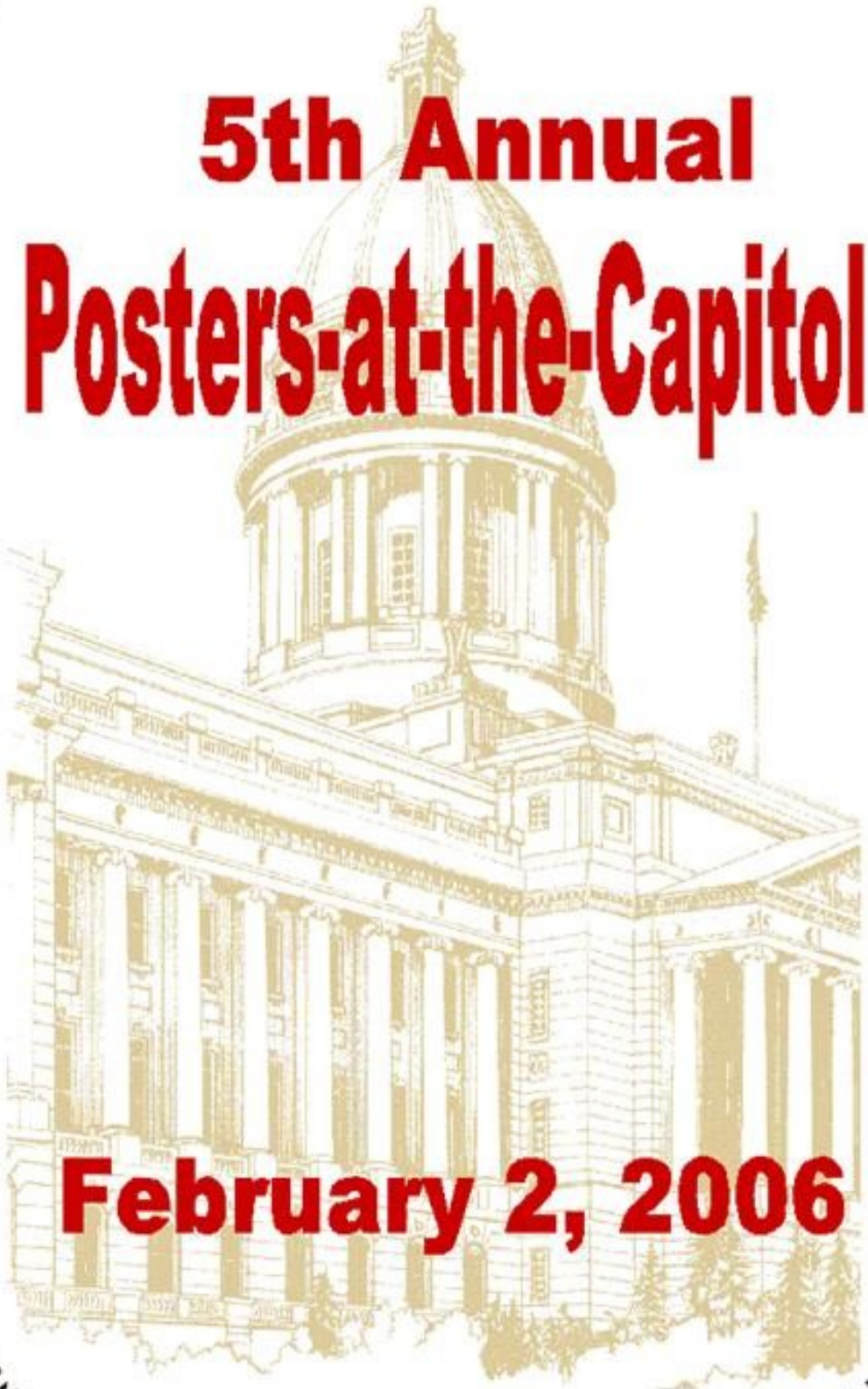
MURRAY STATE UNIVERSITY • NORTHERN KENTUCKY UNIVERSITY • UNIVERSITY OF KENTUCKY • UNIVERSITY OF LOUISVILLE • WESTERN KENTUCKY UNIVERSITY • EASTERN KENTUCKY UNIVERSITY • KENTUCKY STATE UNIVERSITY • MOREHEAD STATE UNIVERSITY •

5th Annual

Posters-at-the-Capitol



February 2, 2006

Welcome from President Joanne Glasser of Eastern Kentucky University:

Eastern Kentucky University is proud to participate in the fifth annual ***Posters-at-the-Capitol*** program because we believe it vividly 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 the best and brightest students you'll find anywhere.

Just as for every great artist there is a source of inspiration, for each of our participating students there is a wellspring of knowledge, wisdom and support that runs deep at Eastern. The projects represented in this exhibit reflect the collaborative efforts of dedicated members of our outstanding faculty – men and women who pass along to our students their own passion for excellence and for learning. As they nurture our students to reach deep within themselves and realize their full potential, they bring great honor to themselves, our University and to the teaching profession.

Undergraduate research is an indisputably integral part of the teaching-learning process at EKU, where students and learning come first. As a "School of Opportunity," we are committed to providing all our students with diverse educational opportunities that augment and enhance their classroom experiences and develop life-long habits of scholarship and intellectual curiosity. Each year, our students' outstanding work is displayed in a week-long Undergraduate Presentation Showcase. This discovery and application of new knowledge is exhilarating for the student participants and uplifting to our entire campus community.

I applaud all the faculty mentors in the ***Posters-at-the-Capitol*** program for providing yet another quality learning experience for their students. To all the students, I offer my heartfelt congratulations and this challenge: let this experience be only the beginning of an invigorating educational journey. As I often say about Eastern Kentucky University, the best is yet to come in your life as long as you continue, in the words of Johann Wolfgang von Goethe, to "dream no small dreams."

Welcome from President Mary Evans Sias of Kentucky State University:

Kentucky State University welcomes this opportunity again to showcase the talents of our students at the ***Posters-at-the-Capitol*** event.

Undergraduate research is an integral part of university life. At KSU, our faculty encourage students to look beyond limitations and to explore possibilities. We strive to instill in our students a passion for new knowledge, the focus to expand their skills, and enthusiasm for lifetime learning. In essence, we strive to provide students with the intellectual tools to fashion a successful future for themselves, their communities, and the nation.

******Welcome******

President Sias' Welcome Cont'd.

Posters-at-the Capitol affords us the opportunity to demonstrate to our governor, state legislature, and the community that undergraduate research is effective in preparing future members of the work force and citizens of our society, which is increasingly being shaped by technology and cyberspace. Funding undergraduate research is essential to preparing future leaders and innovators who will possess the necessary knowledge, skills, commitment, and solutions to meet the needs of the Commonwealth of Kentucky and this nation.

We at Kentucky State University congratulate you on the fifth annual ***Posters-at-the-Capitol*** and wish you much success for decades to come. Our efforts to foster intellectual pursuit are in sync as KSU endeavors in . . . "Inspiring Innovation. Growing Leaders. Advancing Kentucky."

Welcome from President Wayne Andrews of Morehead State University:

I am delighted that the legislature and the public again will have the opportunity to observe and interact with our undergraduate students participating in the ***Posters-at-the-Capitol***. These student projects, completed in conjunction 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 priority that we have placed on providing these types of high quality research experiences for our students, and I am committed to the continued expansion of these opportunities through initiatives such as our Undergraduate Research Fellowship program.

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. 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.

As a relative newcomer to Morehead State University and the Commonwealth, it is very gratifying to me to see the commitment of Kentucky's public institutions of higher education to faculty-mentored undergraduate research and the pursuit of academic excellence.

Welcome from Interim President Kern Alexander of Murray State University:

This year marks the **Fifth Anniversary** of ***Posters-at-the-Capitol.*** In 2002, 85 undergraduates came to Frankfort from our eight public universities to showcase their scholarly and creative accomplishments to members of the legislature and the Governor. Last year, this number had grown to 229. This is both a testament to our students who are seeking learning opportunities and to our academic institutions as they work to provide a greater number of high-quality teaching and learning opportunities for 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 residential colleges, Murray State University is proactively increasing faculty-student interaction. By providing our students with such learning opportunities, Murray State and all of Kentucky's public universities are meeting the objectives of the Council on Postsecondary Education and the legislature by ensuring that Kentucky's college graduates are well prepared for life and work.

We at Murray State join the ***Posters-at-the-Capitol*** Organizing Committee and invite all Kentucky citizens and legislators to visit and review the work of many of Kentucky's gifted students. These undergraduates are contributing ideas that are impacting communities across the Commonwealth. Our wish is to encourage all those participating to continue to reach higher and to set new standards of excellence. Our congratulations to all the 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 the fifth anniversary of ***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 are therefore confident of Kentucky's future.

Welcome from President Lee Todd of University of Kentucky:

Research is a powerful engine that helps drive the economic and educational missions of the Commonwealth. I believe some exposure to and participation in the research process is important for every college student's academic career. The experience opens the mind to new ideas and new possibilities.

Now in its fifth year, ***Posters-at-the-Capitol*** is an excellent opportunity to recognize undergraduate research as an essential part of the educational experience; one that benefits both students and faculty. For students, undergraduate research affords an opportunity to work collaboratively with faculty and peers, to participate directly in the creative process and the generation of knowledge, to experience the rewards of inquiry based learning, and to expand upon the lessons learned in the classroom. Through undergraduate research, students experience personally the intellectual passion that is the foundation of scholarship at the University of Kentucky.

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For faculty, there is no more rewarding teaching opportunity than to serve as a mentor for an eager young mind. The goals that inspire faculty and establish teaching as one of the truly noble professions include opportunities to excite imagination, foster curiosity, and celebrate the values of academic scholarship. Supervision of undergraduate research and creativity projects maximize those kinds of teaching opportunities.

The University of Kentucky is proud of its strong commitment to undergraduate research and creativity. That commitment is reflected by our recent efforts to expand support of undergraduate scholarship, the creation of Kaleidoscope -- a new University journal dedicated to scholarly accomplishments of our undergraduates -- and the Annual National Conference on Undergraduate Research that was held at the University of Kentucky in 2001. We look forward to building upon this success.

Thank you for being a part of this event and remember research is never ending. It has no limits and can take you anywhere you are willing to explore. Enjoy the journey.

Welcome from President James Ramsey of University of Louisville:

The Legislative mandate given to the University of Louisville is to be a "preeminent metropolitan research university." Building a strong research base is critical to our state. The University of Louisville is proud of its many outstanding faculty researchers and scholars who mentor undergraduate students in their laboratories and classrooms. The commitment to our students' educational experience begins with enrollment, and their exposure to research comes early in their academic life. Through the ***Posters-at-the-Capitol*** program, our undergraduate students exchange their ideas and discoveries with the elected leaders to whom the citizens of Kentucky have entrusted their future. Instilling a passion for creativity and new knowledge among undergraduate students is

President Ramsey's Welcome Cont'd.

vital to economic development and quality of life success. The ***Posters-at-the-Capitol*** program introduces undergraduate students to the importance of reporting scientific investigation and supporting crucial public investment in R&D.

This collaborative event among Kentucky's public universities allows talented undergraduates to demonstrate their academic achievement and the effectiveness of Kentucky's higher education system. The University of Louisville is proud of this program and its participants. We hope you will share our enthusiasm for the opportunities offered and visit with our students.

Welcome from President Gary 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 involves 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. The scholarly collaborations utilize the concepts learned in classrooms and laboratories, thereby better preparing 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 the Fifth 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.

Posters-at-the-Capitol Organizing Committee

John Mateja, Chair Murray State University	Rose Perrine Eastern Kentucky University	Lucian Yates, III Kentucky State University
Bruce Mattingly Morehead State University	Phil Schmidt Northern Kentucky University	Philipp Kraemer University of Kentucky
Pamela Feldhoff University of Louisville	Blaine Ferrell Western Kentucky University	Jody Cofer, Preparations Murray State University

Schedule of Activities

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

9:00 a.m. to 2:00 p.m. ……..…….. Legislative Visits

10:45 a.m..……..……..Welcome (Rotunda)
Dr. John Mateja, Chair, *Posters-at-the-Capitol*

10:50 a.m.…….……...Lt. Governor Steve Pence
Commonwealth of Kentucky

11:00 a.m. to 1:00 p.m. ……...… Student Oral Presentations (Rotunda)
Dr. Bruce Mattingly, Session Chair

- Michelle Shouse ……..…….Eastern Kentucky University
  The Effect of Attachment Style on Autobiographical Memory
- Boram Lee……..Kentucky State University
  Behaviors Related to Body Weight Status of Children Participating in the National Youth Sports Program
- Christine Pendleton and Sourik Ganguly (GS)…….Morehead State University
  Development of an [i]in vintro[/i] Protocol to Study Estrogen-Mediated Osteoblast Activity in the Absence of Fetal Bovine Serum
- Mitchum Owen……...……..Murray State University
  Postcards from Spain
- Lauren Petrzilka……..Northern Kentucky University
  Popular Culture and Political Socialization of College Students
- Nicolas Badre…….University of Kentucky
  Reduced Calcium Channel Function in the Drosophila cacTS2 mutant on Vision, Olfaction and Regulation of the Heart
- James Cripps……..University of Louisville
  Modulation of Acute Inflammation by Targeting Glycosaminoglycan-Cytokine Interactions
- Ashley Williams……...……Western Kentucky University
  Interpreting Trace-element and Stable Isotopic Results Recorded in a Holocene Stalagmite from Buckeye Creek Cave, West Virginia

11:00 a.m. to 4:30 p.m. ……...…….General Poster Session Viewing

2:00 p.m.……...…..Group Photograph (Rotunda)

3:00 p.m. to 4:30 p.m. ……..... Reception

1. Yoon Hyeon Hu and Daddy Boateng

Kentucky State University
Faculty Mentors: George Antonious and Tejinder Kochhar

Variations in Capsaicinoids Content of Hot Pepper Extracts

Environmentally compatible pest-control agents for use on vegetable crops are needed to replace pesticides that are ineffective, that have been withdrawn for regulatory reasons or whose costs are prohibitive. Ninety Capsicum accessions selected from the USDA Capsicum germplasm collection were screened for their capsaicinoids content using gas chromatography (GC/NPD). Fresh fruits of *Capsicum chinense, C. frutescens, C. baccatum, C. annuum, and C. pubescens* were extracted with methanol, and analyzed for capsaicin, dihydrocapsaicin and nordihydrocapsaicin. Mass spectrometry of the fruit crude extracts indicated that the molecular ions at m/z 305, 307, and 293 which correspond to capsaicin, dihydrocapsaicin, and nordihydrocapsaicin, respectively, have a common benzyl cation fragment at m/z 137 that can be used for monitoring capsaicinoids in hot pepper fruit extracts. Concentrations of total capsaicinoids varied from not detectable to 11.2 mg fruit-1. Statistical analysis revealed that accession PI-441624 (*C. chinense*) had the highest capsaicin content (2.9 mg g-1 fresh fruit) and accession PI-497984 (*C. frutescens*) had the highest dihydrocapsaicin content (2.3 mg g-1 fresh fruit). Accessions PI-439522 (*C. frutescens*) and PI-497984 contained the highest concentrations of total capsaicinoids. Quantification of capsaicinoids in the selected accessions allowed us to identify genotypes with high levels of total capsaicinoids and enabled the prediction of the amount of each component that can be obtained per kg and per acre of hot peppers produced. Accessions PI-441624, PI-497984, and PI-439522 were identified as potential candidates for the mass production of capsaicinoids, or for the breeding of varieties having greatest capsaicin content.

