis of Policy and Outcomes*  
As a result of Military Sexual Trauma (MST), the Department of Defense enlisted a team to strategically plan for reducing incidence. The most recent policy is the “Department of Defense Annual Report on Sexual Assault in the Military: Fiscal Year 2010.” The women affected by MST that report their assault lie approximately between 10-30% of service members. However, this number is likely much higher, since an estimated 60% of MST’s go unreported. This Policy is vast, and focuses on many areas, some of which include: Prevention Strategies, Victim Confidence in Reporting, Improved Response, System Accountability, Prevention and Response, Statistical Data, and Future Plans. For this analysis, the area of focus was on the prevention of female MST. One cause of MST is the number of Moral Waivers that are given to incoming recruits. Moral waivers are waivers issued to recruits to allow them to enlist in the military, when they would have otherwise not have qualified due to a conviction. By allowing these convicted felons into our military branches, we are increasing the number of crimes that are committed in within the military service. Another cause of MST is redeployment of soldiers to war zones. Recommendations for added preventive strategies include reducing or eliminating moral waivers and decreasing the number of redeployments to war or conflict zones.

15) Jade Boyle and Ashton Korfhage  
Western Kentucky University  
Mentors: Sheila S. Fleiner and Travis K. Wilson  
*Cultural Design for African Children in Need*  
Africa is a continent full of potential and opportunity that has been in turmoil in some form or fashion since the beginning of time. The AIDS epidemic has left one million children orphaned and 3.95 million more with one parent. The "Lost Generation" of South Africa's children is forced to care for themselves, given only a small stipend from the government, and whatever care their extended family and neighbors are willing to provide. This research project identified and designed a mixed use building that gave these children access to healthcare, education and sense of family and community while representing their culture and heritage.
16) Lydia Brothers and Andrea Eastes  
Western Kentucky University  
Mentor: Jackie Johnson  
**ZBLAN Glass: Improving Medical Imaging with Europium Doped HoF3 and SrCl2 based Storage Phosphors**

ZBLAN glass, a glass made from zirconium, barium, lanthanum, aluminum, and sodium, has capabilities of a storage phosphor which makes it a good alternative to x-ray films. A group of researchers gathered over the summer at the University of Tennessee Space Institute with the main goal of characterizing two different series of the glass, one with HoF3 and another with SrCl2. Both sets were doped with Europium, and characterization of both series started with the differential scanning calorimeter to determine the glass transitional phases. From that point, each sample was heat treated to reach the temperatures of the hexagonal and orthorhombic phases as found via DSC. The photoluminescence of the samples was then tested. An x-ray diffraction machine was run on the samples after they had been heat-treated in order to better determine which crystals were forming. This was done in-situ for the HoF3 series and ex-situ for the SrCl2 series. A scanning electron microscope was also employed to find distinct morphologies on certain samples. All of this was done in order to further develop the idea of using the ZBLAN’s storage phosphor-like properties for medical imaging, specifically, mammography. With further experimentation, it has the potential to achieve better image quality than current flat-panel based digital radiography methods at a lower cost.

17) H.D. Burnett  
Eastern Kentucky University  
Mentor: Joyce Hall Wolf  
**Come Fathers, Come Mothers, Come Sisters, Come Brothers: Otherness and Community in "Zion's Walls"**

In 1952, American composer Aaron Copland gathered various folk songs from throughout the United States and arranged them to create a series of pieces for voice entitled Old American Songs. This study examined both Copland’s choral setting of “Zion’s Walls” as well as the original Christian Revivalist tune which first appeared in John G. McMurry’s shape-note hymnal The Social Harp nearly a century before Copland’s arrangement. Critical and historical reading of “Zion’s Walls” revealed two distinct musical movements in two very different periods of American history that were inextricably linked through shared themes of physical and social isolation and alienation, as well as a desire for community and reunification. In the case of the rural Christians of the South, they wished to be united at the symbolic city of Zion; Copland encouraged reunification of the Jewish diaspora in the newly-created state of Israel. Despite emerging from two seemingly disparate musical traditions and cultural experiences, “Zion’s Walls” serves as a lens into the common threads that bind American life and music together. Contextual examinations of original source material as well as Copland’s updated arrangement conclusively demonstrate that both isolation and community are integral facets of American musical experience.
18) Susan P. Camp, Carey Boggess-Story, Charlton Story, Brian Jarvis, Robert Stuard, Joseph Kelly, Justin L. Parrish, Trent Murdock, and John Michael Puckett
Murray State University
Mentors: David Ferguson, Iin Handayani, Roger Miller, Andy Bailey, Robert A. Hill, C. Gustav Helmers, and Chris Rodgers

Study 1 (Camp, Boggess-Story, & Story): 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.

Study 2 (Jarvis, Stuard, & Kelly): Evaluation of Dark-Air Cured and Dark Fire 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 16 different varieties of dark-fired cured and air-cured tobacco. The first experiment was using 15 varieties of dark-fired tobacco which included NL Madole, VA 309, TN D950, 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 second 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’ between replications. There were four replications for each variety with 32” plant spacing and 40” 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.
Study 3 (Parrish, Murdock, & Puckett): Evaluation of Herbicide Treatments for Dark Fired Tobacco

In the herbicide trial, the objective of the experiment is to determine which herbicide treatment will provide the best results when it comes to weed control throughout the growing season. To determine this, we looked at the rate combination's of Carfentrazone-ethyl; Sulfentrazone (Spartan Charge) and clomazone (Command 3ME) as they were applied throughout the growing season. There were four different herbicide treatments in the experiment. Treatments 1-3 were incorporated after spraying and treatment 4 was 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 was clomazone applied at a rate of 2 pt/a. Treatment 3 was combination of carfentrazone-ethyl; sulfentrazone applied at a rate applied at a rate of 12.5 oz/A and clomazone applied at a rate of 2 pt/a. The fourth treatment was a control with no herbicides applied anytime during the growing season. 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*).

19) Chris Carmichael  
Western Kentucky University  
Mentor: Bangbo Yan  
A Novel Layered Metalloporphyrin Material  
Coordination polymer or metal organic framework materials built from porphyrins and related compounds have important applications in many areas such as optical devices and photocatalysts. Using cobalt nitrate and tetra (4-carboxyphenyl) porphyrin as sources of building blocks, we have successfully made a novel two-dimensional coordination polymer. Results from the study of the structure and properties of the new material are reported.

20) Kaitlin Cary and Amanda Piela  
Murray State University  
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. I believe this research could also help to improve the quality of current teachers. 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 classrooms. I would also like to see this information implemented in school textbooks and a teacher preparation program to help create a socially informed educational community.
21) Isaac Casto  
Morehead State University  
Mentor: Christina Conroy  
**Facts are Relations**  
This project suggests the idea that, at the very base of reality, all facts are relations. Of course, while this suggestion seems simple at first, it leads to a variety of problems. First, it entails that intrinsic facts or properties may not exist, something many metaphysicians would suggest entombs our ability to substantiate change; however, the suggestion here is that we do not require intrinsic properties in order for change to occur. We are also presented with a problem of regress: if all facts are relations, does this mean that all facts can be traced in an infinite backwards relativity? This is argued away by suggesting that facts about constituents are relations, but facts about systems may function differently. Ultimately, the goal of this project was to provide the foundational research, vernacular, and theories to begin analyzing the metaphysical relationship of facts, space, and time when placed in the realm of Quantum Mechanics; the same arguments, however, may hold an over-arching importance to general physics as well. In the future, this project will serve as a reference for one of greater scope and difficulty.

22) Suzannah M. Chapman and Amy Clausen  
Morehead State University  
Mentor: Sarah R. Hawkins  
**Embedding Triple III Instructions of RtI When Teaching Statewide Pre-Kindergarten Learning Standards to Children with Significant Disabilities within Inclusive Preschool Classrooms**  
This poster shared the results of a single subject study that assessed the effects of embedding triple III instruction of RtI when working towards pre-kindergarten standards by children with significant disabilities. Teachers in an inclusive public preschool classrooms implemented authentic assessment strategies, selected individualized pre-math objectives, embedded the math objectives in classroom activities, and monitored children’s progress. The results show: children can attain pre-math skills when: a) authentic assessment strategies are employed; b) effective individualized plans are developed; c) embedding consistently occurs; and d) instruction is monitored.
23) Erica Coleman  
Kentucky State University  
Mentors: Changzheng Wang, Lingyu Huang, and Cecil Butler  
Body Weight Status and Willingness to Adopt Healthy Eating and Activity Behaviors Among Kentucky Adults  
The objective of this study was to assess how body weight perception might be related to willingness to adopt healthy eating and activity behaviors among Kentucky adults. Visitors to the 2011 Kentucky State Fair were recruited to fill out a questionnaire before they were given a free analysis of their body composition (body fat %) with a Tanita TBF-521 body composition analyzer. Among the 248 participants, 68% were female and 32% were male. Majority of people with normal body weight considered themselves within the normal weight range. Sixty four percent of overweight men considered themselves normal and 77% of obese men considered themselves only overweight. Fifteen percent of normal weight women considered themselves overweight, but only 21% of overweight women considered themselves normal and 51% of obese women put themselves in the overweight category. About 80% of the participants would choose vegetables or fruits and nuts for snacks but 30% of the obese group would choose chips for a snack. Nearly 72% of the participants thought bad eating habits were responsible for their weight problem but only 10% thought low physical activity was to blame. Nearly 70% of the participants would learn to prepare vegetable dishes on their own but only 14% would do so by attending free workshops. Approximately 72% of participants were willing to add physical activities to their daily life such as walking but only 10% was willing to join a free club for exercise and 10% of the obese was willing to pay for an exercise program. Sixty percent of the obese group was willing to cut soft drinks and 50% of the normal weight and overweight individuals were willing to drink water only. In conclusion, self perception of body weight tends to lower the severity of weight problems in both men and women. However, body weight perception did not affect the willingness to adopt healthy eating and activity behaviors.

24) Brandy Collins  
University of Kentucky  
Mentors: Jeffery Bewley, Joseph Taraba, and George Day  
Viable Alternative Bedding Materials for Compost Bedded Pack Barns  
Compost bedded pack barn use in the dairy industry is increasing in popularity throughout Kentucky and the southeastern United States. The key component for successful composting in these barns is a large open resting area that is generally bedded with sawdust. Previous research suggested sawdust or wood shavings to be the ideal bedding material due to particle size properties that enable the compost to optimally perform. These barns require three to four times the amount of bedding material that traditional freestall barns require therefore a limiting factor to barn success has become sawdust availability. This research aimed to find alternative bedding materials for use in these barns by looking at biomass byproducts of other agricultural industries. As a comparison, three popular sawdust choices were analyzed to determine benchmark goals for other materials. Materials selected were analyzed for initial moisture content, water holding capacity, drying rate and equilibrium moisture content. These characteristics were selected for their ability to provide information about the material particle size. These characteristics also provided a more complete understanding of potential in barn performance.
25) Tracey Daugherty and Lacey York  
Northern Kentucky University  
Mentor: Kereen Monteyne  
Student Learning in Chemistry: Cognitive Skills and Conceptual Models

Study 1 (Daugherty): Student Misconceptions of the Properties of Gases  
Misconceptions pose significant barriers to learning and lead to shallow understanding for students. A literature review of gas law misconceptions was conducted in order to identify common misconceptions held by students on the properties of gases. A set of 80 misconceptions identified from the literature was classified into 16 different categories which included assimilation, understanding formulas, and the particulate nature of gas. Gas questions were served on tests and quizzes administered to students enrolled in general chemistry classes at Northern Kentucky University and California State University: Fullerton. These gas questions were then analyzed to identify target misconceptions. Finally, student responses to the variety of gas questions were analyzed according to a coding scheme in order to identify patterns and determine the misconceptions that were present. It was determined that the majority of students hold at least one misconception, with the most common misconception from the variables category. The most prevalent misconception from the variables category was found to be assigning absolute relationships among variables. This research is a part of a funded grant by NSF in which general chemistry lab activities will be developed to target inquiry skill development and representational competence. These materials will begin to address the misconception problem and help students develop appropriate models of science concepts.

Study 2 (York): General Education Outcomes in a Science Majors Course  
General Education programs at universities are designed to serve as a foundation for a lifetime of learning. The efficacy of these programs is increasingly under review in order to determine whether students are learning skills needed to advance through the major. The purpose of this research is to determine the extent to which students mastered two of the four learning objectives in the sciences category set out by the General Education requirements. These learning objectives are: 1) application of scientific and quantitative reasoning through problem solving or experimentation and 2) use of evidence-based arguments. A set of questions targeting these two objectives were presented to students on general chemistry course exams. Student responses were then analyzed by developing coding schemes to create a profile of student ability. The results of this research could potentially inform curricular changes to improve General Education courses.
26) Alex Davis
Morehead State University
Mentor: Elizabeth Biebel

**A Study of the Psychological Services Available to Law Enforcement Officers**

An exploratory survey was conducted assessing the availability of psychological services for police officers, their families, and civilian workers. The top 50 largest city and county departments, as well as the 49 state police agencies (Hawaii does not have one) were surveyed, with a 46% response rate. Frequencies were calculated on variables to determine most commonly utilized counseling services and concerns. Most agencies provided services to employees via externally contracted mental health providers (79%), while less than half of respondents provided some psychological services to their employees in-house (42%). Available services were marketed most frequently through In-Service training (78%), Academy Lecture (67%), and E-mail (48%). The most commonly utilized services were critical incident debriefings, and counseling for job stress and personal problems (i.e. depression, grief, legal and financial problems). Officers self-referred to counseling services 42% of the time, and were referred by their supervisor 21% of the time. The four largest concerns with seeking counseling were 1) Loss of peer respect, 2) Lack of confidentiality, 3) Loss of job, and 4) Loss of firearm. Over half of responding agencies relied on departmental policies and/or state laws to insure confidentiality (63%). Just over one-third (36%) of respondents restricted access to counseling records, and slightly over one-third (34%) relied on a third party provider to insure confidentiality. One-fifth had firm peer support team expectations of privacy.

27) Cara L. DeMoss and Will L. Grey
Morehead State University
Mentors: Darrin L. DeMoss and Benjamin K. Malphrus

**Gio Lab: Development of CubeLab Platform for International Space Station Based Biomedical Research**

GlioLab is a joint project between Morehead State University, GAUSS-Group of Astrodynamics of the University of Roma, Kentucky Space and the NASA Ames Research Center that involves the development of a 2U CubeLab (GlioLab). The primary objectives of the project are to develop a CubeLab platform for performing biomedical research on the International Space Station (ISS), and to perform preliminary ground-based and flight experimentation (STS-134 and STS-135) that will help drive the development of GlioLab. The platform will incorporate a liquid mixing apparatus that will allow 2-3 liquids to be mixed and require the development of various additional subsystems to support biological specimens for varying lengths of time while aboard IIS. An automated system will control the injection/mixing of liquids in user-specified ratios and at user-specified times. The platform will utilize small fluid amounts (≤10 ml), which will be exposed to microgravity for a specified length of time and then returned to Earth for analysis. A set of mission profiles have been designed based on available ascent and decent vehicles along with the current mechanisms and logistics related to access to the ISS NanoRacks System. These mission profiles will be used to direct the accompanying ground based research utilizing the Glioblastoma cancer line as its experimental model. The potential for biomedical research utilizing Gliolab onboard the ISS or space flights in general will pave the way for future affordable biomedical research in microgravity and hopefully yield new terrestrial biomedical applications and treatments.
28) Lauren Dixon  
Kentucky State University  
Mentors: Charles Bennett and Nancy Webb  
*Characterization of Cardiac Inflammatory-Fibrotic Responses in Angiotensin II-Exposed APOE-/- & APOE/GV SPLA2 Mice Following Treatment with Angiotensin II or Aldosterone Receptor Antagonists*

Angiotensin II and aldosterone antagonist receptor drugs have been reported to influence the development of fibrosis and collagen production in cardiac tissues from the development of hypertension. To test this hypothesis, APOE mice-models were infused Angiotensin II through osmotic pumps to produce hypertensive-induced changes in cardiac fibrotic connective tissue. This study investigated the affects of Angiotensin II receptor blocker Losartan™, as well as the aldosterone receptor antagonist Eplerenone™ on the Angiotensin II-induced changes in cardiac fibrotic tissues, while saline-infused APOE mice served as control models. Subsequent of the 7 days of administration of antagonist receptor drugs, heart tissue from the control and treated groups were prepared for microscopic computation of cardiac collagen deposition in the heart wall at the level of the papillary muscles. Gomori trichrome and picrosirius red staining techniques were utilized to perform microscopic histochemical collagen comparisons between the treatment and control groups. Following statistical analysis of the assessed percentages of the collagen production in the control and treatment groups, it was determined that the Losartan™ group of mice had the least amount of abnormal collagen production within the cardiac tissue, showing that the drug significantly slowed fibrosis and produced fibrotic tissue material compared to the other treated group. The Eperlone™ treatment group showed lesser microscopic evidence of collagen production, which did not necessarily mean that the drug did not work to reverse the fibrotic buildup, but may potentially require a longer duration than 7 days to fully produce its effect on damaged area. Observation and quantification of the amount of collagen present in the hearts of the various mice treatment and control groups assisted in determining the prominent antagonistic receptor drug which limited the inflammatory response within the 7 day study.