2. Catherine Aubee

Murray State University
Faculty Mentor: Chris Bierwirth

The Human Ecology of Islam

Although international curiosity regarding Islam and its influence toward public policy has gained visibility in recent years, its treatment of environmental interactions (i.e., the human ecology of Islam) remains poorly represented in the western and English-language literature. With the understanding that human interpretations of any religion, including the Islamic faith, are dynamic, the goal of this study is twofold: First, to provide an overview of the fundamental sources for Islamic expectations regarding the environment, and second, to cite examples of how these expectations have been applied over time. The holistic nature of Islam has fostered the evolution of a uniquely spiritual but pragmatic environmental model that emphasizes conservation, preservation, and sustainable development. By better understanding this model and its achievements and shortcomings, researchers, public planners, and policymakers throughout the world may gain insight into the successes and failures of their own systems.

3. Peter Wulff and Clifford Harpole

University of Kentucky
Faculty Mentors: Karyn Esser and John McCarthy

Development and Use of Genetic Mouse Models to Study Skeletal Muscle Growth

Growth and maintenance of skeletal muscle mass is critical for long-term health and quality of life because of its contribution to mobility, glucose uptake and fat metabolism. The aims of our research projects are to develop and use genetically modified mice to identify key genes necessary for skeletal muscle growth. My project (P.W.) is to create a double transgenic mouse via cross breeding of individual transgenic mice. First, I will take a mouse that produces the DNA recombination enzyme, Cre, under the control of the Tetracycline Operon promoter (TetO) and breed it against a transgenic mouse carrying the Muscle Creatine Kinase promoter driving the reverse tetracycline-controlled transactivator (rtTA). Once obtained, I will create a triple transgenic to test whether the double transgenic mouse actually maintains proper skeletal muscle specific expression in response to tetracycline. My study (CH) will be to test the hypothesis that a gene that is critical for muscle development, MyoD, is necessary for skeletal muscle growth. We have a mouse in which the MyoD gene has been knocked-out from its genome. I will use a surgical model of skeletal muscle growth (mechanical overload) to test the muscle of these mice. Surgery will be performed on normal and MyoD knockout mice and muscle will be collected from 5-21 days after the surgery. Muscle growth will be evaluated by measuring mass, total protein and total DNA. The results of this study will determine whether MyoD is necessary for skeletal muscle hypertrophy in response to overload.

4. Shelly Smith and Sarah McMurray

Western Kentucky University
Faculty Mentor: Richard Gelderman

The Relationship between Nuclear Activity and Galaxy-Galaxy Interactions for Seyfert Galaxies

We are pursuing an observational investigation to determine the factors responsible for fueling the supermassive black hole that powers an Active Galactic Nucleus (AGN). An AGN is the astronomical term for any object that emits more energy from the central regions of the host galaxy than can be attributed to standard stellar processes. The most famous examples of AGN, quasars and radio galaxies, are the most luminous and dramatic objects in the Cosmos. A less luminous, but much more common example of AGN, known as Seyfert galaxies, is the focus of this study. Western Kentucky University's network of telescopes has been used to obtain images for a sample of approximately 30 Seyfert galaxies. The sample was divided according to parameters characterizing the object's environment as well as its luminosity at radio, infrared, optical continuum, optical line emission, and ultraviolet wavelengths. Analysis of our data is allowing us to determine the environmental evidence for disturbances that might be responsible for the observed level of nuclear activity. Careful construction of our sample is allowing us to resolve the contradictory conclusions of earlier investigations regarding the role of external versus internal processes as the cause of nuclear activity.

5. Jonathan Clark

Kentucky State University
Faculty Mentors: John Sedlacek, Karen Friley, and Steve Hillman

Effect of Entrust®, an Organic Insecticide, on Mortality and Progeny Production of Several Stored Grain Beetle Pests in Shelled Corn

Between 2000-2004, shelled corn in Kentucky had an average annual value of $180 million. Over 50 % of the crop is placed in on-farm storage annually. While in storage corn can be infested by a wide variety of insect pests. Infestation results in damage and losses in Kentucky exceeding $18 million annually. Synthetic chemical control has been used as the primary method of insect control in stored grain for over 40 years. Concerns related to insecticide resistance, chemical residues on food and in the environment, and worker exposure has lead to development of some biologically-based insecticides such as SpinTor® 2SC. SpinTor is a broad spectrum insecticide that was found to be effective against several stored grain beetle species on shelled corn in storage. Recently SpinTor was re-formulated to conform to OMRI national standards. Because organically raised livestock and grain consumption are gaining in popularity and because there are few organic grain protectants, a laboratory study was conducted to determine efficacy of Entrust® on beetles infesting stored shelled corn. Shelled corn was treated with 1 ppm or 3 ppm of Entrust or left untreated. Mortality was quantified at 24, 72, and 168 hours after exposure. No significant differences in mortality was seen between treated and control groups of either *Oryzaephilus surinamensis* or *Tribolium castaneum*. However, corn treated at 3 ppm showed higher mortality and lower progeny production for *Sitophilus zeamais*. Results will be discussed within the context of using Entrust as an organic method of insect control.

6. Kevin Dick and Andrew Lindsey

Western Kentucky University
Faculty Mentors: Bruce Kessler and Stacy Wilson

Imaginary Numbers in Real-World Applications

The concept of imaginary numbers is familiar to most individuals who took Algebra II in high school. However, most people leave that course without ever realizing the usefulness of this concept. Imaginary numbers are by definition an abstract idea, meaning that they do not exist in the real world, yet they can be used to solve real-world problems. As dual majors in engineering and mathematics, we have been exposed to complex numbers (a real number plus an imaginary number) as both an abstract concept and as a useful tool for many tasks performed by engineers on a daily basis. Complex numbers are used to find the characteristics of a circuit, to determine the stability of a control system, to analyze the qualities of both analog and digital signals, and to solve numerous other applications. This poster will show how this inherently non-real concept developed by mathematicians can be used to solve physical problems encountered by engineers in the real world.

7. LaToya Battle

Murray State University
Faculty Mentors: Terry Holmes, Glynn Mangold, and Fred Miller

Geographic Information Systems in Marketing

The goal of this project is to integrate Geographic Information Systems (GIS) into higher education marketing curriculums. Several different industries are already utilizing GIS in their business forecasting and activities. These businesses recognize the numerous advantages that GIS affords them. Therefore, there is a job market for people with experience using GIS. This research project was launched to capitalize on the innovative use of GIS to enhance the teaching curriculum. "Spatially Enabling the Marketing Curriculum" is a series of GIS software modules constructed for the use of students enrolled in college marketing courses. Presently, there is one module being used to test the effectiveness of GIS in a retail management course. The module is entitled "Retail Site Selection in San Francisco." While students study course material on GIS, they are exposed to the retail module and asked to use the software to determine where to locate a new "Better Books" store in San Francisco. We have tested this module for three semesters and have made improvements to it throughout that time period. The improvements were largely based on the feedback gleaned from students' evaluation surveys. This project will continue as we add additional modules to be tested in the marketing courses. For example, we plan to add a module for consumer behavior courses that addresses demographic, lifestyle and purchasing behavior patterns. Similarly, a module for a marketing research course will focus on the use of socioeconomic and demographic data to create customer profiles.

8. Laura Berry and Rebecca Singer

University of Kentucky
Faculty Mentor: Thomas Zentall

Work Ethic in Pigeons: Do Pigeons Prefer to Peck or Not Peck?

Pigeons given a choice between making 1 peck to receive food and making 20 pecks will choose to make 1 peck. However, 1 peck results in receiving food faster than 20 pecks and receiving food faster is better. But what if time to reinforcement were held constant? Would they prefer to pass that time pecking or would they prefer to wait for reinforcement? In our experiment, when pigeons were presented with vertical lines, they had to peck to receive food (on a fixed interval schedule of reinforcement - the first response after 20 sec was reinforced). When they were presented with horizontal lines, they had to refrain from pecking for 20 sec to obtain reinforcement. To test for their preference, all training trials started with a light on the left or the right. When the light was on the left and they pecked at it, it turned on the vertical lines (that required pecking). When the light was on the right and they pecked at it, it turned on the horizontal lines (that required not pecking). On critical test trials the pigeons had a choice between the left and right lights. If pigeons are 'lazy,' they should prefer the light that allows them not to peck. But if they have a 'work ethic,' they should prefer the light that requires that they peck. Results indicate that many like humans, pigeons vary in their preference for working or not working.

9. Christina Coppage

Eastern Kentucky University
Faculty Mentor: Rose Perrine

Religiosity, Adult Attachment, and Attachment to God

In this study the relationship between adult attachment, religiosity, and attachment to God was investigated. Subjects were students from Eastern Kentucky University who have been, or are currently involved in, a romantic relationship. Subjects were given four questionnaires: an attachment questionnaire, two religiosity scales, and an attachment to God questionnaire. These were my predictions: 1) Primary Caregiver's religious feelings will match securely attached subjects' feelings more than insecurely attached subjects' feelings; 2) Insecurely attached subjects will use religiosity to regulate affect more than securely attached subjects; 3) Avoidant (fearful and dismissing) subjects will display higher levels of frustration with God than secure and ambivalent subjects; 4) Avoidant (fearful and dismissing) subjects will display higher levels self-reliance (in relationship with God) than secure and ambivalent subjects; 5) Anxious/Ambivalent subjects will display higher levels of proximity-seeking (in relationship with God) than secure and avoidant subjects; 6) Anxious/Ambivalent subjects will display higher levels of ambivalence (in relationship with God) than secure and avoidant subjects; 7) Securely attached subjects will display higher levels of trust/confidence in God than avoidant and ambivalent subjects; 8) Anxious/Ambivalent subjects will display higher levels of jealousy/fear of abandonment (in relationship with God) than secure and avoidant subjects; and 9) Anxious/Ambivalent subjects will display higher levels of anxious clinging to God than secure and avoidant subjects.

10. Jon Dennis

Morehead State University
Faculty Mentors: Christine McMichael and Royal Berglee

Limits of Acceptable Change in the Red River Gorge

The 26,000 acre Red River Gorge Geological Area is located within the Daniel Boone National Forest in east-central Kentucky. The Red River Gorge offers many recreational activities and is known for its beautiful hiking trails, premier campsites, abundant wildlife, breathtaking views, the extremely rare White Haired Goldenrod, and world-class rock climbing. The Red River Gorge is used frequently by a wide range of visitors and, unfortunately, is sometimes abused by them. In an attempt to identify areas experiencing major negative recreational impacts and to help formulate programs aimed at reducing and preventing future overuse, the US Forest Service, in cooperation with the public, has implemented the Limits of Acceptable Change (LAC) program in the Red River Gorge area. As part of the ongoing LAC effort, this research applied a suite of geospatial techniques to evaluate the impacts of various recreational activities across the Red River Gorge. Specifically, a Global Positioning System unit was used to collect data for five study areas throughout the Gorge, including point features (destination points, rock shelters, campsites) and linear features (user and system trails). These data were then downloaded into Geographic Information Systems software for mapping and analysis. Results from this study are expected to reveal the location and magnitude of recreational impacts in the study areas, allowing the Forest Service to (1) focus on those areas in need of the greatest attention and (2) identify the best management practices needed to preserve the Red River Gorge as a beautiful and accessible destination for all.

11. Adam Ketron

Northern Kentucky University
Faculty Mentor: Diana McGill

Determination of Haloperidol Levels in Rat Serum by High-Performance Liquid Chromatography: A Collaborative Study

As part of a broader study designed to assess the effects of antipsychotic drugs on the behavioral consequences of hippocampal damage, a method for the determination of haloperidol in rat serum by high-performance liquid chromatography (HPLC) is described. These data are necessary to establish a correlation between the amount of drug administered to the rats (via drinking water), the actual concentration in the blood, and the behavioral effects observed in clinical studies. The method uses two liquid-liquid extractions and trazodone as an internal standard to evaluate extraction recovery. Standard curves have been generated using spiked mobile phase samples. Haloperidol and trazodone will be extracted from serum samples and compared to these standard curves.

12. Jessica Cranfield and Russell Neal

Kentucky State University
Faculty Mentors: James Tidwell, Shawn Coyle, and Leigh Anne Bright

Effect of Pellet Size Fed to Juvenile Largemouth Bass (*Micropterus Salmoides*) on Growth and Feed Conversion Efficiency

Fish should be fed the largest pellet they can consume for optimal growth. This allows the least expenditure of energy when feeding. If too small a pellet is fed, inefficient feeding results as too much energy is expanded searching for and consuming many small pellets. If too large, some individuals may not be able to ingest the pellet. As a general rule, the pellet size should be 20-30% of the species mouth gape. As the name implies, the largemouth bass is capable of consuming very large food items. Based on equations that allow mouth gape to be estimated by measuring total length, the pellet size for 8 cm largemouth bass juveniles should be 6-7 mm. However, current pellets fed are 4.8 mm or approximately 25% of the size recommended. The effect of pellet size on the efficiency of largemouth bass grow out should be evaluated to potentially improve feed conversion efficiency and growth. A feeding trial was conducted with juvenile largemouth bass (*Micropterus salmoides*) in aquaria to evaluate the effect of pellet size on growth of juvenile largemouth bass in controlled conditions. Feed-trained largemouth bass (10 g) were randomly stocked into 114-L glass aquaria at 10 fish per aquarium and fed to apparent satiation once daily. There were three replicate aquaria per dietary treatment. Water was monitored 1x/day for temperature and dissolved oxygen. Water quality measurements were taken 3x/week for total ammonia-nitrogen, un-ionized ammonia-nitrogen, nitrite-nitrogen, and pH. Based on preliminary observations, large differences in average weight are not apparent. The fish will be harvested on December 1, and harvest results will be presented in the poster.

13. Amy Bennett

University of Louisville
Faculty Mentor: Barbara Burns

The Development of Mastery and Performance Motivation in Young Children

Mastery and performance patterns were examined in response to failure in 65 preschool children using a puzzle-failure task. Age differences were examined between 3- and 4-year-old children by motivation type as well as differences in a composite helplessness score. Finally, regression analysis was used to examine the effect of mastery experiences, defined by age and skill level, on the helplessness composite score. Both performance-and mastery-oriented response patterns were present in the sample. Independent samples t-tests supported differences in age, with older children demonstrating more mastery-oriented patterns. Regression analysis supported the third hypothesis that the amount of mastery experiences predicted helplessness levels. These findings replicate previous studies of mastery motivation in a younger age group and emphasize the importance of mastery experiences in leading to adaptive motivational orientations.

14. Lindsey Flowers

Murray State University
Faculty Mentor: Jeffrey Frame

The Effect of Nutrition Intervention of Performance Measures of University Rowing Team Members

Studies on nutritional intake of athletes have demonstrated suboptimal intakes in the areas of total energy intake, carbohydrate intake, and calcium and zinc intake. Suboptimal eating, misconceptions about nutrition, improper use of supplements, and use of "fad" diets have contributed to the challenge of nutrition education of athlete populations. Few recent studies have been performed on university athletics demonstrating the role of nutrition intervention in maximizing athletic performance, and no known studies focus upon team members of competitive rowing programs. It is the objective of this study to answer one question: Will nutrition/hydration education intervention of competitive university rowers be reflected in changed eating lifestyles, physical attributes and rowing performance measures? Selection of the nutrition/hydration intervention delivery medium is important in maximizing nutrition lifestyle behaviors. Use of peer nutrition education programs has demonstrated effectiveness in improving knowledge of university athletes.

15. Jennifer Durbin

Eastern Kentucky University
Faculty Mentor: Rose Perrine

Appalachian Dialect and Perceived Intelligence

People in Appalachia often use a distinctive, easily recognizable accent. In the current study, I hope to determine whether or not a person speaking with an Appalachian dialect is perceived as less intelligent than the same person speaking in Standard American English. Also, I hope to discover whether students will be less willing to take a class from the person speaking with an Appalachian dialect, and if they have a lower level of respect for the person speaking in Appalachian dialect. It will also be interesting to see if the participant's identification as being Appalachian has an effect on scores. Undergraduate students at Eastern Kentucky University will hear a tape recording of the same person speaking in one of the aforementioned ways. They will then rate the person on several qualities. The ones of interest are perceived intelligence, willingness to take a class from the person on the recording, and degree of respect for the person on the recording. I expect that when the person speaks with an Appalachian dialect he will be perceived as less intelligent than when he speaks Standard American English. I also expect the speaker with an Appalachian dialect to receive lower levels of respect, and participants will be less willing to take a class from him.

16. Shawn Fehrenbach and Rath Robinson

Northern Kentucky University
Faculty Mentor: Judy Voelker

Lithic Analysis of Stone Artifacts from Northeast Thailand

Our study examines 97 artifacts from the archaeological excavations at the prehistoric site of Phu Lon. This site is a copper mining and production site located along the Mekong River in northeast Thailand. Phu Lon is actually a complex of related sites where a variety of activities occurred. Radio-carbon dating suggests early occupation dates of 1750 to 1425 B.C.E. and shows that most of the activity at the site occurs during the first millennium B.C.E. The set of artifacts consists of stone axes and adzes, stone bracelets, and other small finds. Through careful examination of the data, we are broadening our understanding of how these artifacts were utilized and manufactured. Our objectives include the determination of form and function of each artifact, utilization methods and patterning, and spatial distribution of artifacts throughout the site. This research seeks to develop an understanding of the technological sophistication of the groups that occupied Phu Lon in prehistory, as well as serving as a baseline for future lithic studies in the region.

17. James Cripps

University of Louisville
Faculty Mentor: Rafael Fernandez-Botran

Modulation of Acute Inflammation by Targeting Glycosaminoglycan-Cytokine Interactions

Glycosaminoglycans (GAGs) located on cellular membranes and the extracellular matrix (ECM) are able to interact with chemokines and pro-inflammatory cytokines, leading to local cytokine/chemokine accumulation. The tissue-bound cytokines/chemokines function in promoting leukocyte migration and activation, contributing to local inflammation. Hence, targeting of GAG/cytokine interactions may provide an avenue for the attenuation of inflammatory responses. A cationic peptide (MC2) derived from the heparin-binding sequence of mouse IFN-gamma was previously shown by our laboratory to delay allograft rejection in an animal model. In order to further investigate the immunomodulatory properties of the MC2 peptide, we have studied its activity in an acute peritoneal inflammation model. Groups of C57Bl/6 mice were injected intraperitoneally with either ConA or thioglycollate and treated with saline (control), the MC2 peptide or two control cationic peptides, poly-L-lysine (PLL) and poly-L-arginine (PLA). Treatment with the MC2 peptide, but not PLA or PLL, resulted in statistically significant reductions in total cell numbers, concentration of total proteins, and concentrations of pro-inflammatory cytokines (TNF-alpha, IL-6, or IL-1beta) in peritoneal lavage fluids, without alterations to the qualitative cellular composition of the exudate. These results suggest that targeting GAG/cytokine interactions is a viable approach to reduce inflammation.

18. Sarah McMurray and Dara Hardin

Western Kentucky University
Faculty Mentors: Phillip Womble and Alexander Barzilov

Biometric Fingerprint Access System for Critical Infrastructure Protection

Securing our resources, both critical infrastructure and personnel, is a vital part of Kentucky Homeland Security. With this in mind, Western Kentucky University's Applied Physics Institute, in conjunction with Electronic Warfare Associates of Bowling Green, KY, has developed a biometric fingerprint access system. The system is unique in that it is client/server based and each person's biometric will be replicated to each entrance system using a distributed database system. Security experts can monitor access remotely through this flexible database. The system registers authorized personnel, provides the ability to specify which entrances are to be authorized, specifies times of authorized entrance, provides temporary access, and provides the audit trail report of the use of each entrance. This system can serve numerous types of infrastructures including shopping malls, schools, factories, and other public facilities. The poster will describe the biometric fingerprint access system. Details of the applications scenarios by State and Local governments, local law enforcement, as well as educational institutions will be discussed.

19. Willie Carver

Morehead State University
Faculty Mentor: Karen Taylor

The Out of Classroom Experience: Two Models for Successful Study Abroad in France

The purpose of this study is to compare consortium and single-institution models of study abroad programs, especially as they apply to students attending institutions of higher education in Kentucky. World language educators agree that study abroad is essential for students who wish to develop an appreciation and understanding of the culture, language, and daily life of a country and its people. Most American universities that offer majors in world languages provide some form of study abroad opportunities for their students. Many large universities have strong programs that draw almost exclusively from their own student pool. However, smaller institutions may encounter considerable difficulties in sending their students abroad, and often the financial, planning, and recruiting barriers prove insurmountable. For these smaller institutions, therefore, a consortium model of study abroad, in which several universities collaborate, can be a more effective and financially viable option. This study will focus on the advantages and possibilities of such a consortium model, and will specifically examine the experiences of students and faculty who attended the Kentucky Institute for International Studies' summer program in Paris, France, 2005.

20. Collin Schaumburg

Murray State University
Faculty Mentors: Paul Sikel and Claire Fuller

Do Parasite Loads Vary with Host and Environmental Parameters in Bluegill Sunfish (*Lepomis macrochirus*)?

Parasites have been found to affect the health, behavior, and life history of fishes, including reproduction (e.g., mate choice and parental investment), and habitat choice. Centrarchid sunfishes (*Lepomis*) are among the best-studied North American fishes. Considerable data exist on their reproductive habits, diet, and habitat choice. While descriptive studies have characterized parasite communities of sunfishes elsewhere, little is known about parasite communities on fishes in this region, or the relationship between parasites and the behavior and ecology of sunfishes generally. As a first step in addressing this lack of knowledge, a field study was conducted on parasite loads associated with the gill lamellae of bluegill sunfish (*Lepomis macrochirus*), I hypothesized that: 1) males will have a higher rate of parasitism than females due to decreased mobility associated with defending the nest; 2) parasite loads will be higher in vegetated habitats; 3) gill parasites will be most abundant on the first and largest gill arch; and 4) parasite loads will change throughout the spawning season. I collected fish by rod and reel and cast netting at different sites in Western Kentucky. Fish were sexed and processed in the laboratory to determine loads of parasitic monogeneans. Sampling of fish was conducted throughout the spring and summer spawning season (water temperature $> 65^{o}$F). Parasites were found to be significantly more abundant on the second gill arch, and parasite abundance differed significantly over time. Although parasite loads tended to be higher for males, the difference was not significant.

21. Leanna Lilly, Andra Bush, Megan Payton, Lauren Miller, Carol Hurn, and Shawna Webb

University of Kentucky
Faculty Mentor: C.M. Carswell

Losing Track and Losing Out: Improving Situation Awareness

As we move through our daily lives, we have varying degrees of awareness about what is going on around us. Such situation awareness allows us to foresee potential dangers early enough to respond to them quickly and safely. However, good situation awareness is becoming more difficult to maintain as we engage in more multitasking and as distractions such as personal digital devices become commonplace. Our research evaluates ways to enhance situation awareness in several challenging environments.

In Study 1, we evaluated the mental effort required to use several innovative displays destined for use by surgeons during laparoscopies (keyhole surgeries). When mental effort is reduced by these displays, situation awareness is increased as surgeons have more mental resources to devote to patient monitoring. In Study 2, we also looked at the effects of display design on situation awareness, this time in a control room for first responders to a simulated natural disaster. We identified several risks to mental workload and situation awareness that result when controllers customize their own displays. In the final study, we used training to enhance situation awareness. Participants received practice playing a simulated racing game. Some participants were interrupted periodically by blanking the displays. A control group received no such interruptions while practicing. Quick recovery from interruptions is aided by having good situation awareness and, therefore, participants who experienced interruptions during training were more likely than the control group to maintain it even when playing the game with no interruptions.

22. *How Well Are We Educating Children and Young Adults of Kentucky the Importance of Healthy Eating for a Healthy Body?*

University of Kentucky
Faculty Mentor: Tammy Stephenson

Lisa Keys

The Dietary Habits and Nutritional Education Levels of Pre-School Parents at a Community Head Start Program

The health of America's youth continues to decline as obesity becomes a major epidemic beginning in childhood. Parents have an exceptional level of influence on their children, especially nutritionally, and this could impact how their children grow and develop. Parents with less nutritional education or those that do not know how, or do not practice, healthy eating habits may unintentionally influence their children in directions that could lead to disease and obesity. This research will evaluate the dietary habits and nutritional knowledge of preschool parents at a community Head Start program in Lexington. The Head Start program being assessed has a high percentage of Hispanic children. The parents will be given a survey evaluating their educational background, ethnicity, and knowledge of healthy eating guidelines. It is hypothesized that the Hispanic parents have a difficult time meeting the U.S. Dietary Guidelines following a traditional Hispanic diet. Therefore, better education needs to be aimed at this growing segment of the Kentucky population to ensure that their children are learning how to eat traditional cuisine while also meeting healthy eating guidelines.

Diana Severn

Vitamin C, Zinc Supplementation, and the Common Cold – Does It Really Help?

The common cold afflicts Kentuckians of all ages and results in frequent absences from school and work. It is now known that diet may play a role in the prevention and/or treatment of the cold. The purpose of this study was to examine whether intake of vitamin C and zinc is associated with a reduction in length and severity of cold symptoms while consumed during a cold episode. A survey was administered to 270 undergraduate students from a Human Nutrition and Wellness class at the University of Kentucky. The average number of colds reported per year was 2.7 and the average length of a cold episode was 5.8 days. A total of 127 subjects consumed a vitamin C supplement and 9 subjects consumed a zinc supplement when they felt the oncoming of a cold. Of the total, 42% noticed a decrease in the duration of their cold episode and 41% reported a reduction in symptom severity when taking a vitamin C supplement. With additional zinc, 44% detected a reduction in the duration of their episode, though 44% detected only a slight reduction in symptom severity. Subjects who consumed a regular diet rich in zinc experienced the least amount of annual cold episodes with an average of 2.4 episodes compared with subjects who consume a diet rich in neither vitamin C nor zinc whom experienced an average of 3.2 episodes. Subjects who consumed a daily multivitamin experienced less colds (2.4 episodes) than subjects who do not consume any multivitamin (2.9 episodes). These results provide further evidence that diet is important in the prevention and treatment of the common cold.

23. Ashley Williams

Western Kentucky University
Faculty Mentors: Andrew Wulff and Harry Rowe

Interpreting Trace-element and Stable Isotopic Results Recorded in a Holocene Stalagmite from Buckeye Creek Cave, West Virginia

Speleothems collected from Buckeye Creek Cave, Greenbrier County, WV, exhibit growth records for much of the Holocene, as has been determined through Th-230 dating of multiple specimens. Samples from growth bands were microsampled and trace-element ratios and stable isotopic data for stalagmite BCC-2 have been used to infer paleoenvironmental changes that occurred above the cave during the last ~7500 years. Mg/Ca and Sr/Ca ratios co-vary suggesting similar controls on concentration. Ba/Ca ratios vary inversely with Mg/Ca, Sr/Ca ratios and $\delta^{13}C$. Trace elements may be interpreted to reflect growth rate, mineral-solution reaction, and position of samples along a growth layer along with temporal changes in temperature and precipitation. Carbonate mineral morphology has been examined by SEM, and basic elemental ratios have been obtained on mineral phases using the SEM-EDS at WKU. A deviation in trace elements at ~2700 years BP to 1200 years BP may suggest climatic warming. Century-scale oscillations in $\delta^{18}O$ during the pre-4000 year BP period abruptly give way to less oscillatory, slightly more depleted $\delta^{18}O$ values suggesting a significant shift in climatic conditions ~4000 year BP. The last 2000 years of the record are characterized by increasing Mg/Ca and $\delta^{13}C$. During the same period Ba/Ca increases and then abruptly decreases, while Sr/Ca decreases and then abruptly increases and stabilizes. These data may reflect land-use practices such as deforestation by the indigenous people inhabiting this area.

24. Sara Perkins and Christina Mullins

Morehead State University
Faculty Mentor: Janelle Hare

The Potential of Genetic Transformation as a Mechanism of Bacterial DNA Repair in Acinetobacter Baylyi[/i] Strain ADP1

We are investigating DNA damage response mechanisms in the Gram-negative bacterial genus, [i]Acinetobacter[/i]. One member of this genus, [i]A. baylyi[/i] strain ADP1, has a truncated [i]umuDC[/i] DNA damage response operon that makes it unable to respond to DNA damage like other bacteria. However, ADP1 can survive higher levels of DNA damage than many bacteria, such as [i]Escherichia coli[/i], that possess a well-studied DNA damage response. ADP1 cells can also develop natural competence in early log phase to take up DNA via transformation. Our hypothesis is that without [i]umuDC[/i] gene function, natural transformation is used as a source of undamaged DNA to help repair DNA damage in ADP1 and possibly other [i]Acinetobacter[/i]. We conducted a survey of diverse members of [i]Acinetobacter[/i] to: (i) measure various strains' ability to survive DNA damage (from UV light), and (ii) determine whether each strain could develop natural competence to take up plasmid DNA. In the ten [i]Acinetobacter[/i] strains examined, survival on nutrient agar after 150 J/m^2 of UV exposure ranged from three orders of magnitude less than ADP1 to the same survival levels as ADP1. All [i]Acinetobacter[/i] strains examined did not develop natural competence under conditions where the ADP1 strain, consistent with previous reports, did develop natural competence. These data, once collected for all 21 strains of [i]Acinetobacter[/i] and

Perkins and Mullins Cont'd.

compared with the presence or absence of intact [i]umuDC[/i] operons in these strains, will help determine whether the extent to which [i]Acinetobacter[/i] survival after DNA damage exposure is affected by their ability to perform natural transformation.