29) Sarah Domhoff  
Northern Kentucky University  
Mentor: Judy Voelker  
*New Faces in the Community: The Refugee Experience in Northern Ky/Cincinnati*

Two thousand, nine hundred seventy eight immigrants migrated to the core based statistical area of Cincinnati and Northern Kentucky in 2009. This number is relatively low compared to many of the other areas of the country. However, because these populations are not as prevalent in the region, much of the public is ignorant to the diversity that exists in the area through these immigrants. In many cases throughout history, this same ignorance fuelled injustice, discrimination and prejudice. This study was designed to promote greater refugee inclusion into society specifically in the Cincinnati and Northern Kentucky areas.
30) Tarrah Dunaway  
University of Kentucky  
Mentor: Ani Katchova  

Helping Beginning Farmers in Kentucky Transition into Agriculture  
The U.S. agriculture will be experiencing a major change – about half of the farmers are expected to retire in the next decade and be replaced by beginning farmers. Currently, only 20% of the farms are beginning farms, therefore there is a need to educate and prepare new farmers to transition into agriculture. The Kentucky Beginning Farmer Program (KyFarmStart) is a federally-funded program led by the University of Kentucky to provide educational programs for beginning farmers. In 2010, over 100 beginning farmers enrolled in the program in four geographic areas representing 22 counties in Kentucky. The goal of this research was to evaluate the effectiveness of KyFarmStart program to train beginning farmers and to provide us with a deeper understanding of their characteristics and needs. Specifically, we used an end-of-program evaluation including pre- and post-program assessment of knowledge gained and behavioral changes. We also included detailed demographic questionnaires on beginning farmer characteristics. Our results showed that KyFarmStart has been very effective in training new farmers by increasing their knowledge and involvement with the farm business. We have also developed benchmarks for comparing beginning farmers’ characteristics with the rest of the Kentucky farm population. Specifically, ArcMap from ArcGIS was used to plot the beginning farmer characteristics spatially on a map and compare them with all farmers based on Census of Agriculture data. Our research helps to understand beginning farmer characteristics and their educational needs to prepare them to transition into agriculture and ultimately design more effective educational programs for beginning farmers.

31) Jermain Dunigan  
Kentucky State University  
Mentors: John D. Sedlacek and Karen L. Friley  

Beneficial Insects Associated with Newly Established Native Perennial Plant Borders  
Native perennial plants are beneficial to the environment because they create habitat for wildlife species including beneficial insects. Attracting beneficial insects in a farmscaping approach could be important in trying to establish sustainable methods of insect pest management in vegetable and fruit crops. It has been suggested that non crop vegetation such as grasses and floral strips planted as crop field margins could enhance populations of predaceous arthropods and parasitoids. Therefore, the objective of this study was to compare several insect groups colonizing newly established perennial border plots vs. non-mowed mixed grass/weedy pasture border plots. This study was conducted at the Kentucky State University Research and Demonstration Farm in Franklin Co., KY. Sixteen plant species including big bluestem (*Andropogon gerardii*), thimbleweed (*Anemone virginiana*), New England Aster (*Aster novae-anglica*), side-oats grama (*Bouteloua curtipendula*), purple coneflower (*Echinacea purpurea*), gray-headed coneflower (*Ratibida pinnata*), rattlesnake master (*Eryngium yuccifolium*), common boneset (*Eupatorium perfoliatum*), blue lobelia (*Lobelia siphilitica*), bee balm (*Monarda fistulosa*), switchgrass (*Panicum virgatum*), foxglove beardtongue (*Penstemon digitalis*), hairy beardtongue (*Penstemon hirsutus*), slender mountain mint (*Pycnanthemum tenuifolium*), little bluestem (*Schizachyrium scoparium*), and prairie dropseed (*Sporobolus heterolepis*) were established in 25 m × 2 m border rows replicated three times. Insects were sampled weekly during September using four 15 cm × 15 cm sticky traps mounted to tobacco sticks in each border row. Lady beetles, solitary bees in the genus *Agapostemon*, soldier beetles (*Chauliognathus pensylvanicus*) and green lacewings (*Chrysops* sp.) were more abundant in perennial borders than pasture borders. Results will be discussed relative to the selected flowering plants.
32) Andrea Esterle  
Western Kentucky University  
Mentor: Shivendra Sahi  
*Biosynthesis of Gold and Silver Nanoparticles Using Yucca filamentosa Plant Extract*  
Little is known about the efficacies of whole plant extracts from taxonomically diverse plant species in synthesizing gold and silver nanoparticles (Au/AgNPs) [1]. Since AuNPs show maximum absorbance at or around 550 nm, plant extracts from various plant species supplemented with 10 mM KAuCl₄ for up to 35 h were spectrophotometrically evaluated at this wavelength [2]. Among the species tested, *Yucca filamentosa* showed maximum absorbance. Whereas, *Y. filamentosa* extract supplemented with 10 mM AgNO₃ showed maximum absorbance at 450-500 nm and temporal analysis revealed saturation after 24 h [3]. The study clearly revealed the potential for using spectrophotometric technique in identifying the plant species and duration of treatment that are conducive for the bioreduction of KAuCl₄ and AgNO₃ into AuNPs and AgNPs, respectively. Further, *Y. filamentosa* extract supplemented with KAuCl₄ were incubated at various temperatures (4°C, 22°C, and 37°C) for different time intervals (15 mins to 35 h). Spectrophotometric analysis clearly showed that 37°C is favorable for the synthesis of AuNPs over an incubation period of 24-30 h. Transmission Electron Microscopy (TEM) confirmed the formation of monodisperse spherical AuNPs and AgNPs and they were further validated by Energy-dispersive spectroscopy [EDS]. The results empirically demonstrated the efficacy of *Yucca* extract for the “green synthesis” of AuNPs and AgNO₃.

33) Zachary Ewing and Chad Maschinot  
Northern Kentucky University  
Mentor: Keith Walters  
*Fullerene Research: “Two Paths to the Same Molecule” – Synthesis of Fullerene-Bipyridine Ligands*  
One of our research group’s main objectives has been to produce substituted fullerenes that facilitate metal-catalyzed coupling to other chemical subunits to create supramolecular systems. However, the modular nature of these systems permits alternate synthetic pathways to arrive at the same end product. This poster presents our attempts to investigate various pathways to arrive at the desired molecules, and the pros and cons of each.
Engaging the World through Service: Exploring International Service-Learning Opportunities

This research project explores best practices in international service-learning programs. Bringle and Hatcher (2011) have identified the following components as being critical to International Service Learning: (a) structured academic experience leading to appreciation of the host country and the discipline; (b) learning includes cross-cultural dialogue; (c) reflection furthers global and intercultural understanding; and (d) enhancing the students’ sense of responsibility as a citizen, both locally and globally. Noted educator, John Dewey observed, “That this revolution should not affect education in other than formal and superficial fashion is inconceivable.” The foundation for this study is built upon a review of literature on the theories of service learning. In addition, more detailed information was collected through a variety of research methods including surveys, focus groups, and interviews with students and faculty who have participated in international service learning. The purpose of this data collection was to identify successes and complications when implementing international service-learning experiences. The final report includes, but was not limited to: (a) an overview of service-learning as an instructional method; (b) a list of educational benefits of service-learning from a student perspective; (c) a list of special challenges related to international service-learning from a student and faculty perspective; (d) a list of programs offering international service-learning opportunities; and (e) a proposal for promoting international service learning at Morehead State University.
35) Mark Fein, James Castle, Julie Fisher, Vincent Campbell and Adam Barrett  
Northern Kentucky University  
Mentors: Wayne Bresser and Chari Ramkumar  
Soft Ferrite Pressure Sensors

Study 1 (Fein, Castle, Fisher & Campbell): Varying PVA as a Binder for Potential Soft Ferrite Pressure Sensors  
Binder application experiments of ferrite powders were carried out in order to determine sufficient binder content of toroidal bodies. Large-scale application of binder solution to these powders, such as in powder metallurgy industry, require expensive machinery; their costs however are not conducive to undergraduate research laboratories. A low cost binding process was therefore developed using various amounts of polyvinyl alcohol (PVA) to achieve optimal porosity of the powders after pressing. Scanning-Electron Microscopy and Elemental X-Ray Diffraction were then carried out and the effect of binder content on the porosity of pressed bodies was examined.

Study 2 (Fein & Barrett): The Villari Effect: Pressure vs. Inductance Functions for Potential Soft Ferrite Pressure Sensors  
Reverse Magnetostriction, or the Villari Effect, was analyzed by applying increasing pressure on toroidal bodies. When wrapped in thin conducting wire and current passed through, the inductance may change and thus a pressure sensor can be fabricated. Functions of this inductance vs pressure change are however necessary to create such a sensor. A vibrating sample magnetometer measured initial permeability of the bodies and Scanning-Electron Microscopy was used to study the microstructure both before and after testing. A linear response and eventually a function of linear form is expected after experimentation.

36) Matthew D. Fitzgerald  
Owensboro Community and Technical College  
Mentor: Micah W. Perkins  
Copperbellies go to College: Documentation of the Copperbelly Watersnake (Nerodia erythrogaster neglecta) at the Nature Area of Owensboro Community and Technical College  
The copperbelly water snake (Nerodia erythrogaster neglecta), a Kentucky state-protected species, is found along lakes, shallow open wetlands, shrub swamps, and floodplain forests. Unlike many other watersnakes, copperbellies may travel hundreds of meters away to use upland forest habitats. Copperbelly populations are thought to be declining across their range due to habitat loss and fragmentation. Northern populations in Ohio, Indiana, and Michigan have received threatened status under the U.S. Endangered Species Act. The present interest was in documenting the presence of the copperbelly water snake at the nature area of Owensboro Community and Technical College (OTCT). During 2011, five individuals were marked by scale-clipping and pit-tagging in order to initiate an analysis of the existing population. Such information will help in providing a baseline on population information and determining how populations change.
37) Alyssa Daniele Fountain  
University of Kentucky  
Mentor: Luke H. Bradley  

*Insight into the Potential Anti-Parkinsonian Effects of a Synthetic, Amidated Eleven Amino Acid Peptide*

Parkinson’s disease (PD) is a chronic neurodegenerative disease that knows no economic and social boundaries across Kentucky and the nation, affecting over one million Americans each year and expected to double over the next 25 years. While the cause of this disabling disease is unknown, its symptoms manifest following a loss of the neurotransmitter dopamine. While current treatments are able to relieve the physiological symptoms by restoring dopamine levels in the brain, over time they lose their effectiveness as the dopamine-producing neurons continue to be lost as the disease progresses. Thus as a strategy for the long-term treatment of PD, newer approaches should not only restore dopamine levels, but also provide protection to dopamine-producing neurons from further degeneration. Recently, a synthetic, amidated 11-amino acid peptide, was shown to restore dopamine levels in parkinsonian animal models, while providing neuroprotection. Based on our preliminary data, we hypothesized that its molecular and cellular effects involve the mitochondria and the glycolytic protein glyceraldehyde-3-phosphate dehydrogenase, a known drug target for the treatment of PD. We used in vitro enzyme kinetics and cellular protection assays to investigate this potential mechanism of action. Results from this investigation will drive further studies to evaluate the peptide for the treatment of PD.

38) LeAnna Foss  
Northern Kentucky University  
Mentor: Isabelle Lagadíc  

*Syntheses of Polystyrene-Organoclay Nanocomposites using Thiol-Functionalized Organoclays*

Organoclay-polymer nanocomposites are a class of hybrid materials that are composed of an organic polymer matrix that has inorganic clay nanofillers dispersed within. The incorporation of inorganic fillers into polymeric matrices is a process that has been used for years to improve polymer properties. These nanocomposites exhibit enhanced mechanical, thermal and gas impermeability properties. However, in order to produce a material with desirable properties, complete dispersion (or exfoliation) of the inorganic clay layers within the polymer matrix is necessary. In this project, we investigated the syntheses of polystyrene-organoclay nanocomposites using an organoclay containing a thiol (SH) group (Mg-MTMS) combined with polystyrene (PS). Nanocomposites were prepared using two processes: 1) A solution process where various amounts (1, 5, 10, 25 wt%) of thiol-functionalized organoclay is dispersed into a polymer solution. 2) A surface-initiated polymerization method where the polymerization of the polystyrene takes place after reaction of the styrene monomers with the thiol groups of the organoclay layers acting as anchoring sites for the polymer chains. The optical transparency of the nanocomposite films prepared using the first method was determined and we found that: i) the higher the organoclay content, the lower the transparency of the film and ii) a mechanical stirring of the organoclay/polystyrene mixture is the best dispersion method to maintain a high level of transparency of the films even at high organoclay content. For the nanocomposites prepared with the second method, we were able to obtain evidence of the thiol group reaction with the styrene monomers and consequently, grafting of the polystyrene onto the layers by infrared spectroscopy.
39) Ann Francis  
Morehead State University  
Mentor: Jennifer Brimson Cooper  
*Interpreting the Brazilian Choro: A Study for Flutists*

This study focused on flute improvisational and ornamental techniques in Brazilian choro, particularly as found in the works of famous and prolific choro composer Pixinguinha, Alfredo da Rocha Vianna Filho. Analysis and thorough performance notes of two of his most famous works, Carinhoso and Chorei, favorably illustrate the stylistic features of this genre of composition and the flutist’s approach to performance of this style. The Brazilian choro is a staple of MPB, Music Popular Brasileira, and a wealth of works is available for flute performances. Many publications of the choro are written "straight." This study will help flutists understand the correct interpretations of rhythms and articulations not indicated in the music. Primary sources include Julie Koidin’s *The Brazilian Choro: Historical Perspectives and Performance Practices, Choro* by T. Linvinston-Isenhour and T. Garcia, and private study with Brazilian flutist and choro composer, Felipe Moritz.