25. Laurie Wolsing

Northern Kentucky University

Faculty Mentor: Nan Littleton

Supporting Early Childhood Educators, Families, and Children to Succeed in the Kindergarten Transition Process

It is very important to support our staff, families, and children to help them succeed as they transition into kindergarten. In this project, we provide appropriate training on Early Childhood Development to the staff and parents, utilizing the Head Start Outcomes and Kentucky Pre-School Standards. In this proposal, we will explain the importance of the development of a classroom portfolio, consisting of data, that will include: specific training information on skill building, materials to complete activities to enhance skills at home and school, screening results, Literacy scores, Creative Curriculum Documentation, Early Childhood Rating Scale (utilized in the STARS program), Instructional and Caring Contacts (utilized to monitor the amount of instruction conducted per classroom), digital photos of weekly classroom materials and activities, parent conferences and input, and data regarding trainings attended by staff. The outcome of the project is to provide high quality Early Childhood services to our families, by supporting our staff and parents. The development of the classroom portfolio will allow the consultant to review data and support the staff/parents in appropriate skill development.

26. Jessica Snyder

Eastern Kentucky University

Faculty Mentor: Catherine Clement

Explicit and Implicit Memories for Sexual and Nonsexual Advertisements.

Prior marketing research investigating memories for advertisements has primarily examined explicit memory as a process of retrieving ad information. Explicit memory for recalling ad information requires the consumer to consciously think back to the previously seen ad. Studies in this area have shown that with a lengthy delay between ad exposure and testing, or with divided attention during the ad exposure, explicit memory for an ad is poor. The purpose of the present study was to examine an alternative retrieval process, implicit memory, which may function differently from explicit memory. This form of memory retrieval does not rely on consumers' deliberate search of memory for a previously viewed advertisement, and is also shown to be successful, even when explicit memory fails. These two different forms of retrieval processes may also be differently affected by the content of ads, for example by whether ads have sexual or non-sexual content. Prior research suggests that while participants may pay more attention to sexual ads, the brand names associated with sexual imagery will be less likely to be explicitly recalled than brand names with non-sexual imagery. The present study investigated the effect sexual and non-sexual advertisements have on explicit and implicit memory for brand names.

27. David Hayden, Kaleb Tapp, Chris Rodgers, Lauren Thompson, Billie Dawn Moss, Whitney Shirley, and Jonathon Galloway

Murray State University
Faculty Mentors: David Ferguson, Kenneth Bowman and Pat Williams

Three Dark Fired Tobacco Studies from the Murray State University School of Agriculture

STUDY 1: Hayden, Tapp and Ferguson performed research that compared weed control and crop responses to currently registered herbicides. Nine different plots, selected at random, were comprised of four forty feet long rows and were treated with Napropamide (Devrinol 50-DF), Pendinethalin (Prowl 3.3 EC), Sulfentrazone (Spartan 4F), Clomazone (Command 5ME), and Pebulate (Tillam 6E). One plot was not treated. The variety of tobacco was Narrow Leaf Madole and was set on June 9th, 2005. The first treatment was applied on June 8, 2005. Plant data was recorded on early crop injury and weed control, late weed control, and overall yield.

STUDY 2: Rodgers, Thompson, Moss and Bowman examined dark fired tobacco yields using variable topping stages. This experiment was designed to help farmers increase net profits by illustrating the yield differences that occur when tobacco is topped at different heights and times. Time frames tested were elongated bud, 50% bloom, and 100% bloom. Tested topping heights were 12 leaves and 16 leaves. The project involved six different treatments. In treatment #1, tobacco was topped at elongated bud stage at 12 leaves. In treatment #2, tobacco was topped at elongated bud stage at 16 leaves. In treatment #3, tobacco was topped at 50% bloom stage at 12 leaves. In treatment #4, tobacco was topped at 50% bloom stage at 16 leaves. In treatment #5, tobacco was topped at 100% bloom stage at 12 leaves and in treatment #6, tobacco was topped at 100% bloom stage at 16 leaves. After drying, tobacco leaves were removed from stalks and classified into three categories: lugs, seconds and leaf. All leaves from a treatment were weighed to determine yield.

STUDY 3: Shirley, Galloway, and Williams examined the effects of tray-drench insecticide applications for aphid control and reduction of insect-transmitted viruses such as Tomato Spotted Wilt Virus (TSWV), and POTY virus, and other viruses on tobacco. Platinum, Admire, and Orethene 97 were applied to determine which insecticide application worked best. All chemicals were applied one day prior to setting. The desired amount of chemicals was sprayed over the trays and watered into the root zone of the tobacco transplant. Tobacco was set according to a complete block design with four replications of each treatment. After the first early rating was taken, all tobacco was sprayed with Tracer and Dipel for worm control.

28. Lauretta Osunde

Kentucky State University
Faculty Mentors: James Tidwell, Shawn Coyle, and Leigh Anne Bright

Determination of Safe Concentrations of Hydrogen Peroxide (H_2O_2) for Algal and pH Control in Freshwater Prawn Ponds

In pond production of the freshwater prawn, high concentrations of algae can cause the pH to rise to lethal levels (>10) for freshwater prawn. Algaecides have been used to manage the algae in ponds for other species. However, most commercially available algaecides are copper based; which is highly toxic to prawns. Hydrogen peroxide (H_2O_2) does not contain copper and has been demonstrated as useful for the management of algae and submersed aquatic weeds. The objective of the current research was to determine safe levels of hydrogen peroxide for the use with freshwater prawn; separate trials were conducted to evaluate and narrow the range of concentrations. In each experiment, five juvenile freshwater prawn (average weight = 0.01g for post-larvae and approximately 0.5g for nursed juveniles) were stocked into each of 24 aquaria each containing 8 L of water from a common source. The appropriate amount Green Clean Pro™, a granular algaecide with H_2O_2 as its active ingredient, was added to the aquaria to achieve the desired concentrations. The numbers of live and dead shrimp were determined for each aquarium every 24 hours and each experiment was conducted over 96 hours. Based on these experiments, the maximum safe concentration of hydrogen peroxide for freshwater prawn post-larvae is approximately 5 mg/L. Older, nursed juveniles appear to be able to tolerate concentrations as high as 10 mg/L. These data suggest that concentrations greater than 10 mg/L hydrogen peroxide should not be used as a pond treatment in freshwater prawn ponds.

29. Meagan Martin

University of Louisville
Faculty Mentor: Lora Haynes

Characterizing Early Storytelling: An Examination on Individual Differences in Narrative Ability of Young Children

This study examined differences in storytelling abilities concerning the production of causal connections and goal structure in young children's narratives. Participants included 62 3- and 4-year old children from a private preschool. Storytelling was assessed at two time points using three different wordless picture books by Mercer Mayer. The resulting narratives were examined and coded for the use of three types of causal relationships; within-scene, between-scene, and anticipate causal connections. Clausal distance was developed to measure over how many clauses children made connections. The number of references to the overall goal, outcome, emotion, and character voice were also examined.

30. Chelsea Campbell and Lindsay Clark

Western Kentucky University
Faculty Mentors: Sreedevi Dawadi and Cathleen Webb

Limestone-Based Material for Arsenic Removal from Drinking Water

Arsenic in surface water and ground water is of great concern because of potential toxic effects in drinking water supplies. The EPA recommended that the drinking water standard for arsenic, currently set at 50 parts per billion (ppb), be lowered to 10 ppb by the year 2006. Current remediation technologies are quite expensive and are designed for large water treatment facilities. Many rural water supplies will be out of compliance when the new lower standards are put into effect. This will place increased socio-economic pressure on rural America, primarily because of the lack of inexpensive point-of-source treatment technology. Arsenic is readily soluble and transports easily through ground water. Observations of arsenic contamination from mining areas in the Black Hills of South Dakota indicate arsenic is retained by native limestone. Batch tests conducted as a function of time show that over 70% of the arsenic was removed within 2 hours. Analyses clearly indicate that limestone reduced arsenic concentrations from > 100 ppb to less than 5 ppb. The arsenic removal efficiency of a novel, small scale device with a continuous, fresh exposure of limestone was tested. Arsenic test strips were evaluated for ease of use and for quality analysis and quality control studies. Water samples with various concentrations were tested before and after the batch experiments in order to evaluate the accuracy of the test strips. These inexpensive tests strips can detect arsenic levels on the spot from 1 ppb to 100 ppb.

31. David Patrick Hunley

Morehead State University
Faculty Mentors: Kent Price, Bill Ingler, Ignacio Birriel, and Capp Yess

Sputter Deposition of Indium-doped Iron Oxide Films for Photoelectrochemical Hydrogen Production

Indium-doped iron oxide (Fe_2O_3) films were created by radio frequency powered DC magnetron sputter deposition. The process of sputtering involves depositing thin metal films and insulators onto a substrate. The temperatures during deposition ranged from 150ºC to 250ºC. The deposition rate of Fe_2O_3 was 100W and ranged from 5W to 20W for indium. The samples were created in both an argon atmosphere and an argon/oxygen atmosphere. The effects of the indium doping on iron oxide's conductibility, band gap, stability, and photoactivity in a 5.9M potassium hydroxide solution were examined. The purpose of this study involves the future use of these films in amorphous silicon triple-junction solar cells.

32. Kelly Dawson

Kentucky State University
Faculty Mentors: Kirk Pomper and Jeremiah Lowe

Using Molecular Markers to Determine Clonality of Native Pawpaw Patches

Pawpaw [*Asimina triloba (L.) Dunal*] is a tree fruit native to areas in the Midwest and Southeast United States. Since 1994, Kentucky State University (KSU) has served as the USDA National Clonal Germplasm Repository, or gene bank, for pawpaw; therefore, the assessment of genetic diversity in pawpaw is an important research priority for the KSU program. Pawpaw is usually found as an understory tree, often found in large patches. Pawpaw tend to form many root suckers and it has been suggested that most pawpaw patches are therefore clonal in nature. Leaf samples were collected from trees in three native patches in central Kentucky. The objective of this study will be to utilize simple sequence repeat (SSR) markers with DNA extracted from leaf samples to determine if fingerprint patterns indicate that all trees sampled in the patch are clones. DNA was extracted from leaves of ten trees each from three patches in Kentucky. Using the SSR primer B103, polymorphisms were detected among the three patches with product sizes ranging from 280-600 base pairs (bp). One tree in patch one showed two polymorphic markers, one at 360 bp and the other at 600 bp, indicating the patch was not clonal.

33. Jay Mitchell, Michael Albright, and Sara Rittenhouse

Eastern Kentucky University
Faculty Mentor: Donald Yow

Richmond, Kentucky's Urban Heat Island

Three geography students at Eastern Kentucky University studied urban climate in Richmond, Kentucky during summer 2005. Specifically, they investigated whether or not the city of Richmond generates an urban heat island. The urban heat island effect is the impact that cities have on local air temperature. In most cities, temperatures in and around built-up areas are higher than in surrounding rural areas, especially at night. The urban heat island effect has been studied in numerous cities around the world, but this is the first documented study of this type in Kentucky. Moreover, this project initiated a long-term effort to monitor changes in both the intensity and spatial extent of Richmond's urban heat island as the city grows over time. Urban heat island studies are important because artificially elevated temperatures adversely affect thermally driven energy costs, human health and comfort levels, air pollution, various biotic processes, and the integrity of long-term temperature records. This study employed a fixed-point network of fifteen temperature stations located at sites that are representative of settings found in the Richmond area. All sites were located using Global Positioning Systems (GPS), and temperature data have been analyzed using statistical methods and Geographic Information Systems (GIS). Initial observations show that temperature differences between stations are greatest at night when skies are clear and winds are light. Under ideal conditions, stations in downtown Richmond have recorded temperatures that were more than 7°C warmer than simultaneous observations at rural stations. For more information, visit http://people.eku.edu/yowd/uhisite/index.htm.

34. Kevin Brumley

Eastern Kentucky University
Faculty Mentor: Catherine Clement

Visual Interference

In this experiment, I will explore the effect of visual information on interference with eyewitness memory. Participants will view a video tape of the television series, "Cops." Then, they will view a second tape. Participants in one condition will view a thematically similar tape, while the participants in the other condition will view a thematically dissimilar tape. I expect that those who view the similar tape will have more memory interference. Therefore, I predict that participants who view the thematically similar tape will have more memory errors for the original tape than will participants who view the thematically dissimilar tape.

35. Rachael M. Brown

Murray State University
Faculty Mentor: Howard Whiteman

Evaluation of Alternative Tagging Methods for Ambystomatid Salamanders

Toe-clipping, once a widely used technique for tagging amphibians, has become less accepted in part because of animal welfare issues, and in part because of the development of technologically advanced marking techniques. Two experiments were performed to examine alternative tagging methods, PIT tags (passive integrated transponder) and VI-Alpha tags (visible implant alpha-numeric). There have been few studies on the effectiveness and safety of these tagging devices on amphibians. Experiment 1 involved four treatments administered to spotted salamanders (*Ambystoma maculatum*) from western Kentucky: PIT, VI-Alpha, sham and control. In experiment 2, three treatments were administered to tiger salamanders (*Ambystoma tigrinum nebulosum*) from south-central Colorado: PIT, sham and control. Animals were tagged and then monitored in the laboratory for 12-14 days. Monitored variables included change in mass and condition, incision condition, tag readability and tag retention. All tags were retained during these experiments. PIT tags were successfully read in 100% of the animals in both experiments (20/20 tags), while VI-Alpha tags from experiment 1 could only be read in 60% of the salamanders (6/10). There were no significant differences between treatments in both experiments in regard to change in mass or condition, and there were no cases of incision infection. Thus, neither tagging method had significant short-term effects on salamander health. The rate of failure with VI-Alpha tag readability suggests this tagging method is less effective than PIT tagging, and although the latter is often 3-4 times more expensive, our results suggest that it is the most effective tagging method available.

36. Joel Persinger

Eastern Kentucky University
Faculty Mentor: Rose Perrine

Sex Appeal and Misattribution of Arousal

Does sex appeal cause music to seem more appealing? Eighty Eastern Kentucky University students (12 males and 68 females) were tested to answer that question. Groups of participants were randomly assigned to review a picture either in the sex appeal condition (picture of pop star using sex appeal, e.g.,**,** provocative clothing) or the non-sex appeal condition (same pop star not using sex appeal in picture, e.g., less provocative clothing) before listening to a song believed to be written and performed by the pop star in the picture. They then rated their approval of the music and their perception of the artist's carrier success on a scale of 1 - 6. I hypothesized that students in the sex appeal condition will give higher approval ratings to the music and a more positive perception of carrier success than in the non-sex appeal condition. Results found statistically significant for carrier perception but not for music approval. However, this study found a positive correlation between sex appeal and music approval.