40) Deanna Gipson and Traci Walker  
Western Kentucky University  
Mentor: Barbara Bush  
*The Culturally Competent Dental Team*

Cultural sensitivity begins with the recognition that there are differences between cultures. These differences are reflected in the ways that different groups communicate and relate to one another, and they carry over into interactions with health care providers. A culturally competent clinician views all patients as unique and realizes that their experiences, beliefs, values, and language affect their perceptions of clinical service delivery, acceptance of a diagnosis, and compliance. This presentation demonstrates the need for and the benefits of cultural competency in dental care, and provides practical ways to increase the level of cultural competence in dental/healthcare providers. The American population is increasing in its diversity. There are disparities in the oral health status of people from different cultural backgrounds along with barriers that often prevent minorities from receiving the care they need. Additionally, many dental professionals have not received adequate training in cultural sensitivity or cultural competency. As healthcare providers deliver culturally competent care, patient care improves, patient satisfaction increases, and practices build clientele. In order to increase their cultural competence, healthcare providers should be aware of their own cultural values, recognize that there are differences between and within cultures, identify their own biases, prejudices, or stereotypes, and respect others' differences. The provider should also realize that a patient's culture influences his/her oral health decisions. Based on this, the healthcare provider should look for opportunities to increase his/her knowledge of cultural competency through continuing education courses, cultural competency manuals and material, and through spending time with people from other cultures, realizing that this is an ongoing process. When patients know they are valued and are invited to actively participate in determining treatment, they will seek care more often and get the care they truly need, which improves both their health as well as the health of the practice.
41) Kendra Hargis and L. Hope Ellison  
Eastern Kentucky University  
Mentors: Laurel Morton and Martin Brock  

**Enzyme Stability Studies in Ionic Liquids**  
Enzymes are becoming more important on an industrial level as focus has shifted towards more environmentally benign alternatives in the production of, e.g. pharmaceuticals and specialty chemicals. Researchers have shown that some enzymes can be stabilized and retain activity when dissolved in ionic liquids, which are salts that are normally liquid at room temperature. Our work focused on the study of thermophilic enzymes obtained from thermus thermophilus, as these enzymes prefer to function at higher temperatures more appropriate for industrial applications. We have performed kinetic studies to measure the activity of the enzyme with a selection of ionic liquids at various concentrations. It appears that the enzyme is stable in high concentrations with some of the ionic liquids, especially AMIM Cl and AAIM Cl. We will present our results from these studies to determine optimized conditions for ionic liquid/enzyme combinations.

42) Sherry R. Helm  
Western Kentucky University  
Mentor: Rodney A. King  

**Analysis of RNA Mediated Antitermination in Erwinia tasmaniensis Bacteriophage φEt88**  
RNA polymerase is a highly processive enzyme but transcription terminators can block its progress. The ability to override termination signals has evolved as an effective mechanism to control gene expression. Processive antitermination occurs when an antiterminator element modifies RNA polymerase so that it resists termination at multiple downstream sites. This type of antitermination was first discovered in bacteriophage λ and is common in many lambdoid phages. In λ, early gene expression is achieved through the action of the RNA binding protein N and the RNA transcript of N-utilization sites (nut sites). The N-nut complex modifies RNA polymerase such that pausing and termination of transcription is suppressed. Not all antitermination mechanisms require protein factors. In RNA-mediated antitermination, the RNA transcript of polymerase-utilization sites, or put sites, directly convert RNA polymerase into a termination resistant form. This mechanism was first discovered in bacteriophage HK022. Bacteriophage phiEt88, which infects the bacterium *Erwinia tasmaniensis*, was discovered to have a putL and a putR site by sequence analysis. This is the first example of a bacteriophage that possesses put-like antiterminators but does not use *E. coli* as its host. Antitermination reporter fusions indicate that the putative put sites of phiEt88 promote efficient antitermination.
43) Amy Henges, Clifford Brown, Sarah Maloney, Adrienne Daugherty, Amber Guzman, and Michael Statham
Northern Kentucky University
Mentor: Cecile Marczinski
Acute Effects of a Glucose Energy Drink on Information Processing and Subjective Ratings of Stimulation
There has been a dramatic rise in the consumption of energy drinks (e.g., Red Bull, Monster, Amp) in the past decade, particularly among college students. Young people have become enamored with using these beverages to increase alertness, such as when studying. However, there has been little laboratory research to examine the acute effects of energy drinks on cognitive performance. The purpose of this study was to investigate the effects of a glucose energy drink on an information processing task and on subjective measures of stimulation and mental fatigue. Information processing was assessed using a psychological refractory period task that measured information processing when subjects were required to do two tasks at once. In this study, participants were randomly assigned to one of six dose conditions (energy drinks of 1.8 ml/kg, 3.6 ml/kg, 5.4 ml/kg, and 7.2 ml/kg, a decaffeinated placebo beverage and a no drink condition). Participants completed the cognitive task and subjective measures both a baseline and at 30 minutes after dose administration. The results indicated that the energy drink increased feelings of stimulation and decreased feelings of mental fatigue in a dose-dependent fashion. By contrast, the energy drink had no impact on information processing rates, as measured by the behavioral task. The results are consistent with a growing literature that the consumption of an energy drink may only benefit the subjective feeling state of the consumer, but has no impact on actual cognitive processing.

44) Katlyn Hitz
Murray State University
Mentors: Howard Whiteman and Chris Mecklin
Phragmites Management Effects on Anuran Diversity at Clear Creek Wildlife Management Area
The common reed (Phragmites australis) has been taking over aquatic habitats across the country. The use of herbicide to manage the Phragmites has the potential to affect the biodiversity of the surrounding environment. This study focused on the effects of Phragmites management on the diversity of breeding frog species at Clear Creek Wildlife Management Area, KY by comparing species richness and abundance between one experimental (treated Phragmites) and two control areas (Phragmites control, non-Phragmites control). Using an automated recording device, calling surveys were conducted at each of the three sites to gather data on diversity. The frog call data showed no significant difference in species richness or abundance between the study sites, suggesting that Phragmites provides adequate habitat for anurans in western Kentucky. However, we predicted that there will be a difference in species richness and abundance between the sites in the future, as the Phragmites in the experimental site dies off and the habitat structure changes. Overall, this study offers the opportunity to gain a better understanding of the effects associated with invasive plant management on amphibians in aquatic ecosystems.
45) Mary Ann Hodge  
Murray State University  
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 was to detect pulsars in binary star systems within the Large and Small Magellanic Clouds, therefore contributing to the database of known pulsars. This was done through the use of radio wave detection and analysis of data received from large-scale computer processing.

46) Kathryn R. Hogan and Dominique Peel  
Murray State University  
Mentor: William DeWees  
*Prevalence of Bartonella Infection of Feline Patients in Kentucky Animal Shelters*  
Bartonella disease, also known as ‘cat scratch fever’ is a bacterial disease that is carried by arthropod vectors and is common in multi-cat households and feral populations. This disease plays a significant role in both veterinary medicine and public health and safety, as it has the potential to cause disease in many species of animals and has the zoonotic pathogenic potential to infect humans, specifically those who are immune compromised. Thus, as a zoonotic threat, the importance of understanding the prevalence and pathogenesis of Bartonella bacteria is crucial for the safety and health of the public. The majority of testing protocols for Kentucky veterinary offices do not include Bartonella disease, even though over 20% of seemingly healthy cats are thought to be infected carriers of this disease, and the number of infected cats is much higher in those with documented symptoms. It is estimated that only around 25 veterinary clinics are testing for Bartonella infection through the National Veterinary Laboratory (New Jersey). In this study, shelter cats from presumed feral backgrounds (no owner surrenders) will be given a thorough physical exam and tested using a western blot test through the National Veterinary Laboratory to determine the prevalence of Bartonella infection. If Bartonella infection is above the suggested level for healthy cats or those that show clinical signs, this study could have the potential to alter vaccination and testing protocols throughout the state of Kentucky.
47) Krissie Hogan, Shelby Holzknecht, and Katie Redmond
Eastern Kentucky University
Mentor: Mixon Ware

If it IS Broken, Fix It

Though it had long been a homespun truism in the southern United States, the phrase "If it ain't broke don't fix it" was purportedly popularized by former president Jimmy Carter's Director of the Office of Management and Budget, T. Bert Lance (Nation's Business, May 1977). But if it is broken, we must fix it. In response to historically high child and adult obesity rates, rising healthcare costs, and a shortsighted focus on treatment rather than prevention, this research project explored three possible "fixes" for health indicators that are indicative of "broken" lifestyles. First, the impact of advertising on obesity was examined. With more than $4 billion invested in advertising by the fast food industry in one year, it is not surprising that 84% of parents reported taking their child to a fast food restaurant at least once a week. We addressed the question: can these same advertising tactics be used to reverse obesity trends and promote better nutrition? Second, the role of exercise from early childhood through adolescence was considered. Psychological and physiological effects of involvement in one sport, gymnastics, were evaluated relative to physical, social, and character development. Third, homeopathic and alternative medicine were investigated and compared to traditional models of healthcare. Conclusions are presented as to cost-effective measures to promote wellness in the Commonwealth of Kentucky.

48) Cody Hollan
University of Kentucky
Mentor: Justin Wedeking

The Role of Media Coverage on Supreme Court Confirmation Hearings

The Supreme Court is a pivotal element of our government. Once a person is nominated to the Supreme Court, they are dissected in a confirmation hearing. This is true because of the life appointment of each nominee. During these hearings a plethora of questions are asked to investigate the details of every nominee. Through recent research we have seen the importance of each nominee’s candor in the past. What has changed? Why does the evasiveness of nominees no longer matter? This research project took an in-depth look at the relationship between television media coverage and the Supreme Court confirmation hearings. In 1981, many tuned in to watch the hearings of Sandra Day O’Connor. This marked the beginning of gavel-to-gavel television coverage of the Supreme Court confirmation hearings. From this point, we observed the implication that candor no longer has an effect on the way senators vote. Before 1981, the constituents were versed on each nominee through print. We examined that the implementation of television coverage has created an increase of interest in the confirmation hearings. This caused a demand for new information to be printed about the cases. We researched this phenomenon by sifting through New York Times articles, starting with John Harlan in 1955 through Elena Kagan in 2010. With the commencement of the television coverage, we see that senators have been influenced by partisanship and ideology. We hypothesized that this occurs because the constituents can now see how their senators adhere to the voting standards of their constituents. Elena Kagan stated that the modern day confirmation hearings have become a “vapid and hollow charade”. This implies that she believes that candor no longer is the issue and that ideology now governs the senator’s decision.
49) Marquita Grayson-Holt  
**Kentucky State University**  
**Mentors:** John D. Sedlacek, Karen L. Friley, Kirk W. Pomper, and Jermaine D. Lowe  

**Stink Bug Species in Organic Blackberries**

Stink bugs (*Hemiptera: Pentatomidae*) are pests of blackberries in Kentucky. These insects insert their proboscis into each drupelet and extract the juice, as well as leaving a foul odor and taste. Consumer demand for damage-free produce means that growers must use safe and effective management tactics for insect pests. Organic blackberry growers require sustainable and environmentally sound production methods to manage these insects. Spring-mowing of primocanes, on primocane fruiting blackberry varieties could avoid stink bug attack and delay fruit set. This is the second year of this study. In 2011, three replicate plots of each of two varieties, ‘Prime-Jim®’ or ‘Prime Jan®’ were initially mowed to ground level on April 16. Three replicate plots of each variety were then mowed a second time on June 24, 2011. Stink bugs were sampled weekly using stink bug traps as well as visual search methods. The green stink bug, *Acrosternum hilare*, was most abundant, followed by the brown stink bug, *Euschistus servus*. The one spotted stink bug, *E. variolarius*; twice stabbed, *Cosmopepla lintneriana*; and the rice stink bug, *Oebalus pugnax* were also caught. We caught more stink bugs using the visual search method than using stink bug traps.

50) Lindsay Huffman, Whitney Leggett, and Ryan Alves  
**Eastern Kentucky University**  
**Mentor:** Deborah Givens  

**The Future of Community Media: The 2011 EKU Community Journalism Project**

As online media grows and the recession forces companies to downsize, many journalism students are worried about the future of print media and its role in the community. Each year, the Eastern Kentucky University Community Journalism class conducts a research project pertaining to an aspect about media in communities in the university’s service region. The 2011 class decided to capitalize on the discussion about the importance of local media and investigate partnerships between local newspapers and high schools in Eastern’s 22-county service region. The class wanted to examine whether community media in the region had the necessary resources to disseminate information, part of which includes citizens who recognize the significance of local media. After conducting many phone and in-person interviews, the class found that many communities had already formed partnerships with high schools. Many high school administrators stated their schools offered some sort of journalism program, and many newspapers in the region had partnerships with local schools, whether the partnership was in the form of allowing student freelancers to write for the paper or printing the high school’s newspaper. We also created a list of various suggestions about how to begin a partnership for interested parties, including forming a student-run news bureau or even offering scholarships to students going to college who were interested in journalism. The best result, the class discovered, was that our project was a way for local media and high schools make connections for the betterment of journalism as a whole.
51) Kamal Humagain, Sean T. Hutchison, and Ryan D. Gourley  
Western Kentucky University  
Mentor: John All  
Using Satellite Remote Sensing Data to Describe Spatiotemporal Characteristics of Fire in Nepal  
Fire is an integral and complex aspect of environmental systems throughout the world. Understanding the influences on fire patterns is essential to effective natural resource management. Nepal, a south Asian country with ineffective resource management, is especially susceptible to the consequences of uncontrolled fires. A methodology to track fires using satellite remote sensing and geographic information systems is described. This study employed MODIS satellite data from 2000 to 2010 to generate spatial and temporal statistics describing the characteristics of fire in Nepal. Elevation, moisture, seasonality, and other spatiotemporal layers were used to describe the pattern of fires. Areas with human influence, particularly agriculture and grazing, experienced more burned area overall. Fires occurred more frequently during springs and winters. Major causes behind such distributions are grazers, medicinal plant collectors, poachers and smokers or travelers whilst poor resource management overshadows all these factors. Conservation areas were also particularly susceptible to fires, raising doubts about the effectiveness of resource management strategies.

52) Whitney Jackson  
Northern Kentucky University  
Mentor: Vanessa Hunn  
Second Chance Act: A Policy Analysis and Call for Change  
The policy addressed was the Second Chance Act; this Act is responsible for such programs as the Reentry Initiative. This Act addresses the social problem of recidivism amongst violent offenders. Before the Second Chance Act was enforced, the most significant issue was the safety of citizens. Once the Act was signed, offender’s ability to integrate successfully back into the community became a social issue as well. The Reentry Initiative addresses juvenile as well as adult serious offenders who pose as high-risk offenders. The initiative expresses the significance of preparing offenders for successful integration back into society after serving a period in a state training, school, a juvenile or adult correctional facility, or any other facility that is secure. The Reentry Initiative is responsible for created programs to assist the offender while incarcerated and continues throughout the transition into society. The focus of the Second Chance Act is to make communities safer, by also focusing on the reduction of offenders reoffending the Act can also assist with making communities safer. As of September 2011, Congress began to work on the funding for the Fiscal Year of 2012 and the week prior to September 22, 2011; the Senate Appropriations Committee approved a bill that would eliminate all funding of the Second Chance Act for the Fiscal year of 2012. With funding cuts, programs diminish, which will increase violent offender recidivism as opposed to reducing.
53) Benjamin James  
**University of Louisville**  
**Mentor:** Maureen McCall  

*Retinal Dysfunction in the Trpm1/Tvrm27 Genotype: A New Animal Model of Congenital Stationary Night Blindness*

Complete Congenital Stationary Night Blindness (CSNB1) is a human disease characterized by the absence of a b-wave in the electroretinogram (ERG). The ERG is a mass electrical potential recorded at the corneal surface and the b-wave corresponds to the depolarization of retinal bipolar cells following a light flash. We have discovered that a mutant mouse, Tvrm27, is caused by a point mutation in the Trpm1 gene (Trpm1/Tvrm27 henceforth called Tvrm27). Characterizing the functionality of this mouse is of particular importance, due to the fact that most cases of CSNB1 are caused by genetic mutations like the Tvrm27 genotype, and not whole-scale knockouts like the Trpm1 genotype. Results and conclusions of the study are: a proportion of Tvrm27 retinal ganglion cells show rhythmic bursting, lack of visual responses, and a delayed response to light onset.