37. Brandon Hale, Amanda Criner, Lorena Morales-Paredes, David Segura, and Ariel Cintron-Arias

Murray State University
Faculty Mentor: Linda Gao

Epidemiology as Related to Phylogenetic Distances of the Influenza Virus

The evolution of the influenza virus is characterized by continual changes to its surface structures due to antigenic drift and antigenic shift. In response, the host immune system must alter antibodies in response to the ever-changing virus allowing for the persistence of influenza in a host population. The spread of related strains to a susceptible population with regard to their phylogenetic distance from a parental strain during a season is examined, as well as the dynamics of the immune response within a single host. Very little work has been done to integrate phylogenetic analysis of evolution with the epidemiological spread of the influenza virus. In this study, an attempt is made to couple these two scales by using infection rates that are defined as functions of phylogenetic distances between strains. Competition between strains is focused on and strain prevalence for outbreaks during several seasons (2000-2004, inclusive) is examined at various levels: global, regional, and for New York City. Coexistence is found to only be possible between very similar strains, otherwise competitive exclusion or extinction of all strains occur. Stochastic simulations at the cellular level indicate that the immune system is most effective when the virus has little variability, so the rapid mutation of influenza is an effective strategy in evading the immune system. Similar simulations for the population level show that a strain's prevalence depends largely on the level of change in antigenic structure is produced by amino acid mutations.

38. Russell Neal

Kentucky State University
Faculty Mentors: James Tidwell, Shawn Coyle, and Leigh Anne Bright

Polyculture of Nile Tilapia (*Oreochromis Niloticus*) either Confined in Cages or Unconfined in Freshwater Prawn (*Macrobrachium Rosenbergii*) Ponds

Previous work has shown that tilapia (*Oreochromis niloticus*) confined in cages suspended in prawn (*Macrobrachium rosenbergii*) ponds were able to reduce phytoplankton populations and pH levels. However, tilapia might be even more effective if allowed to freely access all portions of the water column. This study was designed to compare the effects of confined and unconfined tilapia, in polyculture with prawns, on prawn growth, tilapia growth, algae populations and water quality. Juvenile prawn (*Macrobrachium rosenbergii*) were stocked into each of nine 0.04 ha ponds as 60 day nursed juveniles (0.8 ± 0.3 g) at 62,000/ha. Monosex (male) Nile tilapia (*Oreochromis niloticus*) (89 ± 24 g) were stocked unconfined into three of the ponds at 4400/ha. In three other ponds the same number of tilapia were confined in two cages (1-m3 with 100 fish/cage). There were 3 replicate ponds per treatment. Prawns were fed a sinking pellet (28% protein) twice daily at a standardized rate based on percent of body weight per day. Tilapia were fed a floating pellet (32% protein) to apparent satiation (2x/day). Prawns-Unconfined tilapia significantly decreased ($P < 0.05$) average prawn weight (26 ± 4g) and production (1,625 ± 211 kg/ha). These variables did not differ significantly ($P>0.05$) between the prawn monoculture and confined tilapia treatments (38 ± 1 g, and 2,465 ± 44 kg/ha, respectively). Prawn stocked with unconfined tilapia had significantly higher ($P < 0.05$) feed conversion ratio (FCR) (3.0 ± 0.4) than prawn in monoculture or stocked with tilapia in cages, which were again not different (1.9 ± 0.0). Tilapia-Tilapia harvest weight and production were not different significantly different in the confined and unconfined treatments averaging 454 g and 2,293 kg/ha, respectively. Tilapia stocked in cages had a significantly higher ($P < 0.05$) survival rate (99.7 ±1.4) and FCR (1.5 ±0.1) than unconfined tilapia (90.3 ±3.8 and 0.8 ± 0.0, respectively). There were no consistent trends in treatment differences among water quality variables and phytoplankton populations. In ponds with unconfined tilapia, prawn production and size were decreased and FCR was increased compared to ponds where they were confined. This likely indicates competition for food. This is supported by the decreased FCR in unconfined tilapia. This competition was made worse by tilapia reproduction in the unconfined ponds. There was no successful tilapia reproduction in the confined tilapia treatment. In summary, confinement of tilapia in cages appears preferable when polycultured with prawn. Under these conditions the two species appear to operate independently and additively. Also, the problem of unintended tilapia reproduction is avoided.

39. Ron McGavic

University of Louisville
Faculty Mentor: Ron Gregg

Retinal Ganglion Cell Dendritic Stratification of the nob2 Mouse

Light dependent activity within the retina is required for normal retinal ganglion cell (RGC) dendritic stratification into ON and OFF sub-laminae. The first synapse in this pathway is dependent on the expression and normal function of the $Ca_v1.4$ voltage dependent calcium channel (VDCC). The pore-forming (α_{1F}) subunit of the VDCC is encoded by the *CACNA1F* gene. Mutations in this gene cause incomplete congenital stationary night blindness (CSNB2) in humans, and a naturally occurring mouse model of CSNB2 has been identified and named *nob2*. This study investigates whether the abnormal photoreceptor to bipolar cell transmission in the *nob2* mouse alters RGC dendritic stratification in the inner plexiform layer (IPL). Transgenic mice expressing yellow fluorescent protein (YFP) in a small fraction of RGCs were crossed with *nob2* mice and immunohistochemical techniques were used to determine the dendritic stratification of these RGCs. Antibodies to YFP and Choline acetyltransferase (ChAT) were used to identify the ON and OFF sub-lamina of the IPL. The results of this study reveal no differences in the dendritic stratification of RGCs in *nob2* mice. RGC stratification appears to proceed normally despite the loss of normal signaling from the photoreceptors to bipolar cells and loss of α_{1F} subunit expression within the retina.

40. Sarah Rini

Morehead State University
Faculty Mentor: Philip Krummrich

Background Research for an Anthology of Translations on the Hero and Leander Theme in Western Literature

The story of Hero and Leander was originally written by Musaeus around the fifth century A.D. Hero lights a lantern in a tower every night to guide Leander as he swims across the Hellespont to secretly visit her. However, one night the lantern is blown out and Leander drowns. Upon seeing her dead lover, Hero kills herself by jumping from the tower. This simple story has become a recurring theme in literature over many centuries. The limited details have allowed writers to use their literary license to complete the story. Dr. Krummrich, a professor of comparative literature at Morehead State University, is currently translating many of the stories of Hero and Leander into English and compiling them into a book. One of the responsibilities I have had as his research assistant is to research biographical information about the authors whose works will be included in the book. The sources of information about these authors are often written in Spanish; therefore, this part of my responsibility involves using my knowledge of the Spanish language. Another aspect of my job is to find pieces of art and music that are based on the story of Hero and Leander. These pieces will be listed in appendices to the book and included as illustrations. The artwork I find will be used for the cover of the book. My methods of research include using online databases, searching library catalogs, and interviewing knowledgeable professors.

41. Casey Lengacher and Sarah Vessels

University of Kentucky
Faculty Mentors: Jerzy Jaromczyk and Alvaro G. Koch

Liver Cancer Network Database: A Web Portal for Liver Cancer Research at the University of Kentucky

In the United States, particularly the state of Kentucky, the percentage of persons infected by hepatitis has been increasing. This has been causing a corresponding increase in liver cancer, which as of 2002 had climbed to be the 12th leading cause of death in the United States. This trend has raised concerns in the cancer research community regarding the awareness of hepatitis, liver cancer, and the connection these conditions share. To address these concerns, we have assisted the Liver Cancer Program at the University of Kentucky by developing the database for collecting liver cancer related data. The Liver Cancer Network (LCN) Database, a research effort sponsored by the Kentucky Biomedical Research Infrastructure Network (KBRIN), and involving both undergraduate and graduate students, will aid in helping break new ground in the fight against hepatitis and liver cancer. The database uses modern technologies, convenient user interfaces and its development addresses security issues.

42. Courtney Miles

Western Kentucky University
Faculty Mentor: Rodney King

The Immunity Region of Bacteriophage HK639 Encodes an Antiterminator RNA

We have only begun to appreciate the many roles that RNA plays inside a cell. The bacterial sequence database alone has revealed a plethora of un-translated RNAs, some of which have been shown to play important roles in the regulation of gene expression. Regulatory RNAs encoded by bacteriophage have also been characterized. Phage HK022 encodes an RNA that suppresses transcription termination and thus allows full expression of phage genes that lie downstream of terminators. This mechanism of regulating gene expression is called antitermination. We have identified and sequenced a new bacteriophage (Phage HK639) that encodes a similar type of antiterminator RNA. A comparison of different antiterminator RNAs should provide important information on the sequence and structural features that are required the activity of these unusual molecules.

43. Brittany Twinam

Eastern Kentucky University
Faculty Mentor: Catherine Clement

Effects of Practice on Gender in Mental Rotations Task Performance

The present study is designed to partially replicate a study performed by Stericker and LeVesconte (1982). This study will examine the effects of practice on gender differences in spatial tasks. Participants will be male and female psychology undergraduates at Eastern Kentucky University. All participants will complete a pretest and posttest of mental rotation ability. These tests will consist of items from the Stanford Binet "Paper Folding and Cutting" task. Between the pre- and post-tests, half the males and half the females will engage in 20 minutes of spatial task practice by playing the game "Tetris". The remaining subjects will play a non-spatial video game. I expect improvement from pre- to post-test to be greater for practice than no-practice subjects. I also expect that among subjects with no-practice, men will outperform women on both pre- and post-tests. For subjects with practice, I expect gender differences on the post-tests will be reduced.

44. Marquisha Paul

Kentucky State University
Faculty Mentors: Changzheng Wang and Lingyu Huang

A Non-Dairy Source of Dietary Calcium - Bone Soup Prepared With a Pressure Cooker

Bone soup can be an alternative source of calcium for people who can not consume dairy products. A pressure cooker can increase the inside temperature to nearly 120^{o} C and significantly shorten the time needed for making bone soups. The objective of this study was to determine the calcium content of bone soups prepared with a pressure cooker. Soups were made by cooking 100g of bones for 1 hour in 300 ml of distilled water containing 5, 10, or 20% of white vinegar. Soup samples were taken at 0, 1, or 14 hours after cooking and the soup brought to room temperature. The concentration of calcium and magnesium in the soup increased with increasing amounts of vinegar added before cooking. When 5% of vinegar was added, soaking the bones without cooking resulted in higher concentration of calcium than cooking the bones in the pressure cooker for 1 hour. Addition of vinegar after cooking lead to lower initial calcium content, which increased significantly after 1 hour. The pH of the soup was higher after cooking, indicating acetic acid from the vinegar was evaporated during pressure cooking. For most effective extraction of calcium, the bones need to be pressured-cooked before vinegar is added and allowed enough time for extraction with the bones in the soup.

45. Lindsey Jacob and Matthew Jacob (GS)

Murray State University
Faculty Mentor: John Steffa

Music for Film: Creating a Soundtrack to Enhance Video Imagery

This project is focusing on the creative and technical aspects of composing a soundtrack for a video. Computer software that will be utilized to create the soundtrack includes Professional Digital Performer, to sequence MIDI data, and Sound Edit, to edit recorded sound bites. Learning objectives for the project include synchronizing music to video images, creating various textures through the use of non-traditional sound sources, creating musical sequences that reflect moods established by the video, editing prerecorded sound sources, and interfacing video and audio playback. The exhibit will contain a film that is displayed on a laptop computer and a poster containing reasons for particular creative decisions made regarding the soundtrack. The film, entitled "The Letter," is about one female character's struggle with depression and thoughts of suicide. One example of a creative decision in producing the film involves the use of certain musical themes or textures to reflect a scene in the video.

46. Aaron Schihl

Northern Kentucky University
Faculty Mentor: David Hogan

Diversity Courses and Socialization Factors Liberalize Student Opinions Regarding Gay Marriage

This research examined the relative effects of education (completing a human sexuality course) and socialization factors (having favorable interpersonal experiences with a gay person) in persuading college students to support the initiative of gays to marry. Both factors played significant roles.

47. Elizabeth Lush, Andrea Floyd, and Inka Weissbecker

University of Louisville

Faculty Mentors: Paul Salmon and Sandra Sephton

Does Meditation Alleviate Anxiety and Physiological Symptoms Related to Fibromyalgia?

Fibromyalgia is a stress-related disorder characterized by chronic pervasive pain, fatigue, and impaired functioning. Fibromyalgia patients often report increased distress and anxiety. The Mindfulness-Based Stress Reduction (MBSR) intervention is an eight-week program originally designed for chronic pain patients. MBSR teaches participants to redirect attention in a moment-to-moment fashion towards the body in an effort to alleviate distress and anxiety. This study tested the effects of MBSR on anxiety and biofeedback measurements of heart rate, muscle tension, temperature and galvanic skin response with the hypothesis that MBSR would reduce anxiety and stress response activation. Forty-three women with fibromyalgia syndrome were screened for medications that could affect outcomes. Before the start of the intervention, questionnaires assessed demographics, pain ratings and symptoms of anxiety, and biofeedback measurements were collected. All measurements were repeated after the conclusion of the intervention. The effects of the MBSR intervention will be analyzed and results will be reported.

48. Nikki Wheeler

Morehead State University

Faculty Mentors: Troy Wistuba, Judy Willard, and Phil Prater

The Effect of Breed Type on Real-Time Ultrasound Carcass Traits, Performance and Pelvic Measurements of Heifers Enrolled in the Eastern Kentucky Heifer Development Program

Young heifers were weighed, pelvic measured, and ultrasonically scanned to study breed differences for performance, pelvic area, 12^{th} rib fat depth, longissimus muscle area, intramuscular fat, and rump fat. Angus (AN), Angus cross (AC), Gelbvieh cross (GC), Limousin (L), Charolais (CH), and Charolais cross (CC) heifers (n = 411) were delivered to Hazard, KY for the Eastern Kentucky Heifer development program. Heifers were grazed for 138 days with minimal supplementation and then pelvic measurements were taken by an experienced veterinarian and carcass measurements were obtained by a CUP certified ultrasound technician. Initial, mid test and end weights did not differ between breed and averaged 212.2, 244.9, and 276.7 kg, respectively ($P > 0.05$). However, there were differences in total gain and ADG in that the GC heifers had increased total gain and ADG than the other breed types ($P < 0.05$). There were no consistent results for pelvic area although CC heifers did have larger ($P < 0.05$) pelvic areas than AN or AC heifers. The L heifers had the largest ($P < 0.05$) longissimus muscle area (62.1 cm^2) and AN had the smallest (51.5 cm^2) where as the AC, CH, CC, and GC were intermediate, in addition, AN and AC heifers had the greatest ($P < 0.05$) 12^{th} rib fat depth, intramuscular fat, and rump fat of the heifers. These results support the knowledge that earlier developing breeds of cattle have increased intramuscular fat and subcutaneous fat depots.