54) Kayla Jenkins and Chad Jones  
**Western Kentucky University**  
**Mentor:** Joseph Evans  

*Saliva: Decoding the Body*

Saliva testing is a procedure that can be used in a dental office to identify diseases, disorders, or deficiencies by using proteins in saliva as markers. Saliva performs many functions in the mouth to keep the oral cavity in balance. It contains crucial proteins, enzymes, and antibodies that help to prevent infections in the oral cavity. These components in saliva can be used to test for discrepancies in other parts of the body. There are two main types of saliva testing: oral environment testing and pathogen specific testing. Oral environment testing is performed chair-side and takes about 10 minutes. Oral environment testing checks saliva pH, consistency flow production, and buffering capacity. Pathogen specific testing requires 48 hours to incubate and can detect the level of certain bacteria in the mouth. Within the last ten years, saliva testing has emerged in dental offices. It allows professionals to monitor the patient's health, disease onset/progression, and treatment outcomes through noninvasive means at a relatively low cost. Proteins are measured through saliva testing and used as markers to detect the following: caries, periodontal disease, cancers, cardiovascular disease, diabetes mellitus, autoimmune diseases, neurological disorders, and hormonal deficiencies. New technology being used is a microchip implanted under the tissue in the floor of the mouth. This microchip monitors the oral environment and goes unnoticed in the mouth. Research is still being conducted on this product and cost is relatively high at this time. The use of salivary testing in a dental office could be a beneficial and noninvasive way to detect abnormalities in the body especially for those who may not see a physician regularly.
55) McKenzie Johnson  
Kentucky State University  
Mentors: George Antonious and Tejinder Kochhar  

**Analysis of Hot Pepper for Capsaicin and Heavy Metals**

Hot pepper accessions that strongly accumulate heavy metals in their edible portions should be regarded as potential source of heavy metal contamination in the food supply. Phenols, ascorbic acid, capsaicin, and β-carotene are some of the classes of naturally occurring compounds having antioxidants activity in hot pepper. However, elevated concentration of heavy metals in hot pepper fruits could expose consumers to potentially hazardous chemicals. The main objectives of this investigation were to: i) to select candidate accessions of hot pepper having high concentrations of phytochemicals for use as parents in breeding for these antioxidant compounds and ii) assess if hot pepper genotypes that contain great concentrations of capsaicin could be also heavy metals (Cd, Cr, Ni, Pb, Zn, Cu, Mo) accumulators. Seeds of hot pepper (*Capsicum chinense*) were collected from Belize, Brazil, Colombia, Ecuador, Mexico, Peru, Puerto Rico, and U.S. and planted in a silty-loam soil. Fruits of PI-640900 (USA) contained the greatest concentration of capsaicin (1.52 mg g-1 fruit) and dihydrocapsaicin (1.16 mg g-1 fresh fruit), while total major capsaicinoids (capsaicin and dihydrocapsaicin) in the fruits of PI-438648 (Mexico) averaged 2 mg g-1 fruit. PI-152452 (Brazil) and PI-360726 (Ecuador) contained the greatest concentrations of ascorbic acid (1.2 and 1.1 mg g-1 fruit, respectively). PI-438648 (Mexico) contained the greatest concentration of total phenols (349 µg g-1 fruit) while, PI-355817 (Ecuador) contained the greatest concentration of β-carotene among the other 63 accessions tested. Variability of these traits might be utilized via plant breeding approaches for their value-added health-promoting characteristics.

56) Stevi Johnson  
Northern Kentucky University  
Mentor: Isabelle Lagadic  

**Folate Functionalization of Surfactant-Templated Mesoporous Silicates Used as Anticancer Drug Delivery Systems**

Current methods of cancer treatment, while resulting in tumor cell death, also harm healthy cells causing many negative side effects for patients. Mesoporous silica nanoparticles can be used as drug delivery systems to limit chemotherapeutic drug interactions with healthy cells. Recent research has shown that the cetyltrimethylammonium bromide (CTAB) surfactant exhibited specific cytotoxic effects toward cancerous cells without affecting normal cells. This CTAB surfactant is also commonly used as a template for the pore formation of mesoporous silicates. Our research work was to specifically functionalize the exterior pore surface of CTAB–containing mesoporous silicate (MCM) nanoparticles with organic groups capable of targeting cancer cells, such as folate groups. The conjugation of folic acid (FA) groups and fluorescein isothiocyanate (FITC), a dye used to follow nanoparticle cell uptake, to this silicate shell was carried out using two methods. The first method conjugated folic acid or FITC to aminopropyltriethoxysilane (APTES) as a silane precursor before being used to functionalize the nanoparticle. In the second method APTES was first added to the forming shell to functionalize it with amine (NH2) groups, followed by the coupling of the folate or the fluorescein isothiocyanate groups to these amines. The presence of functional groups as well as CTAB in our materials was confirmed by Infra-Red spectroscopy.
Christian Jolly  
Western Kentucky University  
Mentor: Steve Gibson  

**Cold Molecular Gas in the Diffuse Interstellar Medium**  
Stars form during the collapse of cold, dense interstellar clouds. To learn more about the conditions that precede star formation, we wanted to know how such dense clouds form in turn from the ambient interstellar medium. A key step in this process is molecule formation from cold atomic gas, because molecular clouds are more opaque to starlight, so they can become even colder and denser until they collapse under their own weight and form new stars. Using radio telescopes, we observed this phase transition using atomic hydrogen (HI) 21cm-line absorption and carbon monoxide (CO) 2.6mm-line emission. Our results showed that cold HI and CO are sometimes found together in the same area but are more often separate. The level of correspondence varied significantly in different parts of the Galaxy. We showed how trends in the data relate to environmental influences on the evolution of interstellar clouds and the future of star formation in the Milky Way.

David Jones, Phillip Henderson, Noah Nelson, and Paul Auberry  
Kentucky State University  
Mentors: Steve Mims and Rick Onders  

**Contaminant Bioaccumulation in Paddlefish and Hybrid Striped Bass Fingerlings Cultured at Frankfort Waste Water Treatment Plant**  
Paddlefish and hybrid striped bass, chosen as valuable market fish, were cultured in reclaimed, effluent water to identify any contaminant bioaccumulation in fish tissue. Both species were cultured from fingerling to stocker size during a 90 day production trial and the tissue was analyzed by the Kentucky Centralized Lab after the trial period. Bioaccumulation of technical chlordane in paddlefish and hybrid striped bass was detected at levels of 39.4 µg/Kg and 5.4 µg/Kg respectively ($P < 0.05$). Also, selenium was detected at 0.18 mg/Kg in paddlefish and 0.26 mg/Kg in hybrid striped bass ($P > 0.05$); while mercury was detected at 0.02 mg/Kg in paddlefish and 0.04 mg/Kg in hybrid striped bass ($P > 0.05$). Chlordane and heavy metals detected did not surpass FDA regulated action levels. These results indicated that using reclaimed, effluent water and unused wastewater treatment facilities could be a valuable outlet for consumer-safe aquaculture production.
59) James Jones  
University of Louisville  
Mentors: Michal Hetman and Lukasz Somnicki  
**Ribosomal Biogenesis and Neurite Outgrowth**  
An essential requirement of life is the ability to control growth in response to nutrients. Equally important is a cell’s ability to respond to growth factors released by neighboring cells. Such signal transduction pathways have been extensively studied. Expectedly, the high demand for protein synthesis causes such pathways to upregulate the process of ribosome assembly; up to 50% of the transcriptional output of a non-quiescent cell is dedicated to the transcription of ribosomal RNA (rRNA). Cellular growth signals oftentimes converge on transcription factor 1A (TIF1A), which modulates the activity of RNA polymerase I (Pol-I), the dedicated polymerase of rRNA genes encoding the 5.8S, 18S, and 28S rRNAs. In the developing nervous system, dendrite outgrowth is essential and becomes the largest energy expenditure of neurons. Neuritogenesis is controlled by a class of extracellular factors called neurotrophins, including brain-derived neurotrophic factor (BDNF). It is known that BDNF activates the ERK1/2 signaling cascade which ultimately leads to phosphorylation of TIF1A, stimulating nucleolar transcription and promoting neuritic growth. What has yet to be discovered, however, is how increased Pol-I activity leads to neuritic morphogenesis. To gain insight into this important question, we investigated the involvement of ribosomal biogenesis in the process of BDNF-induced dendrite outgrowth in cultured rat forebrain neurons. We measured the morphogenic response to BDNF or a constitutively active mutant form of TIF1A under conditions of inhibited ribosomal biogenesis with shRNAs targeting ribosomal proteins RPS6, RPS14, and RPL4. We observed that knockdowns of those proteins attenuated neuritic morphogenesis without interfering with nucleolar transcription and/or the structural integrity of the nucleolus. Therefore, making new ribosomes is necessary for neurite outgrowth.

60) Karen Jones  
Murray State University  
Mentor: Simone Silva  
**Kentucky Migration**  
Human Capital Theory offers a theoretical basis for economists to predict the likelihood and magnitude of migration. The purpose of this quantitative study is to determine what migration factors draw workers to a particular county, as well as the factors that press workers to leave that county. Specifically, OLS regressions are performed where the percentage of migrants in a county are the dependent variable and ethnicity, education, age, economic indicators and other control variables are included as independent variables. Three interesting results were observed. The first concerns ethnicity. People that migrated to a Kentucky county moved to areas that were racially diverse (non-white). When the dependent variable is “All movers from outside the county”, the percentage of non-whites in a county has a positive, statistically significant coefficient. A similar pattern is observed when considering people migrating from other states, from Abroad, from other states in the South, West, from Puerto Rico and the US Islands. The second interesting result concerns the relationship between poor counties (% population below the poverty level) and migration. Although it is assumed that low income movers migrate to counties that are economically prosperous, that is not verified in the recent Kentuckian case. Poor movers did not migrate to more wealthy counties or to counties with better employment opportunities but to poor counties with low education levels. As expected, other movers did not migrate to poor counties. Finally, movers migrated, neither to rural counties nor counties with large populations, but rather to urban medium-sized counties.
61) Amber Kelly, Ashley McCorkle, and Marilyn Feil  
University of Louisville  
Mentor: Alan Cheng  

**Stress Signaling Pathways Regulated by Chromium Compounds**  
Chromium (VI) compounds are primarily produced for their industrial use in wood preservation, leather tanning, paint pigments and metallurgical products such as stainless steel. Chromium (VI) can readily enter cells and is quickly converted to chromium (III), thus acting as an oxidative agent. Interestingly, chromium (III) has been shown to sensitize insulin signaling and modulate fatty acid and carbohydrate metabolism. While chromium (VI) is a known inhaled carcinogen and its harmful effects are mediated through oxidative stress, the exact molecular mechanisms and cellular/metabolic effects of chromium (VI) have yet to be elucidated. In our studies, treatment of HepG2 cells with chromium (VI) resulted in cell death in a dose dependent manner. We further demonstrated that the treated cells underwent apoptosis, as evidenced by Poly ADP Ribose Polymerase (PARP) cleavage. Immunoblot analysis also suggested the activation of multiple pathways by chromium (VI) exposure. However, we could not detect observable changes in the levels of several metabolic enzymes involved in fat and carbohydrate metabolism. Our current studies involve using siRNAs and pharmacological inhibitors against metabolic enzymes to test whether they mediate the effects of chromium compounds.

62) Kayla Kelly  
Morehead State University  
Mentors: Benjamin C. Williamson and Rebecca S. Miculich  

**The Use of Real-time Ultrasound and Predictive Software to Estimate Carcass Yield and Quality of Fed Cattle**  
Use of real-time ultrasound as a means of predicting endpoints of fed-cattle has shown variable results. Sixty-four crossbred steers and heifers (276 ± 42 kg) were grouped based on similar endpoints that would result in maximum carcass value. Body measurements of rib fat (RF), percent intramuscular fat (IMF), and longissimus muscle depth (LMD) were recorded using real-time ultrasound one week prior to transport to a commercial feedyard in Iowa; predicted carcass composition was estimated (Cattle Performance Enhancement Co., Stratford, TX). Cattle were harvested when visually appraised to have 1 cm of RF. Carcass parameters were recorded for hot carcass weight (HCW), yield grade (YG), and quality grade (QG). Pearson square correlations were used to determine the relationship between predicted carcass measurements, carcass grades, HCW, and performance parameters. Predicted HCW correlated (P < 0.05) with actual HCW and final BW (r = 0.30 and 0.29, respectively). Yield grade correlated (P < 0.01) with predicted RF (r = 0.33) and tended (P < 0.06) to be correlated with the probability of grading prime (r = 0.24). Predicted final BW correlated (P < 0.01) with HCW (r = 0.31) and final BW (r = 0.30): HCW and final BW tended (P < 0.10) to be inversely correlated with predicted IMF (r = -0.22 and -0.23, respectively). Ultrasound IMF correlated (P < 0.05) with YG (r = 0.25). Predicted carcass composition correlated with carcass grid values, actual HCW, and final BW. Carcass predictive software may be an effective tool in uniformly marketing cattle.
Lisa Kenney  
University of Louisville  
Mentor: Diane Chlebowy  
*The Relationship of Depression and Anxiety to Diabetes Self-Management in Men: A Review of the Literature*  
Diabetes mellitus (diabetes) and diabetes-related complications are a leading cause of death in the United States. The direct annual medical costs related to diabetes management have increased in recent years. Diabetes self-management is a complex process involving many facets of self-care and medical treatment. The purpose of the literature review was to examine the relationship between depression and anxiety to diabetes self-management in men. A literature search was conducted using electronic databases (CINAHL, EBSCOhost, PubMed) to search for relevant articles. Keywords used during the search included: anxiety, depression, and diabetes self-management in men. Inclusion criteria for articles were: (1) diabetes self-management in men as the dependent variable; (2) depression or anxiety as the independent variables; (3) publication after 2000; and (4) an English language publication. Findings indicate that few studies address the relationship between depression and anxiety to diabetes self-management in men. However, researchers suggest that there is a relationship between psychological stress, including depression and anxiety, and diabetes/pre-diabetes self-management in the study population. While most studies focus on a comparison between genders, a few studies focus on diabetes self-management in men. Qualitative studies reported the psychological aspects of diabetes in men while focusing on the social factors of masculinity. The literature review reveals that there is an evident gap in the literature with few studies examining the relationship of depression and anxiety to diabetes self-management in men. Further studies should examine this relationship to improve health outcomes and the quality of life of men living with diabetes.

Bryan Kidd, Lauren Stinson, Bailey Blair, Ashley Despard, and Kelsey Stillwell  
Eastern Kentucky University  
Mentor: Melody Farris Jackson  
*Design on the Move - Transporting Interiors that Empower Social Responsibility*  
In a world that struggles to meet basic needs in impoverished areas and disaster relief situations, there is room for new thinking in design. As Interior Design students at EKU we have tackled tough issues of our global social and sustainable responsibility. And, we have put the designs on the road, the water, and the air to bring "Design to the People". Thinking of spaces that are transportable, we have used the tools of our trade to solve problems that center around basic human needs: shelter, food, water, and supporting services. These unique creations will serve as an “Oasis” and solution-based process centers. We hope this project will engage, stimulate, and inspire designers and consumers to think not about what design can do for us, but what we can do for design.
65) Kari L. Koester  
Murray State University  
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.