49. Nicholas Jackson and Samuel Nicaise

University of Kentucky
Faculty Mentor: Vijay Singh

Tailoring Porous Alumina Templates for Use in Nano-Scale Heterojunctions

Thin-film anodized porous alumina templates have the potential for revolutionary impact in nano-structured solar cells and display devices. They can be used to create large, uniform, self-ordered nanoscale hetero-junctions. Aluminum anodized in a suitable acidic electrolyte under controlled conditions forms a hydrated aluminum oxide containing a two-dimensional hexagonal array of cylindrical pores. Electrodeposition of subsequent materials in the pores leads to the formation of individual devices, each isolated from the other by the insulating alumina matrix around it. Evaporative deposition may also be possible with thin porous alumina and lower aspect ratio. The advantages of this method are (1) uniform pores with sub-micrometer to nanometer diameters, (2) arrangement of vertically directed pores at almost identical spacing, (3) ability to control diameter of pores by changing electrolyte composition and electrochemical processing regimes, and (4) high reproducibility of the film structure for samples of large sizes. The challenges for our application are to tailor the thickness of the film to the desired solar cell. We are also working to determine whether an aluminum contact layer attached to the pores is a desirable attribute. Anodization of porous alumina has been performed at different temperatures and for different durations. Characterization has been done by FE-SEM, UV-Vis Spectrophotometer and 4-point probe.

50. Amy Kaczynski and Ian Rice

Western Kentucky University
Faculty Mentor: Gordon Smith

Acoustic Agglomeration of Fly Ash

Coal pollution is a problem in Kentucky, affecting a significant portion of residents. The current technologies employ electrostatic precipitators to remove large particles from the exhaust, leaving smaller particles in the fluid stream. Western Kentucky University is investigating methods of further reducing the amount of airborne fly ash exiting coal processing plants by means of pretreating the exhaust acoustically, agglomerating the fine dust into larger clumps for easier and more thorough removal. Initial investigations are underway, agglomerating cork dust and cigarette smoke (which is comparable in consistency to fly ash) utilizing speakers. Additional work developing thermoacoustic prime movers (a technology converting thermal energy to acoustic work) as the sound source has reached the prototype stage. This novel system geometry employs harmonic resonant modes, which facilitates the insertion of a dividing membrane to separate the thermoacoustic components from the hazardous exhaust stream. Initial results and analysis will be presented. The results of this work will help further the overall goal of applying thermoacoustic technology to this problem, which will enable the pretreatment process to occur utilizing the waste heat of the exhaust as the energy source.

51. Michelle Shouse

Eastern Kentucky University
Faculty Mentor: Catherine Clement

The Effect of Attachment Style on Autobiographical Memory

An individual's attachment style affects many aspects of their behavior and personality. The purpose of the proposed study is to further evaluate attachment style and its effect on autobiographical memory. It is proposed that securely attached individuals have more positive autobiographical memories compared to insecurely attached individuals. Subjects will be recruited from Eastern Kentucky University. They will write a paragraph describing an interaction between themselves and a professor or high-school instructor. They will then complete a questionnaire measuring their overall feelings about that interaction and a questionnaire measuring their attachment style. I expect securely attached students to have more positive autobiographical memories regarding the interaction than insecurely attached students.

52. Todd Broker

Murray State University
Faculty Mentor: David Eaton

NASCAR Sponsorships and Their Affect on Market Definition

A typical fortune 500 company will spend millions of dollars on advertising every year to try and affect their market. These dollars gain them market share, create brand loyalty, and increase overall demand for that market, among other things. But what about advertising in NASCAR? Are NASCAR's advertising goals the same? If they are, are they being fulfilled? I am studying the popular sport of NASCAR racing and the millions of dollars in sponsorship that flood that business every year. I am looking at the amount of money that goes into the sport and how that money correlates in individual companies to other advertising expenses, revenue, and adjusted stock prices. I am also looking at the winning consistency of a driver to determine if driver success correlates with how well the driver's sponsor company does in the stock market. Also, I am trying to determine if companies only look at monetary benefits from NASCAR sponsorship or if there are other goals they are attempting to meet. My basic hypothesis is that on multiple levels it is not worth it for all types of companies to invest in NASCAR racing due to many factors. Since the sport has grown considerably in the last ten years, there have been a number of atypical companies sponsor cars that were not seen through the 1970's and 80's. Has the nature of NASCAR sponsorship changed over the years?

53. April Newsome

Kentucky State University
Faculty Mentor: Avinash Tope

Detection of Urinary DNA Adducts: Identification of Farmers at Risk of Genetic Toxicity Due to Occupational Exposure to Pesticides in Kentucky

Chronic low level exposure to pesticides has been implicated in many health conditions such as induction of oxidative stress, cytogenetic damage, which potentially can lead to development of cancers in humans. Level of 8-hydroxy-deoxo-guanosine (8-OHdG) in the body fluids such as serum and urine is a highly sensitive biomarker of DNA damage occurring due to DNA-adduct formation. The objective of the study was to determine genotoxic changes in farmers from surrounding counties in Kentucky and to evaluate the effects of continuous exposure to pesticides through monitoring the urinary levels of 8-OHdG. Urine samples were collected once a month for six months, from June 2003 through November 2003 from farmers (n= 16) and controls (unexposed n=8). The collected urine samples from each individual were stored at -20 ^{0}C and pooled after six months, and the levels of 8-OHdG were detected using Enzyme Linked Immunosorbent Assay. No statistically significant difference at $P \leq 0.05$ was observed in the levels of urinary 8-OHdG between the controls and farmers exposed to pesticides.

54. Hajara Mahmood

Western Kentucky University
Faculty Mentor: Heather Johnson

Bridging the Gap: Bringing STEM Role Models to Every Classroom in Kentucky

This project was the first step in the production of a video featuring interview biographies of a multicultural group of Kentucky STEM (Science, Technology, Engineering, and Mathematics) role models. Twenty-five Kentucky born/raised STEM professionals were identified and their professional backgrounds were researched. This work was preliminary to the production of a video to be distributed to all 1,271 Kentucky primary, middle, and secondary public schools. The premise of this project is that all students need role models with whom they can identify, and who convey to them, "I am like you. See what I have accomplished. You can do this too." Ideally, these role models would be present in all classrooms. In reality, it would be impossible for them to reach all classrooms in person. This project will be a solution to this problem. It will bring STEM role models to every classroom in Kentucky.

55. DeShayna Davis, Dennis Morrell, and Ben Overgaauw

University of Kentucky
Faculty Mentor: Susan Barron

Prenatal Exposure to Alcohol Increases Later Alcohol Consumption during Adolescence: Data from a Rat Model

A study by Brown et. al. shows that over 80% of high school students begin drinking alcohol by the time they graduate. This adolescent period is when most individuals initiate alcohol and other drug use. While many factors may contribute to dangerous drinking in adolescence, the potential role of prenatal alcohol exposure is often not considered. Recent data by Baer et al. suggest that prenatal alcohol exposure may be a risk factor for the development of alcohol and other drug problems in human populations. There are many factors difficult to control for when studying this question in clinical studies. Therefore, we used a rodent model to examine whether alcohol exposure during early development increases the likelihood of drinking during adolescence. Our model uses a neonatal exposure period that overlaps the human 3rd trimester "brain growth spurt". Offspring were tested during adolescence. In order to initiate drinking, the offspring were given a 10% sweetened, sucrose solution with alcohol gradually added across days in increasing concentrations. The sucrose concentration was reduced and the amount of 12% alcohol consumed was recorded daily. Neonatal alcohol exposure was associated with increased alcohol consumption during adolescence relative to controls. These data provide further evidence that prenatal alcohol exposure may indeed be a risk factor for subsequent alcohol abuse in adolescence.

56. Joseph Mayhorn

Morehead State University
Faculty Mentor: Ilsun White

Long-Term Learning Deficits and Neurochemical Changes Result

METH is known to produce neurotoxic effects in the central nervous system, affecting an array of behaviors. This study examined the effects of METH on spatial learning and correlative changes in neurochemistry. Rats were trained in a visuospatial task requiring a correct barpress opposite the stimulus location until they reached a criterion of acquisition (>85% correct, three sessions). Rats received four injections of METH (9.0 mg/kg) or saline at 12-hour interval. Two weeks following treatment, rats were retested on the same task to examine METH effects on retention. METH treatment displayed no significant effect on retention. Rats then began training on a reversal task requiring a correct barpress same as stimulus location to examine METH effects on new learning. METH treatment impaired performance on the reversal task, showing a delayed learning. The fact that learning prior to METH exposure remains intact suggests that learning METH-induced impairment is specific to new learning. Dopamine levels were measured using HPLC and compared between treatment conditions. Results indicated an upregulation of dopamine in the prefrontal cortex and the nucleus accumbens of METH-treated rats, suggesting the escalated levels of dopamine are responsible for learning deficits.

57. Laricia Longworth

University of Louisville
Faculty Mentor: Dennis Molfese

Affects of Sleep Restriction on Speech Processing in Children

The impact of sleep on learning and speech processing in children is not a thoroughly investigated question. There are few studies that address this specific area directly in normally developing population. According to Dahl, sleep-deprived children often exhibit behavioral and cognitive symptoms, such as: difficulty with attention, that resemble those observed in attention deficit hyperactivity disorder (ADHD). The implications of sleep on learning in normal children is a topic of concern. Mild sleep restriction due to delayed bedtimes for children are prevalent in current society, but little is known of the neurocognitive affect of this restriction.

58. Meagan Shields and Heather Gulley

Northern Kentucky University
Faculty Mentor: Heather Bullen

Probing Bacterial Adhesion: Analysis of the Interaction of Siderophores with Aqueous-Metal Oxide Interfaces

Biofilms have a profound impact on industrial, food processing, and medical settings creating significant problems such as: contaminating food supplies, creating infections, and corroding petrochemical, water treatment and heat exchange systems. Although biofilms are prevalent within the natural environment, it is still unclear how their interactions may influence mineral deposition/recycling or other environmental/medical processes. Characterizing the interactions of bacteria (which compose most biofilms) with metal oxide surfaces is imperative toward the development of a fundamental understanding of biofilms in aqueous systems. This presentation describes the use of attenuated total-reflectance infrared spectroscopy (ATR-FTIR) to monitor bacterial biofilm adhesion onto model metal oxide sol gel films. The role of catecholate and hydroxamate siderophore models in the initial adhesion of bacteria to TiO_2, MnO_2, and Cr_2O_3 surfaces has been investigated. The interaction of model siderophore ligands as a function of pH and ionic strength using ATR-FTIR is presented. Preliminary ATR-FTIR results indicate that catechol binds covalently to the TiO_2 and MnO_2 surfaces in a bidentate dianion form.

59. Emily Clausen and Jennifer Allen

University of Louisville
Faculty Mentor: Eric Wong

Cytoskeletal Involvement in Ephrin-mediated Axon Guidance

Axon guidance is the mechanism by which a nerve cell extends a thin process, the axon, over potentially thousands of other cells to accurately make a connection (synapse) with a target cell. This process is led by the growth cone, a motile receptor-rich structure at the end of growing axons that samples its surroundings to determine direction of growth. The extracellular matrix protein laminin, and the cell adhesion molecule n-cadherin, both promote axonal extension. The growth factor, BDNF, can also act as an attractive factor, although its primary function is to promote survival. In contrast, the ephrins are repulsive guidance molecules that cause the growth cone to collapse within 30 minutes. This collapse "resets" the growth cone and it starts moving in another direction. Cytoskeletal effectors are involved in the collapse, but the specific role of the cytoskeleton in this process is unknown. Recent data from our lab has shown that the ephrin-induced collapse can be modulated by BDNF and n-cadherin. This presents a model for the study of cytoskeletal contribution to the collapse. Retinal neurons are stained to reveal the actin cytoskeleton, and alterations to the cytoskeleton are correlated with the collapse of the growth cones after contact with ephrins, in the presence and absence of modulatory elements. The hypothesis predicts that cytoskeletal rearrangement and retraction significantly precedes and causes visible growth cone collapse.

60. Keith Allen

University of Kentucky
Faculty Mentor: Joe Chappell

Functional Analysis of Terpene Synthases in Arabidopsis Thaliana using the Surrogate Splicing Method

Terpene synthases are responsible for a key biosynthetic step in the formation of mono-, sesqui- and di-terpenes produced by plants that are valuable in medicine, in food, and in the cosmetic industry. The overall objective of the current project is to exploit the natural diversity of terpene synthases to obtain a more detailed understanding of the molecular and structural basis for how terpene synthases function, so enabling the informed development of strategies for producing important value-added terpenoids at high levels both *in vivo* and *in vitro*. Two putative terpene synthase genes of *Arabidopsis thaliana* will be cloned and expressed, the encoded enzymes characterized, and reaction products generated by these enzymes investigated by GC-MS. The identification of additional terpene synthases will contribute to our understanding of the structure-function relationships within terpene synthase family of proteins and should provide the means for developing novel synthase using the tools of protein engineering.

61. Bradley Smith and Leslie Beavin

Western Kentucky University
Faculty Mentors: Michael Stokes, Doug McElroy, and Charles Kimwele

Molecular Identification of Illegal Game Meat Utilization in Commercial Outlets in East Africa – Nairobi Case Study

Wildlife, traditionally viewed in East Africa as a dietary supplement, has become a key source of food and unofficial tender in the drive for human survival in eastern and southern Africa. Wildlife populations within and outside protected areas are being greatly impacted by the illegal killing of wildlife for meat; this is the so-called use and trade of "bush meat". Within Kenya, a substantial illegal urban commercial trade is said to be evident, with hundreds of illegal traders operating in major towns including Kenya's capital, Nairobi. Bushmeat is generally thought to be sold as beef or mutton to unaware customers. Such bushmeat is derived from illegal and unsustainable poaching. Once a carcass has been dressed and the meat de-boned, positive identification of meat as bushmeat is, in most cases, impossible. This presents a constraint in the control of illegal bushmeat trading. In 2004, the Born Free Foundation sponsored a study in Nairobi to assess the frequency with which bushmeat was sold in commercial butcheries as domestic meat. Because their results were suspect, based on the technique used and on species identified, we decided to validate their study using modern, DNA-based techniques, namely the sequencing of a 492 cytochrome B fragment which provides a species identification marker. Thus far we have analyzed 24 of our 104 samples, none of which have been determined to be bushmeat. This is in contrast to the Born Free Study, which identified upwards of 34% as bushmeat (25% as only bushmeat, 19% as both domestic and bushmeat).

62. Carlene Webb

Eastern Kentucky University
Faculty Mentor: Millicent Fleming-Moran

A Needs Assessment: Emergency Room Experiences of the Latino Community in Monroe County, Indiana

The Latino population has grown exponentially in the past decade, especially in Monroe County, IN. This population is considered medically underserved due to limited English proficiency, lack of insurance, or other cultural differences. A needs assessment was conducted to determine how accessible emergency care services are to this community with two goals in mind: 1) to determine what has already been done by the previous Latino Task force needs Assessment and 2) to understand the community's perception of the level of culturally competent procedures available in the ER setting of Bloomington Hospital. One-on-one structured interviews were conducted with ten key Latino advocates and other local health service providers to the Hispanic community. Transcribed interviews were analyzed for consistent themes among the key informants. Findings include difficulty understanding the function of the ER, not disclosing full medical history because of fear of deportation, and billing and follow-up difficulties. Barriers to Emergency Department care depend on a Latino's immigration and financial status, language capacity and appointment availability in language-friendly public, and low cost clinics. Lack of familiarity with hospital protocols, untrained interpreters, and confusion over payments makes the ER a confusing yet obvious source of care. These

Webb Cont'd.
findings are part of a broader assessment of service barriers for Bloomington Latinos, and will be used to formulate continuing education/cultural competency training for the Emergency Department staff of Bloomington Hospital.