66) Anastasia Kruse  
University of Kentucky  
Mentors: J. Zach Hilt, Kimberly Anderson, and Robert Wydra  
Biocompatibility Analysis and Cancer Therapy Applications of PEG-Iron Oxide Core-Shell Nanoparticles  
Composite magnetic nanoparticles provide the opportunity for direct tumor targeting, thermal therapy, and controlled drug release. However, the magnetic nanoparticles must be biocompatible in order to be used in cancer therapy applications. By coating iron oxide magnetic nanoparticles with hydrogels formed from poly (ethylene glycol) 400 dimethylacrylate (PEG400DMA), it is hypothesized that their toxicity can be decreased while maintaining their property of heating in alternating magnetic fields. In this study, it was found that when the concentration of nanoparticles was increased, cell viability of NIH 3T3 fibroblasts and A549 lung cancer cells decreased. For example, the cell viability of NIH 3T3 fibroblasts exposed to 100μg/ml PEG400DMA coated nanoparticles was found to be 66%, while fibroblasts exposed to 500μg/ml PEG400DMA coated nanoparticles had a cell viability of 2%, and exposure to 1000μg/ml resulted in a zero percent viability, after 24 hours of exposure. Cells exposed to iron oxide nanoparticles coated with citric acid had higher viabilities than cells exposed to PEG400DMA coated iron oxide nanoparticles, which was likely a result of differences in particle stability. In the thermal ablation studies, A549 lung cancer cells were exposed to citric acid coated iron oxide nanoparticles at a concentration of 15mg/ml for 3 hours to allow particle interaction. The cells were then exposed to an alternating magnetic field for 10 minutes and incubated for an additional two hours. The heat generated by the magnetic nanoparticles in the alternating magnetic field caused a change in temperature of greater than 15 degrees Celsius, which was enough to induce significant cell death.
**Suzanna Lagerroos and Phillip Janz**  
Eastern Kentucky University  
Mentor: Adam Lawson  

*Sensation Seeking Personality Influences Deceptive Acts*  

During pregnancy, an increase in Sensation seeking reflects the need for varied, novel, and complex sensations and experiences (Zuckerman, 1990). Four sub-traits encompass sensation seeking including thrill and adventure seeking (TAS), experience seeking (ES), disinhibition (DI), and boredom susceptibility (BS). Research has shown that sensation seeking affects a person’s arousability of information, reflected by responses to intense and distinctive stimuli. For example, low sensation seekers react to intense stimuli in defensive manners, whereas high sensation seekers react in a more approach oriented manner. To our knowledge, no studies have examined how differences in sensation seeking affect deceptive acts. The current study explored the link between deception and the sub-traits of sensation seeking. To examine deliberate deception, the study had participants pretend to steal documents from an office, and then conceal their knowledge of the burglary but to otherwise respond truthfully. Results indicated that response accuracy was overall higher for deceptive than truthful responses. In terms of sensation seeking, the TAS and ES subgroups had significant results, though they had opposing relationships with the response time of deceptive responses. The TAS subscale had a positive relationship with response time, and the ES subscale had a negative relationship with response time. These results suggest that deceptive responding affects the TAS and ES sub-traits because individuals high in these dimensions tend to seek experiences that affect physical (TAS) or mental (ES) states. The act of deceiving may be more intriguing for these two subgroups since deceiving normally makes individuals nervous. This nervous reaction affects individuals differently who seek out physical and mental stimulation.

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**Megan LaRue**  
Kentucky State University  
Mentors: Chi Shen and Mathew J. Beck  

*Mapping Socorro: Understanding a DFT Code*  

Socorro is a free-ware scientific code that implements Time-Dependent Density Functional Theory (TDDFT). TDDFT is a quantum mechanical method used to determine the time-dependent properties of materials at the level of atoms and electrons. Socorro is programmed in FORTRAN 90/95, a language widely used in scientific computing. The Socorro code is complex, and makes use of many advanced programming techniques. The complexity of the theory implemented and the FORTRAN implementation in Socorro make modifying and extending the code extremely difficult. As part of an undergraduate research experience project funded by the Kentucky NSF EPSCoR project, and connecting Kentucky State University and the University of Kentucky, a map/encyclopedia of the raw Socorro code was developed. The map is documented in an online “wiki”. A wiki is a flexible and extensible website that allows easy creation of interlinked web pages. The wiki structure organizes information about the Socorro code, making it easier to understand and ultimately modify and/or expand. In creating our wiki-based map of Socorro, a number of complexities were unraveled. Specifically the wiki greatly simplified the function overloading and objectification used throughout Socorro. The wiki structure showed users the connections between subroutines and modules, and organized information about the elements of the code in an intuitive way.
**69) Katie Leblanc**  
**Murray State University**  
**Mentor: Iin Handayani**  

**Soil Responses to Farming Management 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.

**70) Melissa Lee**  
**Kentucky State University**  
**Mentor: George Antonious**

**Analysis of Dimethazone and Trifluralin Herbicides in Soil Incorporated with Sewage Sludge**

The sharply escalating production costs associated with the increasing costs of energy and fertilizers to U.S. farmers and the problems of soil deterioration and erosion associated with intensive farming system have generated considerable interest in less expensive and more environmentally compatible production alternatives such as recycling wastes from several processing operations. The increased production of sewage sludge in the U.S. has led many municipalities to consider the application of sewage sludge to agricultural land as a means of sludge and nutrient recycling. We conducted a field experiment to study the impact of sewage sludge on the concentration of two herbicides, dimethazone and trifluralin, in soil under field conditions. Three soil management practices were used i) municipal sewage sludge obtained from Metropolitan Sewer District, Louisville, KY and mixed with yard waste compost and incorporated into native soil at 15 t acre-1 (on dry weight basis) with a plowing depth of 15 cm, ii) municipal sewage sludge was mixed with native soil at 15 t acre-1 with a plowing depth of 15 cm, and iii) a no-mulch (NM) control treatment (roto-tilled bare soil) was used for comparison purposes. The soil in the experimental area was sprayed with a mixture of two preemergent herbicides, dimethazone and trifluralin formulations. We concluded that the increased organic matter content of soil due to the addition of soil amendments (swage sludge and sewage sludge mixed with yard waste compost) increased the concentration of dimethazone and trifluralin retained in soil.
Adapting to "Green" Workspaces in an Open-Floorplan Building

In 2000, the U.S. Green Building Council (USGBC) created a framework for “Leadership in Energy and Environmental Design” (LEED), a certification system for measuring “green” construction and sustainability practices in building design (U.S. Green Building Council, 2011). The Davis Marksbury building opened in the spring of 2011 as the University of Kentucky’s first LEED-certified building. It houses a cross-disciplinary team of people from many areas of study (computer science, engineering, psychology, education, decision and information sciences, language, art and media). However, the openness of the workspaces, in conjunction with the “green” features has lead to some challenges for the people who work in the building. The focus of this investigation was to better understand how the architectural layout and energy-efficiency features of the building affect the productivity and satisfaction of the building’s occupants and visitors. To comply with LEED requirements, many of the controls for the lights, doors and thermostats are automatic and controlled from a centralized computing system. For the next several months, data was being collected through 1) interviews with students, staff and faculty, 2) observations of people, and 3) the building’s computer. The study’s goal was to understand how people adapt to the new building and to make specific recommendations for changes that may increase the productivity and overall satisfaction of the people in the building, without sacrificing energy efficiency, collaborative freedom or environmental control. While these recommendations are tailored for the Marksbury Building and the University of Kentucky, they will be generalizable to other settings.

Mobile Application Security

As mobile applications become widely used, they have become targets for computer criminals to exploit. To help understand the extent of resources that an Android application uses during the installation process, we have built an application that observes the installation and reports what resources and permissions are accessed, or required. By creating this application we can gather valuable data on what resources have been accessed during this installation process, and diagnose whether those applications are considered to be high-risk applications based on their possible vulnerabilities. The app reports a sliding scale number of vulnerability risk.
73) Rachel Malof  
University of Kentucky  
Mentors: Gia Mudd Martin and Debra K. Moser  
Perceived Barriers to Communication with Health Providers and Influences on Health Outcomes in Appalachian Communities

Introduction: Appalachian communities experience significant health disparities compared with other U.S. communities. Communication barriers between patients and health providers have been associated with poor health outcomes. The purpose of this qualitative study was to explore perceptions of health provider communication and influences on health services among Appalachian residents in Kentucky.  
Method(s): A qualitative study was conducted in Appalachian communities as part of a larger study to develop a heart health intervention. Three focus groups were conducted (n = 34) with purposive sampling to recruit participants using a semi-structured discussion guide. Focus groups were audio taped and the transcriptions analyzed using qualitative description. Text specific to provider communication was coded and a code network developed to identify themes.  
Results: Several themes emerged from the data. Unclear communication by health providers was the most prevalent and impeded participants’ understanding of health issues and contributed to feelings of inadequacy. Intimidation was also a barrier, with participants describing providers as unapproachable and interactions uncomfortable. Another barrier was a lack of continuity of care. Attendance by various providers and fragmented services were described as being disruptive to the development of trust, diminishing open communication.  
Discussion & Conclusions: Research on health communication barriers in Appalachian populations is limited. This study indicates that the use of language appropriate to the level of client understanding and development of consistent client-provider relationships can reinforce client self-confidence and engender comfort and trust. More effective communication guided by the findings has the potential to influence health outcomes in Appalachian communities.

74) Nicholas Mason and Corey Moore  
Morehead State University  
Mentors: Steve Chen, William Salazar, and Steve Middleton  
An Examination of Behavioral Data as Indicators of Student-Athletes’ Academic Success

Due to the over-emphasis on the role of student-athletes’ on college campuses (Thompson, 2008; Wieberg, 2008), the researchers collected a series of behavioral data to analyze athletes’ daily routine based on the research concept of past studies (Becker, 1965; Csikszentmihaly & Larson, 1994; Lee, Park, & Shin, 2007). 186 student-athletes (125 males and 61 females) of a Kentucky regional university (a NCAA Division-I affiliated institution) completed the 11-item daily life behavioral survey from early September to mid-October, 2011. The results indicated that the participants spent a daily average of six hours studying and attending classes and four hours in athletic practices and competitions. The participants’ time spent in leisure and social activities also varied significantly based on their gender identification, racial background, grade level, and participatory sport. Participants’ academic performance (grade point average) was found to be positively correlated (p < .01; Pearson r = .497) with the time spent in attending classes and studying, and negatively correlated with the time spent in competition and practice and leisure activities (p < .01; Pearson r = -.357). In conclusion, the sample group of this study did not engaged in a high number of hours in athletic related activities as other reports suggested. Nevertheless, the need to ensure that student-athletes balance their academic and athletic life was indicated by the results. The researchers provide further discussion and practical suggestions on how to deal with the issue of student-athletes balancing their time between studying and athletic demands.
75) Michael Mazzotta, Janeth Davidson, Alex Montavon, and Jackson Overton  
Eastern Kentucky University  
Mentors: Darrin Smith, Buchang Shi, and Rebekah Waikel  
Recent Advances in Renewable Fuel Production for Kentucky  
The possibility of manufacturing renewable fuels domestically is necessary stemming from energy dependence. Possible solutions are being investigated for alternative sources of energy in the Commonwealth of Kentucky and the following research endeavors describe different aspects being conducted. One project involved the improvements to algal oil production for biodiesel. Identification of genes that promote lipid production in the algae, Chlorella protothecoides, has been performed by comparing the transcriptomes (all mRNAs) of algae in known conditions that promote lipid production to those in normal growth conditions. The unique mRNA signature of lipid production is used to determine novel environmental conditions that increase lipid production. A second project investigated cellulosic biomass as a renewable feedstock. Breaking down cellulosic biomass sources can provide a renewable feedstock to aid in the development of biofuels (through sugar production) and more valuable compounds (replacing petrol-based compounds). Studies with liquid ionic salts at room temperature have shown solubilization of biomass. However, chemical modifications to the biomass that occur during this process are unknown, but ambient ionization mass spectrometry has assisted in characterizing these dissolution products. Finally, investigations have occurred with the formation of branched hydrocarbons during Fischer-Tropsch reactions. As a practical way to produce fuel from biomass through the Fischer-Tropsch (FT) reaction, the mechanism for the reaction is still a subject of debate. How the branched hydrocarbons are formed is still not clear. Branched alkanes from C8 to C12 were synthesized and identified against the branched hydrocarbons produced by the FT reactions using gas-chromatography (GC). The formation of branched hydrocarbons was interpreted by the alkylidene mechanism for the FT reaction.

76) Alia McDole  
Morehead State University  
Mentors Janet Rice McCoy and Brice Yates  
ET Magazine: “Beauties of the Week” in from 1950s to 1970s  
For generations internalized racism has existed between light-skinned and dark-skinned Black women. Scholars such as Hughes and Hertal (1990), Klonoff and Landrine (2000), and Hill (2011) have explored this form of racism and the role society, family, and especially media have contributed to the process. This preliminary study examines how visual images in JET magazine contributed to internalized racism. JET magazine is a current weekly magazine for readers of African descent and was first issue was published on November 1, 1951. The data set consists of photographs of “Beauties of the Week” from November 1951 to August 1971. Internalized racism was explored by looking at the photographs to determine whether light-skinned or dark-skinned Black women were more prevalent. Text accompanying the photos was analyzed to determine if a stigma was attached to being dark-skinned. Ultimately, this study explored if racism can exist within the same racial group impacting magazine cover models, job opportunities, and even a mate.
77) Katelyn McNamara  
**University of Kentucky**  
**Mentor:** Jonathan Lifshitz  

**Diffuse Traumatic Brain Injury Exacerbates Inflammatory Pain**  
The prevalence of traumatic brain injury (TBI) in the United States exceeds 1.5 million annually. The majority of TBIs involve diffuse mild to moderate brain injuries resulting from falls, motor vehicle accidents, and contact sports. TBI reduces quality of life as cognitive, emotional and sensory deficits manifest. Similar abnormal or adverse behavioral responses can be elicited in a rat model of diffuse mild to moderate TBI (McNamara, 2010). The purpose of the present study was to test whether experimental brain injury increases behavioral signs of pain associated with cutaneous inflammation. Moderate fluid percussion injury (FPI) (1.9 atm), mild FPI (1.0 atm) or sham brain injured rats were evaluated bi-weekly for thermal hypersensitivity using cool and warm stimuli over a 10-week time course. At the 10th week, 0.5% carrageenan was injected intraplantar into the left hind paw to produce inflammatory pain. Withdrawal responses to cool and heat were tested one-three hours post-injection. To assess spontaneous pain at 2-3 hours post-injection, we recorded the duration of paw withdrawal in the absence of stimulation over 3 min. The results indicate that neither mild nor moderate brain injury changed thermal responses over the 10 week period. After the induction of inflammation, sham and TBI increased heat hypersensitivity to the same extent. Furthermore, both mild and moderate TBI dramatically increased behavioral signs of spontaneous pain at 1, 2 and 3 hours post-carrageenan. These results indicated that TBI does not change the sensitivity of tactile and thermal somatosensory pathways, but does increase the spontaneous pain.

78) Viktoria Melnyk  
**University of Kentucky**  
**Mentors:** Melanie G. Hardin-Pierce and Susan K. Frazier  

**Mortality, Baseline Inflammatory Status and Cardiovascular Function in Adult Mechanically Ventilated, ICU Patients**  
Inflammation may induce cardiovascular dysfunction, prolong mechanical ventilation and contribute to weaning failure and mortality in critically ill adults. A comparison of baseline status in patients requiring mechanical ventilation who survive with those who die may contribute to understanding of factors that increase mortality. The purpose of this descriptive, comparative, repeated measures study was to compare baseline demographic, clinical, inflammatory and cardiovascular variables measured in adult ICU patients receiving mechanical ventilation who survive with those who die. Demographic and clinical data were abstracted from the medical record. Cardiovascular variables were measured using impedance cardiography. Venous blood was obtained for measurement of C- reactive protein and inflammatory cytokines. Patients (n = 38) were primarily male (57%), married (54%), Caucasians (95%) with an average age of 53 + 16 years. Patients were ventilated for 12 + 7 days, primarily for a respiratory diagnosis (62%). One third of patients (32%) died and those who died exhibited twice the comorbidity burden (p = 0.02); higher central venous pressure (19 + 6 versus 12 + 6 mmHg, p = 0.01), lower mean arterial pressure (65 + 13 versus 81 +, 13 mmHg, p = 0.04) and higher NTproBNP (6898 + 4631 versus 2944 + 2648 pg/ml, p = 0.05) without significant differences in inflammatory status between those who survived and those who died. Heart failure, exhibited by elevated venous pressure, B-type natriuretic peptide, and hypotension, were more likely at baseline in ventilated patients who later died during hospitalization.
79) Bradford Miller  
Morehead State University  
Mentor: Adrian Mandzy  

*Beyond the Cold War; an Analysis of Operation Frantic*

With the cooling of relations between the Soviet Union and the United States in the aftermath of World War II, the significance of Poltava’s role in the war is inadequately reflected in most popular histories. The paradoxical successes of Operation Frantic did not fit neatly into the politically tainted memory that influenced American and Soviet scholars alike during the Cold War era. Although the operation’s impact on the outcome of World War II is debatable, the diplomatic and logistical accomplishments of the men and women responsible for the planning and rebuilding of the joint Soviet-American airbase at Poltava deserve more than mere footnotes in the historical record. Additionally, Allied strategic bombing missions launched from Poltava severely damaged previously unreachable German industrial centers. By comparing archival records housed in the National Archives with the stated objectives of Operation Frantic, a thorough and unbiased analysis was conducted. Additionally, an analysis of current memorials and monuments to the operation was prepared and a case made that the operation is inadequately memorialized due to Cold War tensions. Through increased collaboration on the governmental and academic levels of both Ukraine and the United States, the historical memory will reflect the significance of Poltava’s distinction as the only combined Soviet-American headquarters in World War II.

80) Carmen Miralda  
University of Louisville  
Mentor: Moises A. Carreon  

*Zeolitic Imidazole Framework-8 Catalysts in the Conversion of CO2 to Chloropropene Carbonate*

The catalytic activity of ZIF-8 and amine-functionalized ZIF-8 catalysts in the synthesis of chloropropene carbonate from CO₂ and epichlorohydrin is demonstrated. In contrast to hitherto known catalysts, ZIF-8 catalysts displayed high epoxide conversions, and moderate to high selectivities to chloropropene carbonate at reaction temperatures as low as 70°C. No co-catalysts or solvents were required during the reaction. The incorporation of ethylenediamine in ZIF-8 enhanced its catalytic performance due to the higher CO₂ adsorption capacity of the amine-functionalized samples. The ZIF-8 catalysts however, lost their distinctive crystalline structure and superior catalytic performance when attempts were made to recycle them after use.
80) Jonathan Modaff  
Morehead State University  
Mentor: Wendell O’Brien  
An Analysis of the Elements of Relativism and Skepticism within Taoism  
The Taoist philosophy embraces several defining theories and conceptions that collectively act as the foundational elements to this distinct way of thought. This study provides an analysis of two major components central to the Taoist philosophy: relativism and skepticism. These two particular inherent Taoist qualities have greatly shaped the position of Taoism within the realm of world philosophies and have also acted as precursors to various relativist and skeptic systems of thought in both the East and the West. Chuang Tzu's "The Chuang Tzu" is an extremely influential Taoist text and provides a collection of sayings and parables that illustrate the strong relativist and skeptic attitude particular to Chuang Tzu's form of Taoism. This study is limited mainly with the first seven chapters, known as the "Inner Chapters", of "The Chuang Tzu" and will be used as the basis for analysis.

81) James W. Morris  
Bluegrass Community and Technical College  
Mentors: Norman Strobel and Larry Porter  
UV-C Resistance of Probiotic Lactobacilli and Deinococcus Radiodurans  
The bacterium Deinococcus radiodurans is unusually resistant to damage and death caused by diverse promoters of oxidative damage, including gamma radiation, UV-C radiation, hydrogen peroxide (H2O2), and dessication. This resistance is apparently due primarily to the presence of a manganese-based antioxidant system that protects cell proteins from oxidative damage and inactivation. Several bacterial species in the genus Lactobacillus are also relatively resistant to gamma radiation and accumulate manganese. Thus, it was hypothesized that a mixed Lactobacillus culture from a commercial prebiotic product would exhibit manganese-dependent UV-C resistance similar to that of D. radiodurans. This was tested experimentally by spreading dilute bacteria suspensions on the surface of agar media, followed by exposure to UV-C for 40, 60, 80, or 120 seconds. Control plates received bacteria but were not exposed to UV-C. Colonies formed by surviving bacteria were counted after 1-2 days of incubation. Results of preliminary experiments indicated that the two mixed Lactobacillus cultures employed were more resistant to UV-C than was a known susceptible bacterium, Serratia marcescens. A laboratory strain of Escherichia coli was intermediate in its UV-C resistance. The UV-C resistance of one Lactobacillus culture was greatly enhanced by growth on a manganese-rich medium prior to UV-C exposure. Results of experiments designed to compare the manganese-dependence of UV-C resistance in Lactobacilli and D. radiodurans are presented. The possible contribution of oxidative stress resistance of Lactobacilli to their probiotic effects are discussed.
82) Daniel Murphy
University of Louisville
Mentors: Daniel Conkin and Petra Haberzettl

Environmental Pollutants and Obesity: Effects on Circulating and Bone Marrow Endothelial Progenitor Cells

Environmental air pollutants, such as fine particulate matter (PM2.5), are associated with increased risk of cardiovascular disease (CVD) and mortality. Obesity is an emerging epidemic in the United States and is associated with increased risk for the development of diabetes and CVD. Endothelial progenitor cells (EPCs) contribute to endothelium health and are important in angiogenesis and endothelial repair, and the levels of EPCs in the blood are a prognostic indicator for cardiovascular health. This study was designed to investigate the effects of diet induced obesity (DIO) and exposure to PM2.5 on murine endothelial progenitor cell populations.

C57BL/6 mice were exposed to concentrated air particulate matter (CAP, 6-10x concentrated ambient PM2.5, 6h/d, 4, 9, or 30 days), and/or fed high fat diet (60% kcal from fat, 4 or 12 weeks). Mice exposed to PM2.5 showed a significant decrease in peripheral blood EPC (PB EPC) levels, measured as Flk-1+/Sca-1+ cells by flow cytometry. The decrease in circulating EPCs was accompanied by an increase in bone marrow derived cells (BMDCs), positive for Flk-1+/Sca-1+ and Dil-acLDL+/UE-lectin+ as measured by immunofluorescence microscopy. DIO also decreases PB EPC levels, and increases the number of bone marrow derived Flk-1+/Sca-1+ and Dil-acLDL+/UE-lectin+ cells. When high fat fed mice were exposed to PM2.5, we found a decrease in PB EPCs, along with an increase in BMDCs. However, combination of PM2.5 and HFD had no significant additive effect on EPC numbers. These results indicate that PM2.5 and DIO impair EPC mobilization from the bone marrow in a similar, non-additive way.
83) Mikell Nelson and Alyssa Nantz  
Western Kentucky University  
Mentor: Rebecca G. Tabor  

*Dental Health Literacy: A Plea For Simplicity*  
Health Literacy is a real issue for the majority of the population in our country. In general, the current health literacy skills of the overall population of our nation is falling short of what health systems require to be able to successfully manage one’s health. Our current healthcare system is not designed or equipped to serve patients with low health literacy skills. Dental Health Literacy is an emerging issue of great importance that if taken seriously has the potential to revolutionize dental healthcare for the patient. By utilizing methods of effective communication between the patient, dental team, and community, we will promote cooperation and understanding, which ultimately will all result in a more efficient, successful dental care system and the best possible care for the patient. The goal of this presentation is to provide a simple framework of what we, as health care professionals, can do to make it easier for people to obtain, process, and understand basic health information and services needed to make appropriate health decisions. If we act on these steps, positive outcomes will result for us and for the patients we have stewardship over. It is our duty to raise awareness to the current disconnect between our health care system and the health literacy skills of our patients, discuss ways we can simplify the system to better serve the current needs of our patients, and show how such changes will benefit our patients and ourselves.

84) Pritesh Patel  
Murray State University  
Mentor: David Eaton  

*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.
In the present study, we have reported the green synthesis of gold nanoparticles (GNPs), using potato starch as reducing as well as stabilizing agent in buffer solution. The resulting GNPs were near spherical in shape with average diameter of 15 ± 5 nm. The synthesized nanoparticles were characterized and investigated for their antibacterial properties against both gram negative (Escherichia coli) and gram positive bacteria (Staphylococcus epidermidis). These GNPs were found to possess significant dose dependent antibacterial activity against both strains. GNPs showed a significant catalytic activity and can easily be functionalized using a simple, greener method for various applications in non-polar chemistry. The overall results suggested the formed multifunctional starch encapsulated GNPs (St-GNPs) can be useful as antibacterial agent, catalyst and for wide variety of environmental, biomedical, and industrial chemical application.

Due to 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 project offers a perpetual 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 project discusses work-life balance as a third variable to the relationships among minority mothers. We interviewed twelve minority mothers in regards to work-life balance and received valuable information on the assimilation of a minority mother and how her life is affected by her home and work life. 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, specifically minority mothers.
87) Leslie Potts  
Murray State University  
Mentor: Dayle E. Saar  
*Distinguishing Between Morus rubra, Morus alba and Their Various Hybrids*  
White Mulberry (*Morus alba*) is a widespread, non-native weedy species in the US, which readily hybridizes with the native Red Mulberry (*M. rubra*). Present criteria to distinguish between Red and White Mulberry, utilized for over 150 years, are unreliable, based on our DNA analyses. Taxonomists have relied almost exclusively on the degree of leaf pubescence (hairs); heavy on Red vs. little or none on White. Our research uses molecular markers to identify “pure” species as well as interspecific (between-species) hybrids. These molecular fingerprints demonstrate that some individuals of White Mulberry have as much pubescence as Red Mulberry, which has led to many individuals of pubescent White Mulberry being misidentified as Red Mulberry. Currently, we are comparing our DNA identifications with trees in an effort to discover more reliable morphological characters for field identification. Leaf vein patterns appear to be much more reliable than pubescence, and more testing is underway to confirm this. We are also surveying the status of Red Mulberry in Kentucky to determine if “pure” individuals exist in significant numbers, or if it is being swamped-out through hybridization with White Mulberry. Results of this study will be communicated to appropriate conservation agencies at various levels.

88) Margaret Powell and Kaitlyn Sullivan  
Northern Kentucky University  
Mentor: Keith Walters  
*Fullerene Research: Spectroscopic Study of Charge Transfer in Fullerene-Transition Metal and Molecular Wire Supramolecular Organometallic Systems*  
Our research group is interested in designing novel supramolecular systems that exhibit photo-induced charge transfer excited states. These systems fall into two categories: 1) those that unite fullerene and transition metal subunits and 2) those that create extended organic structures that enrobe a transition metal center and allow for their polymerization into linear “molecular wires”. This poster presents recent spectroscopic measurements on several subunits of interest to both of these categories, as well as some initial polymeric results. Presented measurements include absorption, emission (steady-state and time-resolved), and transient absorption measurements at various temperatures. Results will be presented, along with an interpretation of the picture they paint for these supramolecular complexes.
Policy Strategies for Preventing Teen Pregnancy in Kentucky

Teen Pregnancy in the state of Kentucky has been an area of concern for educators, families, and policy makers for many years. The state of Kentucky is among the top ten states with the highest teen pregnancy rates in the nation (CDC, 2010). The national birth rate for teens age 15-19 in 2008 was 41.5 per 1,000. Kentucky's teen birth rate was 55.6 per 1,000. Even more alarming is the rate among Black and Hispanic youth which were 72 per 1,000 and 133 per 1000, respectively. Although there has been a general decline in teen pregnancy across the United States, rates of teen pregnancy in Kentucky continues to remain high. The financial, social, and psychological costs associated with teen pregnancy weigh heavily on teen mothers, families, and the public sector (Hoffman, 2006). Thus, it is critical that sex education programs be restructured to help alleviate this problem. The aims of this review were to identify factors that are associated with teen pregnancy among adolescents and provide policy suggestions (supported by empirical research) to reduce teen pregnancy rates for Kentucky adolescents. Findings from the review indicated that multiple factors were associated with teen pregnancy rates including poverty and income inequality, lack of effective sex education, and lack of parental support/communication about sex, to name a few. Teen pregnancy rates also varied across ethnic groups. Given the disparities among ethnic and cultural groups, it is imperative that policy makers and educators design sex education curricula and prevention efforts to lower the rates for all groups. Our paper presents a model based on the bioecological theory by Urie Bronfenbrenner geared towards creating sex education policies that involve overlapping systems (e.g., family, community, culture/ethnicity, religious beliefs, socioeconomic status) to reduce teen pregnancy. This proposed policy is evidence-based and includes a comprehensive approach to preventing and lowering teen pregnancy rates in Kentucky. It is expected that efforts from policy makers, schools, families, churches, businesses, and adolescents themselves will result in healthy sexual behaviors and choices for teens and consequently a significant reduction in teen pregnancies.
Enhanced Nanoporous Minerals for Energy Processes

The nanoporous crystalline mineral sitinakite (crystalline titanium silicate) is a highly selective fast ion conductor that is being used for targeted removal of cesium and strontium from high-level waste solutions at DoE facilities. In addition to environmental concerns, titanium silicates and similar zirconium and yttrium silicates, have a wide range of evolving applications from battery materials, hydrogen storage, and rare earth and transition element catalyst for gasses and petrochemicals. Sitinakite is stable under a wide range of pressure, temperature, and chemical conditions which make it an ideal host material to perform selective chemistries in extreme environments. Therefore, our investigation was to determine the fundamental structural properties of this unique mineral for exploitation toward other energy related applications. This research led to several discoveries that reveal multiple ion exchange steps that serve to enhance ion selectivity, and the host crystalline framework control these steps as well as the chemistry and hydration state of the native compound. To determine the exchange mechanisms, we collected high temporal resolution in situ spectroscopy data, coupled with diffraction and computational studies, to capture the ion exchange process from the natural sodium form, to the enhanced hydrogen form, and finally to the cesium exchanged structure. Recent advances to this century old puzzle in crystal engineering of rare minerals as well as new materials for hydrogen and REE catalysis, and how understanding the atomic scale properties can be used for novel designer nanostructured compounds are presented.