63. James Locke and Melissa Porter

Murray State University
Faculty Mentor: Pablo Molina

Hydrogen Bonding is the Prime Determinant of Carboxyl pKa Values at N-termini of Alpha-Helices

Experimentally determined mean pKa values of carboxyl residues located at N-termini of alpha-helices are lower than their overall mean values. Here, we perform three types of analyses to account for this phenomenon. We estimate the magnitude of the helix macro-dipole to determine its potential role in lowering carboxyl pKa values at N-termini. No correlation between the magnitude of the macro-dipole and the pKa values is observed. Using the pKa program propKa we compare the molecular surroundings of 18 N-termini carboxyl residues versus 233 protein carboxyl groups from a previously studied database. While pKa lowering interactions at N-termini are similar in nature to those encountered in other protein regions, pKa lowering backbone and sidechain hydrogen bonds appear in greater number at N-termini For both Asp and Glu, there are about 0.5 more hydrogen bonds per residue at N-termini than in other protein regions which can be used to explain their lower than average pKa values. Using a QM-based pKa prediction model, we investigate the chemical environment of the two lowest Asp and the two lowest Glu pKa values at N-termini so as to quantify the effect of various pKa determinants. We show that local interactions suffice to account for the acidity of carboxyl residues at N-termini. The effect of the helix dipole on carboxyl pKa values, if any, is marginal. Backbone amide hydrogen bonds constitute the single biggest contributor to the lowest carboxyl pKa values at N-termini. Their estimated pKa lowering effects range from about 1.0 to 1.9 pKa units.

64. David Soleimani-Meigooni

University of Louisville
Faculty Mentors: Paula Bates and Shelia Thomas

A Novel Mechanism of Cancer Cell Death Triggered by G-Rich Oligonucleotides

AGRO100 is a synthetic DNA oligonucleotide that has recently been tested in Phase I clinical trials for the treatment of advanced cancer. Unlike other forms of cancer treatment, AGRO100 does not appear to induce cancer cell death by triggering an apoptotic pathway. Previous research has shown that AGRO100 causes a change in the morphology of cancerous cells, which is characterized by cellular swelling, however DNA synthesis ceases. The goal of this experiment was to comparatively analyze the size difference of AGRO100 treated U937 leukemia cells and untreated U937 cells by forward-scatter flow cytometry, and to determine whether AGRO100 induces changes in protein synthesis and cell division to cause enlarged cancer cells. Cellular divisions were analyzed by reading carboxy-fluorescein diacetate, succinimidyl ester stained samples of AGRO100 treated and untreated cells by flow cytometry. 35S-methionine incorporation assay allowed for quantification of in-vitro protein synthesis, using a scintillation counting method, for AGRO100 treated and untreated U937 cells. Preliminary data indicates that AGRO100 treated cells are larger, undergo fewer cellular divisions, and synthesize more proteins than their untreated counterparts. This uncoupling of cell growth from cell division by AGRO100 treatment is the likely cause of the change in the morphology of the cancer cells, which suggests that AGRO100 may be triggering necrosis/oncosis in the cancer cells.

65. Emmanuel Fields

Kentucky State University
Faculty Mentors: Steven Mims and Richard Onders

Growth, Survival, and Proximate Fillet Composition of Paddlefish* Polyodon Spathula *Fed Three Diets of Differing Protein Levels in Ponds

Paddlefish, *Polyodon spathula*, is receiving increasing attention as an aquaculture species worldwide. Several European countries report propagation efforts along with China, Russia, and even Cuba. In addition, various states of the US in the native range of paddlefish propagate them for mitigation and sport fishing programs. Diverse culture methods have been reported, however, intensive culture requiring feed training and prepared diets will be necessary to provide juveniles in sufficient number to support aquaculture. In the wild, paddlefish consume large zooplankton captured by filter feeding; however, the nutritional requirements of paddlefish are not known. High protein trout diets are typically used to feed train and rear paddlefish in tanks, raceways, or ponds. In a previous study at Kentucky State University, we compared growth, survival and proximate fillet composition of paddlefish fed commercial trout or catfish diets with no differences in growth performance, survival, fillet moisture, or fillet protein. Fillet lipid content was higher in paddlefish fed the trout diet; however, both diets produced fillet lipid content higher than reported values for extensively cultured paddlefish. In this study, we compared growth, survival, and fillet composition of paddlefish fed three diets of 32%, 27%, and 22% protein.

66. Paul W. Robinson

Morehead State University
Faculty Mentor: M. Scott McBride

Re-Orchestration of Philip Wilby's "Concert Gallop" for Wind Orchestra

Since 1597, when the well-known Venetian composer Giovanni Gabrielli set a specific instrumentation for his *Sonata pian e forte*, composers and arrangers have engaged in the practice of assigning particular instruments and voices to the various musical roles played in compositions of the Western music tradition. Compositions that gain popularity have historically been re-orchestrated for other media. One of the most famous 19th Century examples is Modest Mussorgsky's *Pictures at an Exhibition*; a work originally composed for piano but more widely known by its famed symphonic orchestration by Maurice Ravel. This process of re-assigning instruments from one medium to the other, more accurately called orchestration, remains a widely used practice in the Western classical tradition. The purpose of this study is to re-orchestrate for the instruments of the wind orchestra, Philip Wilby's *Concert Gallop,* a work originally set for the instruments of the British brass band. It is intended that the new wind orchestration will retain the concept of the original composition while expanding on the more limited array of color and expression offered by the brass band instrumentation and exploiting the relatively vast color palate of the wind orchestra. Consideration will be given to the range of each instrument and their color characteristics in the upper, middle, and lower registers, and the special characteristics of the muted brass sound. The orchestration will exploit the essence of the brass sound where appropriate and use the woodwind instruments to accomplish the lighter and more transparent portions of the piece. Distinct articulations, instrumental combinations, and doublings will be imposed to achieve the greatest range of expression for the wind orchestration. Ultimately, this wind orchestration of Wilby's *Concert Gallop* will extend the availability of this music to the enthusiast of the wind band medium, worldwide. The study will utilize instrumentation and orchestration texts of Hector Berlioz, Nikolai Rimsky-Korsakov, Kent Kennan, Alfred Blatter, and Samuel Adler, and the brass band scores and wind orchestrations of English composer Philip Wilby and other appropriate scores of selected composers.

67. Tyler Downing

Murray State University
Faculty Mentor: Suguru Nakamura

Enzymatic Activity of Renal H-K-ATPase in the OMCD of Transgenic Mice

The H-K-ATPase (HKA), a potassium dependent proton transporter in the outer medullary collecting duct (OMCD), plays an important role in acid-base homeostasis. The OMCD contains two HKA isoforms; gastric (HKAα1), dominant under normal dietary conditions (ND), and colonic (HKAα2), induced under a K-free diet (KD). The enzymatic activity (EA) of HKA in the OMCD is incompletely understood. The focus of the present study is elucidating the EA of HKA in HKAα1 and HKAα2 knockout (KO) mice under ND and KD. KO mice were subjected to ND or KD for ten days. Ten OMCD tubules were extracted, half placed in potassium-free media (solution 2), half in potassium-containing media (solution 3). Fluorescence measurements are based on the hydrolysis of ATP to ADP, coupled with the oxidation of NADH. ADP is determined by a decrease in NADH fluorescence. In K presence, NADH fluorescence of HKA α1 KO mice read 13.5±0.7 pmole for ND and 10.3±0.2 pmol for KD, indicating stimulation of the colonic isoform. HKA α2 KO mice averaged 6.8±0.3 pmol for ND and 5.4±0.3 pmol for KD in solution 2 ($p<0.002$). Solution 3 readings were 6.0±0.3 pmol for ND and 4.6±0.2 pmol for KD ($p<0.0005$). K addition produced significant changes in NADH fluorescence of ND and KD KO mice. The results demonstrated potassium depletion's association with increased EA of H-K-ATPase in OMCD, consistent with the activation of HKA α2 isoform. A significant difference in ATP production in HKA α2 KO mice is likely due to enhanced EA of H-ATPase under potassium depletion.

68. Jason Passafiume

University of Kentucky
Faculty Mentor: Bruce O'Hara

Cerebellar mRNA Levels of per 1, 2 as a Function of Sleep Deprivation in C57BL/6L Mice

Circadian rhythms (driven by biological 24-hour internal clocks entrained by the light-dark cycle) and homeostatic mechanisms (an organism's increasing sleep-drive with increasing sleep deprivation) both determine an organism's level of sleepiness. The forebrain's suprachiasmatic nucleus (SCN), a cluster of about 10,000 cells within the hypothalamus above the optic chiasm, houses mammals' master circadian pacemaker. In mice, the SCN is known to oscillate in accordance with the expression of a small number of "clock-genes": period genes per1 and per2 (per1,2); cryptochrome genes cry1 and cry2 (cry1,2); and transcriptional regulators clock and bmal1. Data implicates cry1,2 and per1,2 in participation in both circadian and homeostatic aspects of sleep in mice. In mouse cerebellar granule cells, induction pathways for per1 mRNA expression have been identified, and physiological roles of per1,2 mRNA expression have been explored through anxiolytic drugs. Still, per1,2 mRNA expression's function in the cerebellum remains unclear. The role(s) of cerebellar per1,2 mRNA expression in sleep regulation are explored using Real-Time Polymerase Chain Reaction quantification by testing the following hypotheses: 1) per1,2 mRNA levels in the cerebellum have a positive correlation with increasing amounts of sleep deprivation (SD), 2) mice allowed some sleep recovery time following SD have decreased per1,2 mRNA levels in the

Passafiume Cont'd.
Cerebellum, and 3) Knockout mice with abnormalities in sleep homeostasis have corresponding alterations in per1,2 mRNA levels.

69. Susan Harvey

Eastern Kentucky University
Faculty Mentor: David Reingold

The Perception of Racism at Indiana University-Bloomington: Do Students Consider Racism to be a Problem on Campus?

This study examines the perceptions and attitudes of students at Indiana University - Bloomington about racism, discrimination, and cultural diversity on campus using a survey questionnaire. The survey consisted of three sections, one was background information and the other two were questions relating to perceptions and attitudes about racism on campus. The students were randomly selected from all classes that were offered during the second summer term on campus. Participants were also selected from various on-campus locations. Data was collected from 111 undergraduate and graduate students on campus. The results from this study indicate that students do perceive racism to be a problem on campus. There was also a significant difference in the perception of racism based on race (black and white) and gender. Black students reported much more negative experiences with regards to racism and discrimination than did their white counterparts. The findings of this study support other studies conducted on racism that conclude that racism is a perceived problem on campus by students.

70. Tim Morgan

Western Kentucky University
Faculty Mentors: Alexander Barzilov, Phillip Womble, and Doug Harper

Beam Line Optics for 2.5 MeV Van de Graaff Particle Accelerator

The 2.5-MeV Van de Graaff particle accelerator with several ion beam lines for material-oriented research, analytical material science and teaching is under construction at WKU's Applied Physics Institute. The beam of charge particles generated by accelerator will be transported toward different experimental stations. Bending and switching magnet systems for the main beam line of the accelerator facility have been designed. The 0.5-Tesla electromagnet will bend a beam up to 90˚ from the beam axis. The Lorentz force governs the charge particle's circular orbit in a uniform magnetic field and allows direct control of the beam direction by variation of the magnetic field strength. The poster will describe the accelerator design, the beam line architecture, and beam optics. Details of the switching/bending electromagnet system will be discussed.

71. Lauren Petrzilka

Northern Kentucky University
Faculty Mentor: Michael Baranowski

Popular Culture and Political Socialization of College Students

Few people would disagree that popular culture figures have played a large role in youth vote efforts with major youth voter awareness campaigns seen from P. Diddy ("Vote or Die"), MTV ("Choose or Lose"), and even the world of professional wrestling (the WWE's "Smackdown Your Vote!"). We believe that the study of popular culture's influence on the political attitudes and activities of college students is both important and very timely. While there has been some previous work done in this area, most notably David Jackson's 2002 book "*Entertainment & Politics: The Influence of Pop Culture on Young Adult Political Socialization*," we believe this to be an under-researched area with the potential to generate a number of interesting findings.

72. Andrew Feldman

University of Louisville
Faculty Mentors: Aruni Bhatnagar and Brad Hill

Activation of Nrf2 by Lipid Peroxidation Products

Aldehydic products of lipid peroxidation, such as 4-hydroxy-trans-2-nonenal (HNE), are generated during oxidative stress and are associated with the onset and progression of cardiovascular disease. The transcription factor NF-E2 related factor (Nrf2) coordinates expression of antioxidant and detoxification genes (phase 2 genes) that constitute a cellular defense that scavenges reactive oxygen species, detoxifies electrophiles, and maintains intracellular reducing potential. Thus, we hypothesized that lipid peroxidation products, such as HNE, would feedback to stimulate the phase 2 response by activation of Nrf2. After rat aortic smooth muscle cells (RASMs) were exposed to HNE, the translocation of Nrf2 to the nucleus and the expression of genes that are transcriptionally driven by Nrf2 were measured by Western blot analysis. Exposure of RASMs to 25 μM HNE for 6h resulted in a two-fold increase in Nrf2 nuclear translocation and an 18-fold increase in production of the well-studied phase 2 response enzyme, heme oxygenase-1 ($p<0.05$). Additionally, intracellular glutathione levels, as measured by spectrophotometric assay, were significantly increased after 6 h of stimulation. Inhibition of aldose reductase, an efficient HNE metabolizing enzyme, by tolrestat resulted in an increase in Nrf2 nuclear translocation, underscoring the sensitivity of the phase 2 response by lipid peroxidation products. Taken together, these data indicate that lipid peroxidation products are potent activators of the Nrf2-driven phase 2 response and, therefore, may play a role in the pathological development of cardiovascular disease.

73. Amanda Day and Lisa Hinkle

Morehead State University
Faculty Mentor: Shari Kidwell

"I Can Do Better" The Relationship Between Parental Attachment and Care-giving Behaviors

Attachment is a "state of mind" about relationships, including rules that guide parenting, and it is believed to be "handed down" from generation to generation. Attachment, in turn, has been found to predict a variety of socioemotional competencies, both in children and adults. The purpose of the present study was to examine the relationship between parents' attachments to their own parents and their parenting behaviors and perceptions of their relationships with their children. Subjects for the current study were 55 parents and their preschoolers. Parenting was measured with questionnaires and interaction tasks. Perceptions of their relationships with their children were assessed via an interview. Attachment was assessed in an interview in which parents described how they were disciplined and comforted by their parents and the effects these relationships had on them. Parents classified as secure perceived themselves as more nurturing and consistent, and ratings of parenting behaviors suggested that they were more warm, empathic, and encouraging with their children. Additional, qualitative analyses were undertaken to examine whether parent's perceptions of their relationships with their children were consistent with their attachment patterns. The vast majority of parents displayed the caregiving perceptions that were expected, given their attachment pattern. These responses suggested that secure parents had positive, realistic, and balanced relationships with their children, relative to insecure parents. However, some insecure parents had perceptions of their relationships with their children that were similar to those of secure parents. These results have implications for interventions to prevent the "handing down" of insecure attachments.