Gender Differences in Diabetes Self Management Among Urban Hispanic Latino American Adults: A Pilot Study

Gender differences exist when considering the prevalence of diabetes and death rates among Hispanic Latino Americans. Limited research addresses the influence of gender differences on diabetes self-management among this population. The purpose of this study is to identify gender differences of factors which positively and negatively affect diabetes self-management among urban Hispanic Latino American adults. In this mixed-method design, 36 Hispanic Latino American adults with type 2 diabetes mellitus (T2DM) will be recruited from two urban agencies. An 18-item instrument will be used to obtain demographic and medical history data. Three groups comprised of only women and three groups comprised only of men will be used to identify factors which affect diabetes self-management. Participants will engage in a 60 minute audio-recorded discussion offered in English or Spanish. Quantitative data will be analyzed using SPSS 17.0. Qualitative data will be transcribed and then analyzed using Atlas ti 6 ® software. Codes will be assigned to each text passage with key themes and concepts identified. Themes and concepts will be validated by two focus groups to arrive at consensus of findings. The results of this study are pending. Data collection and analyses will be completed by December 2011. Findings will be presented at Posters at the Capitol in January 2012. This study further addresses the existing health disparity among Hispanic Latino American adults with T2DM. An understanding of gender differences and diabetes self management behaviors will assist with the design of gender-specific interventions in improving the health outcomes of this population.
92) Zaheen Rabbani  
University of Kentucky  
Mentors: Michael B. Reid and Jennifer Moylan  
*Catabolic Response of C2C12 Myotubes Following Doxorubicin Exposure*  
Doxorubicin, a commonly prescribed chemotherapeutic agent, causes skeletal muscle wasting in cancer patients undergoing chemotherapy. Doxorubicin increases oxidants and decreases skeletal muscle mass in vivo. The purpose of this study was to investigate the cellular response of doxorubicin in vitro. We hypothesized that doxorubicin causes a catabolic response in C2C12 myotubes, increasing ROS and promoting atrophy. Cultured myotubes were exposed to doxorubicin (0.2 μM, 2-48 hrs). Cytosolic oxidant activity was measured using the redox sensitive probe dichlorofluorescin. We used real time PCR and Western blot to measure mRNA and protein for ubiquitin ligases MAFbx/atrogin-1 and MuRF1, the caspase-3 protease, and myofibrillar proteins actin and myosin. Oxidant activity was elevated 13 ± 9 % (2 hrs, n=18, p<0.05). Following doxorubicin (48 hrs) actin (-49 ± 4 %, n=3, p<0.01) and myosin (-40 ± 9 %, n=11, p<0.05) proteins were decreased. Doxorubicin increased MAFbx/atrogin-1 mRNA 16 and 24 hrs (74 ± 8 %, n=3, p<0.01; 132 ± 8 %, n=3, p<0.01) following exposure, and elevated protein at 24 hrs (15 ± 4 %, n=13, p<0.05). Doxorubicin did not alter MuRF1 mRNA or protein (data not shown). Caspase-3 precursor and active form were elevated 6 hrs (precursor: 25 ± 7 %, n=3, p<0.05; active: 125 ± 35 %, n=3) and 24 hrs (precursor: 36 ± 6, n=3, p<0.01; active: 87 ± 12 %, n=3, p<0.01) following doxorubicin. Our data suggested that doxorubicin increases oxidants, leading to downstream catabolic signaling.

93) Casey Reineking  
Murray State University  
Mentors: Murphy Smith, Don Chamberlain, and Holly Rudolph  
*An Examination of Inventory Valuation Convergence under Generally Accepted Accounting Principles and International Financial Reporting Standards*  
The American economy has enabled more people to enjoy a high standard of living than at any other place or time in the history of the world. Key to that economic success story is America's free enterprise system, a balance of a citizen's freedom to operate a business with appropriate government oversight, which includes oversight of financial reporting by publicly-traded companies. Numerous publicly-traded companies (i.e., companies whose stock is bought and sold on the stock market) operate in Kentucky and some are headquartered in Kentucky, such as Ashland (ASH), Humana (HUM), Lexmark (LXK), and Papa John's (PIZZA). The stock market requires that high-quality, reliable financial information is made available to investors, lenders, and other interested parties. Such information depends on guidance provided by appropriate financial reporting standards. A revolutionary trend in financial reporting is convergence of U.S. standards of accounting, called Generally Accepted Accounting Principles (GAAP), with International Financial Reporting Standards (IFRS). A key accounting issue facing accounting standard-setters is inventory valuation. Both GAAP and IFRS permit inventory valuation methods known as First-In-First-Out (FIFO) and weighted average. However, IFRS does not allow Last-In-First-Out (LIFO), while GAAP does allow this method. This study examined reasons why IFRS prohibits the LIFO method and the impact of a shift from LIFO to an IFRS-allowed method. Results of a case study analysis indicated that this change will significantly affect the financial results of publicly-traded companies, and thereby will have major implications to the overall U.S. economy, including federal tax revenues and investor decisions.
94) Justina Riddick  
Kentucky State University  
Mentors: John D. Sedlacek and Karen L. Friley  

*Does a Methyl Salicylate-Based Lure Attract Lady Beetles to Blackberries?*  

Kentucky produces approximately 45 ha of blackberries for a total value of $1,000,000 annually. Demand for locally grown and damage-free blackberries usually exceeds the supply. Developing more sustainable production methods, including the use of beneficial insect attractants, such as a methyl salicylate-based lure is important for the success of small and limited resource farmers. Eight blackberry sites, including six collaborators, were located in Franklin, Fayette, Scott and Shelby Counties, Kentucky. Three plots were certified organic and the other five plots had no pesticides applied. Four sticky traps and posts were placed in all plots and two PredaLure® lures were placed in each of the PredaLure plots. Sticky traps were collected weekly, placed in labeled ziplock bags and taken to the laboratory where lady beetles were identified using an illuminated magnifier. Total number per species and average number per trap were then calculated. Seven species of lady beetles were identified in the PredaLure plots, while six species were found in the non PredaLure plots. PredaLure plots had more pink lady beetles, while non PredaLure plots had more Asian, spotless, mildew-eating and orange-spotted lady beetles. Results will be discussed with respect to previous laboratory attractancy studies and location of each sampling site, as well as the surrounding landscape.

95) Terri Rose  
Morehead State University  
Mentor: Rebecca Roach  

*The Space Movie Project: Digital Movie Making for Innovative, Real World Thinking*  

The Morehead State University (MSU) College of Education collaborated with the faculty of the College of Science & Technology, MSU Space Science Center, MSU Center for Regional Engagement and Kentucky Dataseam to facilitate a two-day workshop, online learning community and ongoing in-school support for 74 students (50% females) from counties in Eastern Kentucky. Through the use of cutting edge technology, in both desktop movie making and research tools, high school science and technology teachers, and students from rural, impoverished schools were given an opportunity to work with Science Education professors, Space Science engineers and educational technology specialists to teach their students to research and record digital documentaries. These documentaries were later showcased on the “larger than life” ceiling of The Digital Star Theatre, a 100 seat multi-function, state-of-the-art digital classroom. This mixed-method study analyzed movie rubric scores to measure impact on student learning. It also conducted surveys with students and teachers to measure the project's impact on instructional practices. Interviews with participants were conducted to describe the impact on student career and college choices, and science departments' astronomy programs. Survey data were also collected on student college and career choices related to STEM fields. 21st century skill integration is crucial to college and career readiness in middle and high schools. The results of this study are significant to their applications toward project-based learning in the classroom.
96) Tyler Rose, Brandon Molton, Hyoung Sup Lim, Benjamin Cahall, Justin Hamilton, and Daniel C. Graves
Morehead State University
Mentors: Kevin Brown, Benjamin K. Malphrus, Jeffrey R. Kruth, and Eric T. Thomas

The Cosmic X-Ray Background NanoSat (CXBN): An Improved Measurement of the Diffuse X-Ray Background

The goal of this mission is to significantly increase the precision of measurements of the Cosmic X-Ray Background in the 30-50 keV range, thereby constraining models that attempt to explain the relative contribution of proposed sources lending insight into the underlying physics of the early universe. The mission addresses a fundamental science question that is clearly central to our understanding of the structure, origin, and evolution of the universe by potentially lending insight into both the high energy background radiation and into the evolution of primordial galaxies. CXBN will map the Extragalactic Diffuse X-Ray Background (DXB) with a new breed of Cadmium Zinc Telluride (CZT) detector. The DXB is a powerful tool for understanding the early universe and provides a window to the most energetic objects in the distant universe. Although studied previously, existing measurements disagree by about 20%. With the novel CZT detector aboard the CXBN, a new, high precision measurement is possible. In ~1 year of operation the experiment will have collected 3 million seconds of good data, reaching a broadband S/N ~250. The science mission requirements fortunately allow for the design of a relatively simple spacecraft, making this mission ideal for the CubeSat form factor. Additionally, because of their low cost and short development time, cubesats represent an ideal learning opportunity for students, particularly at the undergraduate level. The CXBN mission has been awarded a flight opportunity by the NASA Educational Launch of a Nanosatellite (ELaNa) program and is scheduled for launch in July 2012. The satellite is currently under development, and is primarily constructed and tested by undergraduate students who also participate intimately in the design of its systems.
97) Kyla Ross  
Kentucky State University  
Mentors: George Antonious and Tejinder Kochhar  
**Half-lives of Endosulfan Isomers on Field Treated Vegetables**

The environmental fate of field-applied synthetic pesticides has been under investigation for a number of years. Endosulfan 3 EC, a mixture of α- and β-stereo isomers, was sprayed on field-grown pepper and melon plants at the recommended rate of 0.44 kg A.I. acre⁻¹. Plant tissue samples (leaves and fruits) were collected 1 h to 30 days following spraying and analyzed for endosulfan isomers. Analysis of samples was accomplished using a gas chromatograph (GC) equipped with a mass detector in total ion mode. The results indicated the formation of endosulfan sulfate as the major metabolite of endosulfan sulfite and the relatively higher persistence of the β-isomer as compared to the α-isomer. The initial total residues (α- and β-isomers plus endosulfan sulfate) were higher on leaves than on fruits. On pepper and melon fruits, the α-isomer, which is the more toxic to mammals, dissipated faster (T1/2 = 1.22 and 0.95 d, respectively) than the less toxic β-isomer (T1/2 = 3.0 and 2.5 d, respectively). These results confirm the greater loss of the α-isomer compared to the β-isomer, which could ultimately impact endosulfan dissipation in the environment. The higher initial residues of endosulfan on pepper leaves should be considered of great importance for timing field operations and the safe entry of harvesters due to the high mammalian toxicity of endosulfan. Endosulfan residues on treated pepper and melon fruits might exceed the tolerance level of 2 mg kg⁻¹ under intensive agricultural use where endosulfan is recommended on a two-week schedule for control of many vegetable insects.

98) Maria Scherrer  
Northern Kentucky University  
**The Bioavailability of Lactate Dihydrate and Calcium Lactate Monohydrate**

Athletes are continuously searching for an advantage over their competitors. A new ergogenic aid containing Lactate Dihydrate and Calcium Lactate Monohydrate has recently been touted in the mainstream sports media for performance enhancement. However, there has been no scientific evidence to support or refute these claims. Manufacturers of the supplement claim improved performance through increased energy and a decrease in lactic acid production. While energy is produced through the lactate shuttle system, availability as a substantial source of energy during exercise is questionable and not currently supported by existing research. Also, supplementing with external lactate should not directly affect lactate production in the body. In order for this supplement to increase performance it must be available within the system. The purpose of this study was to evaluate the bioavailability of calcium lactate monohydrate and magnesium lactate dihydrate. Ten subjects (male = 7 and female = 3) participated in this study. Resting blood lactate was measured prior to ingestion of the ergogenic aid utilizing the Lactate Pro and a finger stick. After ingestion of the ergogenic aid subjects remained in a resting state for one hour, per manufacturer’s instruction to ingest one hour prior to competition. Upon completion of that hour resting blood lactate levels were measured again. Means for the two measures were compared utilizing a dependent T-test with significance set at P<0.05. There was no significant difference (P=.235) between pre (1.48±0.47) and post measures (1.61±0.53). Supplementation of lactate does not appear to significantly increase bioavailability.
99) Sarah Seger  
University of Kentucky  
Mentors: J. Zach Hilt and Kim Anderson  

*In Vitro Dual Treatment of Cancer Cells with Hsp90 Inhibitors and Hyperthermia*

Successful hyperthermia therapy of cancer is dependent upon the extent of heat-induced protein denaturation and aggregation within the cell.¹ When a cell is presented with potentially toxic conditions, such as hyperthermia, heat shock proteins (Hsps) ensure cell survival by re-folding damaged proteins.² Hsp90, the most abundant heat shock protein within eukaryotic cells, has been shown to induce thermotolerance during hyperthermia therapy by stabilizing numerous client proteins.³ In this research, the effects of Hsp90 inhibitors, geldanamycin (GA) and 17-N-allylamino-17-demethoxygeldanamycin (17-AAG), in combination with hyperthermia therapy on cancer cell viability was examined. In an in vitro study, cultured human A549 lung carcinoma cells were exposed to non-toxic concentrations of inhibitors for 48 h followed by a 30 min hyperthermia treatment. A hyperthermic temperature of 43°C was created via temperature-controlled incubation or alternating magnetic field activation of non-toxic, citric acid coated Fe₃O₄ nanoparticles (magnetic fluid hyperthermia). Our results suggested that the Hsp90 inhibitors do not enhance the effects of hyperthermia, and possible explanations have been proposed.

100) Aman Shah  
University of Kentucky  
Mentors: Esther E. Dupont-Versteegden, Jena White, and Amy Ferry  

*P-bodies are Elevated with Age-, but Not Disuse-associated Skeletal Muscle Atrophy*

Processing Bodies (p-bodies) are small cytoplasmic granules which contain many enzymes involved in decapping and degradation of unused mRNA and are proposed to function as storage for unused mRNA until translation. We hypothesized that age- and disuse-induced muscle atrophy would be associated with an increase in p-bodies. Therefore, the purpose of this study was to determine the difference in the abundance of p-bodies between young versus old, and ambulatory versus hindlimb suspended rats. Brown Norway/Fisher344 male rats at 6 and 32 months of age were hindlimb suspended for 14 days to induce muscle atrophy. Gastrocnemius muscles from 6 and 32 month old ambulatory and hindlimb suspended rats were dissected and homogenized for protein abundance determination. Western blotting was performed with Decapping Protein 2 (DCP2) antibody to measure p-bodies abundance in the protein samples. DCP2 is a protein involved in decapping and degradation of mRNA and is a strong marker for p-bodies. Bands from Western blots were analyzed based on their optical density value, which is directly proportional to the abundance of DCP2 protein. We found that DCP2 was significantly more abundant in 32 month old compared to 6 month old rats. However, no significant difference was observed in the abundance of DCP2 between ambulatory and hindlimb suspended rats at either age. Therefore, we concluded that p-bodies are elevated with age-associated muscle atrophy, but not with disuse. Future studies will be directed toward determining whether other components of p-bodies are elevated and investigating the functional significance of increased presence of p-bodies.
101) Johnna Sizemore and Emily Nicole Dixon
Eastern Kentucky University
Mentor: Rebekah Waikel

*Characterization of Cardiac Remodeling During Pregnancy in Rats*

During pregnancy, an increase in blood volume occurs to compensate for fetal development, resulting in cardiac hypertrophy. For the majority of women, this physiological cardiac hypertrophy resolves following pregnancy. Prolonged cardiac hypertrophy can lead to heart failure. We propose that by studying the biochemical mechanisms that mediate healthy cardiac remodeling associated with pregnancy, we will gain a better understanding of mechanisms involved in pathological cardiac hypertrophy. To determine the biochemical changes that occur during pregnancy induced cardiac remodeling, we subjected rats to timed matings and collected morphological and biochemical data from not pregnant, 19 days pregnant, and 24 hours postpartum. We found differences in heart weights on the 19th day of pregnancy as compared to their non-pregnant littermates. Real-time PCR analysis revealed alterations in expression of some gene markers of hypertrophy during pregnancy and postpartum. Our data demonstrates pregnancy induced cardiac remodeling in the rat involves both morphological and biochemical changes.

102) David Spencer
University of Kentucky
Mentors: J. Zach Hilt, Travis Sexton, and Louis B. Hersh

*Enhanced Biofunctionalization of Gold Nanoparticles Using the ISOFURE Method*

The unique chemical and physical properties of gold nanoparticles (GNPs) render them as effective carriers for various biomedical applications. During the multi-step functionalization of the particles for these applications, it is important to tailor the surface properties in order to avoid agglomeration issues associated with charge neutralization, hydrogen bonding, etc. Although various additives have been employed to reduce agglomeration (such as charge and steric stabilizers), these result in an overall decreased surface area available for therapeutic functionalization. Herein, a novel strategy of isolating, functionalizing, and subsequently releasing (ISOFURE) biofunctionalized nanoparticles using a polymer matrix is reported to solve such issues. Specifically, a biodegradable poly(β-amino ester) hydrogel composite was synthesized with GNPs entrapped in its matrix. GNPs were biotinylated within the hydrogel matrix, and the GNPs were bound with streptavidin upon release from the hydrogel matrix. GNPs were then conjugated with the model enzyme catalase that was pre-biotinylated. UV-visible spectroscopy and bioassaying confirmed enzymatic activity of catalase bound GNPs via the ISOFURE methodology. The ISOFURE methodology has been shown to be an effective method to enhance biomolecular loading without the need of external stabilizing reagents.
103) Sean Spille  
University of Louisville  
Mentor: Barbara Stetson  
*The Dual Health Crises of Chronic Disease and Health-Risk Behaviors in Kentucky: Self-Care Practices and Diabetes Knowledge Scores among Smokers and Non-smokers*  
Kentucky bears a challenging public health burden of high rates of chronic disease including obesity and diabetes. This burden is particularly glaring in low-income and underserved populations. In parallel, Kentucky historically has been a tobacco producing state, and has one of the highest rates of smoking in the nation. Health risk behaviors such as smoking may result in devastating outcomes for Kentuckians already bearing the burden of chronic disease. Understanding how smoking is manifested in Kentuckians living with diabetes may assist efforts to optimize health-care outreach to manage this public health crisis. The primary aim of this study was to assess rates of smoking in underserved Kentuckians receiving diabetes care in community settings. A second aim was to examine the diabetes self-care practices and knowledge in smokers and nonsmokers. Participants were 254 adults with type 2 diabetes recruited from an urban University medical clinic and health department programs in Louisville, KY. Twenty-one percent were smokers, forty-four percent were African American, sixty-one percent were women, and nineteen percent resided below the U.S. poverty line. Validated measures were used to examine diabetes self-management practices and knowledge. Smokers had less optimal diet self-management practices (p=.042) and fewer correct on the Diabetes Knowledge Test (p=.046). More research is needed to examine how smoking behaviors are related to self-care and quality of life in people living with diabetes. Public policy consideration of these issues may lead to more successful patient outcomes and lower overall medical costs to the individual, community, and state.

104) Mary Spraggs and Cheyenne Ullrey  
Western Kentucky University  
Mentor: Matthew J. Nee  
*An Examination of Atmospheric Composition Data from Mammoth Cave National Park*  
Data obtained from an atmospheric chemistry field station located in Mammoth Cave National Park was analyzed over multiple time-scales with the purpose of finding any correlations between nitrogen oxides (NOx = NO + NO2) and solar irradiance. These correlations are expected due to the large number of photochemical reactions involving NOx in Earth’s atmosphere. The data from the field station was organized into graphs in order to make the correlations visible. Time correlations and correlations of composition with other factors such as sun levels, precipitation, temperature, humidity, and particulate matter were considered. These data represented a first step toward correlating NOx levels with nitrate content in local soil and water samples, a relatively unexplored area, particularly in the Commonwealth. Any correlations in the data allowed better understanding of the role NO3 has in producing tropospheric NOx and promoted awareness of its harmful potential in promoting acid rain and increased amounts of ground ozone.
105) Wesley Stinson, Julie Duffy, April Brooks, and Emilee Workman  
Madisonville Community College  
Mentor: Mary Janssen  
*Phototaxic Behavior of Mealworm Larvae (Tenebrio molitor) in Dim and Bright Light*

Mealworms are the larval form of the grain beetle *Tenebrio molitor* and are negatively phototaxic organisms. In the first experiment, two Petri dishes had three larvae placed in each and each dish was partially covered with cardboard. Both dishes were exposed to light for three minutes and then rotated 180 degrees to again expose the mealworms to light for three minutes. In the second experiment, individual mealworms were released in a tray partially covered with cardboard, and their movements observed in dim or bright light. Results of the initial experiment showed fewer animals in light at the end than at the beginning of each three-minute segment. Results of the second experiment showed that in bright light, mealworms showed shorter latencies to go to the opposite side of release, fewer crossings between light and dark, and a higher percentage of time spent in the dark region.

106) Danielle Story  
Morehead State University  
Mentors: Bernadette Barton and Constance Hardesty  
*The Role of Gender Equality Groups on a Contemporary College Campus*

Gender affects our lives from the day we are born. It determines what behaviors are acceptable, what clothes we wear, our self-image, family relationships, and sexuality. Gender impacts our education, the workplace and our careers. At the same time, gender inequality persists in daily life, and many problems arise from these inequalities. In Fall 2011 the investigator started a new student group, Student Association for Gender Equality (SAGE) on the campus of Morehead State University. Drawing on ethnographic observations made while forming SAGE and on in-depth interviews with group members, this study explores how contemporary college students’ understand and experience gender inequality. In particular, this study examines the most pressing gender issues faced by young people today, the motivations of participants to join a support organization, and the what members envision the group’s role on campus.
107) Rebecca Suttmiller, Denise Hickson, and Sara Bamberger
Northern Kentucky University
Mentor: Jill Shelley
It's All About the Prints
Fingerprinting is one of the most common methods used in identifying criminal suspects. Next to DNA, fingerprints are the most important piece of evidence used to aid in convictions. In today’s court more juries are persuaded by concrete evidence than any other forms. Cyanoacrylate fuming (super glue fuming) is the chemical process of visualizing latent fingerprints that might be on non-porous surfaces. The super glue fumes will bond with the organic components and moisture of the fingerprint. One major problem with super glue fuming is that the print is not fumed long enough, so that the print does not show all of the ridge details. Or the print is fumed too long and the print becomes oversaturated with superglue, there is no ridge detail. The purpose was to observe three main factors that can be controlled: amount of time for fuming, humidity inside the fuming tank and concentration of the cyanoacrylate that would give the best overall quality print. It is believed that the amount of time the item is fumed depends on the size of the fuming tank and the object that is being fumed. The humidity inside the tank also influenced the amount of time.

108) Mathew Thacker
Eastern Kentucky University
Mentor: John Bowes
Science in Modern Society: A Lack of Understanding.
Advancements made in science during the 1600’s created an atmosphere of controversy that would resonate into modern day discoveries. Galileo’s discovery, in the 17th century, of sunspots contradicted the universally accepted perception that the sun was actually a celestial body, being flawless. Critics of Galileo's observations attacked his methods of observation, faulting his equipment and other techniques. The trend of criticizing measurements and observations based on a general lack of understanding dramatically altered the perception of such scientific breakthroughs as Newton’s discovery of the law of universal gravitation, Darwin’s theory of evolution, Lemaître’s theory of what would come to be known as the Big Bang Theory, and the recent observation that the universe is expanding at an accelerated rate. Many discoveries, throughout recent centuries, have been trivialized because of the inability to decipher scientific methods and comprehend the far reaching implications that discoveries have made in modern society. The historical repeated reactions from the general public have set a trend that demands an examination into the importance of a stronger general science foundation within the education system than that of which is currently in place.
109) Tiffany Tharp  
Eastern Kentucky University  
Mentor: Mixon Ware  
**Grimm Messages of Sexism, Ageism, and Violence in Children's Books**  
Reading to children has been shown to enhance literacy, but at what cost? Does the mere act of reading to encourage a child's love of books trump a responsibility for appropriate content and moral development? Through a content analysis of themes in children's fairy tales and rhymes, this study examined the effects of selected themes in children's literature. From a father locking his daughter in a tower to then lower her hair and entice men, to the domestic slavery of a girl named Ella, to Briar Rose's drugging, messages of gender stereotypes, ageism, and violence are juxtaposed against positive messages more appropriate for child development. Children's books reinforcing developmentally appropriate values and moral development are reviewed and presented as alternatives to Grimm tales.

110) Tom Wagoner and Katy Newlin  
University of Louisville  
Mentor: Joseph Steffen  
**Gender Differences in a Hormone Related to Obesity**  
The CDC ranks Kentucky fifth in levels of adult obesity. Adiponectin is secreted from fat cells and associated with obesity. In this study, we quantified blood levels in normal male and female rats and compared levels in different adipose tissue locations (visceral, inguinal and interscapular white and brown adipose tissue) between genders. Blood adiponectin in females (9.4 ± 0.6mg/ml, N = 4) was significantly (P < 0.01) greater than in males (4.4 ± 0.8mg/ml, N = 5). Tissue level of adiponectin did not differ between adipose tissue sites within a gender, but was different in fat locations between genders. Levels of adiponectin in the visceral fat pad of males was 2.5 times higher than in females (P < 0.01). A comparable difference was found for the inguinal fat depot, with the level of adiponectin in male tissue over 3 times higher than females (P < 0.02). The results indicate that there are prominent gender-based differences in both serum adiponectin and in the fat depot content of this adipokine. However, the tissue adiponectin concentrations were reversed compared to the serum levels. The serum data are in agreement with studies in the literature, but the observations of tissue adiponectin and its relationship to serum levels poses other questions related to synthesis and release of adiponectin. This data suggests that adiponectin may produce differential gender effects in relation to obesity and other diseases like diabetes. (This study was supported by grants from the Office of the Executive Vice-President for Research).
111) Camara Wall  
Kentucky State University  
Mentor: Charles Bennett  

**Hepatic Ischemia and Reperfusion Injury in Copper-Deficient Rats**

Dietary copper is known to have a significant role in the normal structure and function of the cardiovascular system. In particular, animals fed diets that are deficient in copper have shown augmented inflammatory responses in the heart, lungs, and systematic circulation. The current study was designed to determine whether a marginal restriction of copper would promote inflammatory damage in the liver. Male Sprague-Dawley rats were fed purified basal diets which were either copper adequate (Cu-A; 6.0 mg Cu/kg diet) or copper marginal (Cu-M; 1.5 mg Cu/kg diet) for four weeks. The rats were anesthetized, a midline laparotomy was performed and a clamp was used to suspend blood flow to 70% of the liver. The rats were subjected to hepatic ischemia for 90 minutes, which was followed by 8 hours of reperfusion. Myeloperoxidase as an index of neutrophil accumulation, was significantly greater in the Cu-M group but hepatocellular damage as indicated by serum ALT was not different. We conclude that a marginal copper deficiency is proinflammatory with a significant effect on the neutrophil function.

112) Ruojing (Audrey) Wang  
Murray State University  
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.
113) Thomas Werfel  
Murray State University  
Mentors: Halim Ayan and Hongmei Li  
“Proximity Activated” Smart Nonoparticle for the Delivery of siRNA to Metastatic Tumor Cells  
Permeability-glycoprotein (P-gp) overexpression 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.

114) Hailley White  
Morehead State University  
Mentor: Janet Rice McCoy  
Vegetarians Kill Christian Missionaries: A Fram Analysis of 19th Century Coverage  
This research examines the Kucheng Massacre as it was known in the United States, or the Wasang Massacre as it was known in Australia. This event happened in the Fujian Province of southern China on August 1, 1895. Nine British missionaries representing the Anglican Church Missionary Society were killed by members of a Chinese vegetarian sect, along with the five-year old son and baby daughter of one of the couples. This was one of the largest massacres of foreigners prior to the Boxer Rebellion of 1900. Fisher’s narrative paradigm and Goffman’s theory of framing are used to analyze the accounts of this incident printed in the New York Times. These texts include news summaries, news stories, and letters to the editors. Walter Fisher’s narrative paradigm is used to label the primary players in the texts. The players fall into four categories—missionary, vegetarian sect member, British government official, and Chinese government official. In addition, the narrative paradigm is used to explore the interaction between these players. Erving Goffman’s theory of framing is based on the idea that humans constantly change and shift their perspective of events to make sense of what occurs. Despite being trained to be objective, journalists use frames to describe incidents and tell their stories. Using textual analysis, this study identifies and analyzes the frames reporters used when writing their stories and readers used when responding with letters to the editor. Frames are identified for each of the four players in the narrative.
115) Jennifer White  
Northern Kentucky University  
Mentor: Juliann Young  
*The Effects of the Visual Arts on Stress*  
“Art offers…space—a certain breathing room”. John Updike. The relationship between the arts and mind-body wellness is well documented. Arts such as yoga, meditation and breathing exercises have long been lauded as successful ways to reduced one’s overall stress. Art is also becoming increasingly popular in the therapeutic setting, allowing clients to explore art as a medium to reduced stress, tension and deal with life changes. In the applied setting, usefulness of art as a tool for stress reduction is well documented. However, virtually no experimental research documents the use of viewing art to reduce stress. The current study aimed to address the lack of research by investigating the relationship between visual art and transient rates of stress. Freshman participants were exposed to artwork or a blank page during a stressful test taking procedure. Participants were asked to rate their stress before and after viewing the art. It was hypothesized that students, who viewed art, rather than a neutral stimuli, would indicate lower rates of stress. Additionally, those students who viewed realistic art, rather than abstract art would report lower rates of stress. Analysis and discussion focus on the effectiveness of viewing art on reducing stress and the influence the type of art has on its usefulness in reducing stress. Future directions of this line of research are discussed.

116) Cory William Wilbur  
Madisonville Community College  
Mentor: Janardan Rohatgi  
*Analysis of Wind Data and Potential for Wind Energy in Western Kentucky*  
In late 2005, an automatic, stand-alone wind data logger and acquisition system was installed in the North Campus of Madisonville Community College. About four years of data have been analyzed in this paper. The wind data system was placed at an elevation of 30 feet above ground. Extrapolating these data to a height of 330 feet, the typical hub height of large megawatt-sized turbines, reveals that there may be a reasonably good potential for large-sized wind turbines in the region.
117) Erik Wilson  
Eastern Kentucky University  
Mentor: Ben Freed  

*Monitoring Howling Monkey Ranging Behavior Using Vocalizations in Ometepe, Nicaragua*

Researchers have suggested that folivorous primates in secondary growth forests, compared with those in primary growth forests, have greater intergroup distance and daily path length. To test this hypothesis, population surveys of mantled howling monkeys (*Alouatta palliata*) were conducted July, 2011 on Ometepe Island, Nicaragua in both undisturbed primary forest and reclaimed secondary forest. The two forest types are largely representative of common environments howlers inhabit. Triangulation of predictable vocalizations (the "dawn chorus", a spacing mechanism), combined with ground censuses, were used to determine the daily location and size of six howler groups. Groups in the secondary forest were larger than those in the primary forest, but the female / male ratio for all groups surveyed was similar (between 2:1 and 5:1). Spacing was approximately 300 meters between groups in the undisturbed primary forest, and 400 meters between groups in the secondary forest. Daily path length averaged nearly 25 meters per day, much smaller than that normally reported for *A. palliata*. Overall, intergroup spacing significantly increased in secondary forests. Daily path length, however, was much smaller than the estimated 400 meter figure in previous research on *A. palliata* in secondary forests.

118) Leslie Wilson  
Western Kentucky University  
Mentor: Hemali Rathnayake  

*Reactive Group Functionalized Silsesquioxane Nanoparticles for Drug Delivery Applications: Synthesis, Characterization and Particle Morphology*

Nanoscale particles derived from silicon, such as silica and siloxane are important examples of nanomaterials that can be applied in materials, electronics or biological context. As the surface of silica or siloxane core structure can be easily functionalized with various organic functional groups, there has been a great effort to use them as biological carriers, including the silsesquioxane nanoparticles described here. Two types of reactive group functionalized silsesquioxane nanoparticles were prepared by direct hydrolysis and condensation of their respective silane precursors. Particle sizes were controlled upon adjusting the molar ratios of organotrialkoxy silane, base, and TEOS concentrations. These resulting nanoparticles with reactive amine groups were found to be more advantageous over functionalized silica or organically modified silica nanoparticles due to the higher load of covalently attached ligands and the high solubility in water. Cellular uptake and cytotoxicity of these nanoparticles was studied in vivo for potential applicability for cancer-targeted drug delivery applications.