74. Blaire Cullman-Clark

University of Kentucky
Faculty Mentors: Robin Cooper and Sameera Dasari

Influence of 5-HT Receptors on Behavior and Heart Rate in Drosophila Melanogaster Larvae

The serotonin-ergic systems in nervous tissue is known to play a vital role in development and behavior in simple to complex animal models. To have effective and differential responses to serotonin (5-HT) in various tissues there are multiple types of 5-HT receptors. In the Drosophila genome there are only four 5-HT receptors, thus to understand the role in development and importance of the 5-HT circuitry and actions on target tissue we use the genetically manipulatable fly model. Among the 4 receptors in fly, the 5-HT2dro is known to be essential in the embryonic stages of development. Also the expression profile of 5-HT2dro has been shown to be a major receptor in the 3rd instar larvae. We are assessing the role of 5-HT2dro receptor in 3rd instar larva using two different temperature sensitive mutant lines, HsZ2 and Y32 for the dysfunction of the receptor. Our preliminary studies with these mutants have shown that mouth-hook movements and body wall movements are decreased compared to Canton S (wild type). The heart rate of wild type larval Drosophila is enhanced by serotonin (5-HT). 5HT (1uM/l) injected into 3rd instars increases HR by 46%. Our studies have shown that an

Clark Cont'd.
exogenous application of 5-HT on the heart in a semi-intact preparation increases the heart rate in dose response fashion. The heart rate in the HsZ2 and Y32 mutant lines is currently being investigated along with the sensitivity of the larvae CNS to exogenously applied 5-HT in controls and mutant 5-HT receptor lines.

75. Derek Downing

Northern Kentucky University
Faculty Mentor: Diana McGill

Quantification of Inhibitor Studies of Na^+, K^+-ATPase and H^+, K^+-ATPase Chimera

Intracellular ion transporters such as the Na^+, K^+-ATPase (NKA) and H^+, K^+-ATPase (HKA) can be used as targets to treat diseases. The Na^+, K^+-ATPase is a target for digoxin analogs in the treatment of congestive heart failure (CHF). While the H^+, K^+-ATPase is a target for omperazole analogs in the treatment of ulcers. Chimeras of the two proteins have been produced to allow study of the drug binding specificities of these two proteins. To determine inhibitory response to digoxin analogs, multiple clonal cell lines expressing either an unaltered NKA or an NKA-HKA chimera (DB) were assayed using ouabain as the inhibitor. Isolated membranes from the cell lines were used in enzyme inhibition assays. To date only the DB chimera data have been studied. Once assays on NKA have been completed, comparison between the two will give insight into ouabain binding sites and binding specificity. Information on the inhibitory sites of the native sodium pump could provide valuable information and possible new treatment options of CHF.

76. Jessica Hancock

Western Kentucky University
Faculty Mentor: Nancy Rice

Characterization of the Human PHKG2 Promoter

Phosphorylase kinase (PhK) is a 1.3 x 10^6 Dalton serine-threonine protein kinase that plays an important role in glycogen breakdown. PhK is a hexadecamer of 4 subunits with $(\alpha\beta\gamma\delta)_4$ stoichiometry. The γ subunit is the catalytic subunit of the holoenzyme and contains a kinase domain and a C-terminal calmodulin binding domain. Two tissue-specific isoforms of γ exist, muscle and liver, each encoded by separate genes, PHKG1 and PHKG2 respectively. To identify potential regulatory mechanism that mediate the temporal expression of PHKG2 gene, the putative human promoter region was analyzed. Sequence comparison reveals that the PHKG2 promoter shares 42% identity with PHKG1. Additionally, evolutionary comparisons reveal 46% and 46% sequence conservation of the human PHKG2 promoter to rat and mouse respectively. Based upon TransFac Analysis several putative transcription factor binding domains were identified that may regulate liver-specific expression: 1 hepatic nuclear factor (HNF) 3β, 1 HNF-4, and 4 activator protein (AP) 1 sites. Biochemical analysis of this promoter has been performed in muscle-specific (C_2C_{12}) and liver-specific ($HepG_2$) cells. The information obtained from this study will further advance our understanding of the various glycogenoses that result from mutations in the PHKG2 gene.

77. Huan Dinh

University of Louisville
Faculty Mentor: Tamer Inanc

Low Cost Mobile Robotics Experiment with Camera and Sonar Sensors

The aim of the research is to demonstrate a design of a low cost mobile robotics experiment using camera and sonar sensors. The experiment is designed to be used as one of laboratory sessions for a new course, *Fundamentals of Autonomous Robots*, which was recently developed and taught in the University of Louisville. This new hands-on course aims to *foster* students' interests from different fields to autonomous mobile robotics and improve the education in this area. The proposed experimental setup consists of a low cost LEGO Mindstorms Robotic Invention System kit, Handy Board microcontroller board, CMU camera and SRF04 sonar sensor. The other outcome of this research is a conference paper which has been submitted to the 2006 IEEE International Conference on Robotics and Automation (ICRA 06) in the special student education category.

78. Caroline Jahn, Lonnie Curnutt, Vicky Carpenter, and Seth Pryor

Eastern Kentucky University
Faculty Mentor: Robert Lierman

Geologic Map of the Pioneer Weapons Wildlife Area, in the Salt Lick Quadrangle, Kentucky

The project focused on geologic mapping of the Pioneer Weapons Wildlife Management Area in the Daniel Boone National Forest, in east-central Kentucky. The project required the generation of a geologic map, structural contour maps, and a composite stratigraphic section. All data included in this project was gathered in the field through the inspection of various outcrops exposed in the study area. The geologic interval measured extended from Mississippian rocks of the Borden Formation to Pennsylvanian rocks of Corbin Sandstone Member, Grundy Formation. The students developed skills in measuring stratigraphic sections and describing rock lithologies. A variety of specialized equipment employed during the course of this investigation included a Pauline altimeter, Brunton compass, and Global Positioning System (GPS) unit. The class learned to properly record, manage and interpret field notes and field based data. This project resulted in a significant increase in knowledge of field studies that required students to work together in order to be more successful geologists.

79. Jerry Henderson

Morehead State University
Faculty Mentors: C. Brent Rogers and D. Johnson

Effects of Media Composition and Spacing on Hydroponic Float-bed Production of Basil,* Ocimum basilicum *'Large-leaf Italian'

Changes in the tobacco industry have resulted in numerous growers seeking alternative uses for float-beds constructed for tobacco transplant production. The growing of herbs may provide alternatives for some. Preliminary studies revealed saturation of traditional float-bed media to be a problem for some species of herbs. A study to evaluate the effect of media mixes composed of different ratios of traditional media and sand on production of basil, *Ocimum basilicum* 'Large-leaf Italian', and the effect of different plant spacings in 200-cell float trays was conducted in outdoor float-beds during the summer of 2005. Four media:sand mixes -- 1:1, 2:1, 3:1, and 1:0 -- were used with 2 spacing patterns -- one seed in every cell and one seed in cells in alternate rows and columns. Trays were floated in water containing appropriate nutrients. Nine weeks after planting plants were harvested. Stems were cut just above media level and total shoot weight and plant number per flat were recorded. Data was gathered from four replications. Analysis of the data indicates media mix is not a significant contributing factor in basil production. Spacing, however, is a significant factor with wider spacing being more effective in producing desirable plants. Additional studies on basil and other species of herbs in indoor float-beds are planned.

80. Daniel Heath

Murray State University
Faculty Mentor: Martin Milkman

The Social Security Dilemma: An Analysis

Currently, there is an ongoing debate concerning the future of Social Security. Almost everyone recognizes that if something is not done to change the program's present course, it will soon become insolvent. There are several possible reforms which have been proposed. A few of the prospective reforms include: increasing the eligible amount of taxable earnings, decreasing benefits, increasing the retirement age, and partially privatizing the system. This paper examines each of the potential changes and weighs its merits and shortcomings. Finally, the paper draws a conclusion about the combination of changes that appears to be the least intrusive on society and most feasible in terms of the current time constraints.

81. Michelle Brammer

University of Kentucky
Faculty Mentor: Kevin Sarge

Expression and Function of HSF2 during Xenopus Development

Heat shock factors (HSFs) regulate the transcription of heat shock proteins, which are expressed in response to stress stimuli. There is a debate about the role of one of these factors, HSF2, during development. HSF2 knockouts in mice have been shown to display prenatal lethality, brain abnormalities, reduced female fertility, reduced spermatogenesis, and altered heat shock response. Another study showed no difference in morphology, behavior, or life span between wild type and HSF2 null mice. In order to help resolve this debate and to potentially display a conserved role for HSF2 in development, we will study HSF2 expression patterns in Xenopus laevis tadpoles. Western blot analysis will be performed comparing HSF2 and sumoylated HSF2 levels during different stages of development. SUMO-modification of HSF2 is necessary to convert it into its active DNA-binding form. Therefore, both the level of HSF2 and the level of SUMO-modification are indicative of its activity in the developing tadpole. The effects of lowering HSF2 levels with RNA interference (RNAi) will subsequently be studied. Factors such as gross morphology, motility, and viability will be evaluated throughout development.

82. Regina Hill

Kentucky State University
Faculty Mentor: George Antonious

Dimethoate Residues in Soil and Runoff Water Under Three Management Practices

Dimethoate [O, O-dimethyl-S-(N-methylcarbamoyl-methyl) phosphorodithioate] is a broad-spectrum systemic insecticide currently used world-wide and on many vegetables in Kentucky. Dimethoate is a hydrophilic compound (log K_{OW} = 0.7) and has the potential of off-site movement from the application site into runoff and infiltration water. The persistence and dissipation pattern of dimethoate residues were studied in soil and water under field conditions. Following foliar application of Dimethoate 4E on broccoli foliage at the rate of 0.47 L $acre^{-1}$, dimethoate residues were monitored in soil, runoff water collected down the land slope, and in infiltration water collected from the vadose zone. The study was conducted on a Lowel silty loam soil under three soil management practices: 1) soil mixed with municipal sewage sludge, 2) soil mixed with yard waste compost, and 3) no-mulch rototilled bare soil used for comparison purposes. The main objective of this investigation was to study the effect of mixing native soil with municipal sewage sludge or yard waste compost, having considerable amounts of organic matter, on off-site movement of dimethoate into runoff and infiltration water following spring rainfall. Runoff water and dimethoate residues in runoff water from the no mulch treatment were higher than sewage sludge treatment. Dimethoate residues in the 10-15 cm top soil were greater (0.27 Fg. g^{-1} dry soil) in soil mixed with sewage sludge than yard waste and no mulch soil (0.085 and 0.19 Fg. g^{-1} dry soil, respectively).

83. Jennifer Glanzer

Western Kentucky University

Faculty Mentors: Frank Kersting, Marty Boman, Janice Ferguson, Mary-Lloyd Moore

The Kelly Autism Program, Western Kentucky University

During the Hurricane Katrina Community Assistance Program, two Western Kentucky University student organizations and the Kelly Autism Program assisted in relief efforts. Both the Student Council for Exceptional Children and the National Student Speech Language and Hearing Association contributed time, talent, and fundraising efforts. The cooperation is an example of collaboration between the College of Education and Behavioral Sciences and the College of Health and Human Services. In addition, the Kelly Autism Program also staffs members of these organizations that are helping with the relief. High school students diagnosed with Autism are also devoting their time and assisting in all phases of the relief effort. WKU's Quality Enhancement Program (QEP) contains goals of student engagement and experiential learning, which include addressing success in global society awareness. The QEP is also focused on increasing faculty and staff capacity to facilitate student engagement. A pre-post attitude questionnaire using the Likert scale was used to determine the degree of change in students' perception about their need to assist other communities and to involve students with disabilities in such projects. All measures documented a positive change in the student's perspective. In addition, interview documentation of the high school students who are diagnosed with Autism also noted a positive change in recognizing the need for community involvement. The poster session will depict the community involvement activities in which the student organizations participated. The attitude survey pertains to WKU's QEP initiative, and the interview results from the high school students who are attending the Kelly Autism Program.

84. Daniel Slusher

University of Kentucky

Faculty Mentors: Nancy Webb, Meredith Bostrom, Bruce Webb, and Torrence Gill

Enhanced Expression of Group V and X Secretory Phosphlipase A2: Two Enzymes Implicated in Cardiovascular Disease

Cardiovascular disease is the leading cause of death in Kentucky. Two enzymes, Group V and Group X secretory phospolipase A2 (sPLA2), are thought to play a role in atherosclerosis, the most common cause of heart disease. However, investigation of their role in heart disease is difficult because these proteins are present in low amounts in tissues. The goal of this project is to develop methods to express and purify sufficient amounts of the enzymes for future studies. Many research groups have shown that a baculovirus expression system is often effective for producing mammalian proteins in insect cells. Baculovirus is an insect virus that naturally infects moths and butterflies. Recently, a novel system that produces higher baculovirus expression has been developed at the University of Kentucky. We determined whether this system could be used to express Group V and Group X sPLA2. We constructed two baculoviruses for each enzyme, one with and one without a fused protein sequence that was added to facilitate enzyme purification. Results will be presented to demonstrate the feasibility of our approach for generalizing pure, enzymatically active, Group V and Group X sPLA2.

85. Joshua Sheets

Morehead State University
Faculty Mentor: Sean Reilley

The Impact of Depression and Anxiety Symptoms on the Adult Self Report Scale for AD/HD

Attention Deficit / Hyperactive Disorder (AD/HD) is frequently misdiagnosed in adults. Attention rating scales are currently used in the diagnostic process for adult AD/HD. Difficulties arise when these measures are used in differentiating between primary attention problems in AD/HD and secondary attentional features of psychiatric disorders. Recent work with a broad band AD/HD measure, the Brown ADD Scales, has shown that subclinical symptoms of anxiety and depression are sufficient to yield scores in the highly probable AD/HD. This present study attempted to evaluate the generality of these findings using a narrow band AD/HD screening instrument, the Adult Self-Report Scale (ASRS) in a quasi-experimental design. ASRS scores were compared among groups of college individuals with AD/HD (n=19), those without AD/HD or depression, but having high levels of trait anxiety (n=20), non-AD/HD students with elevated depressive and trait anxiety symptoms (n=24), non-AD/HD individuals with elevated depressive symptoms with normal levels of trait anxiety (n=18), and a control group without AD/HD or elevated depression or anxiety symptoms (n=24). On the Inattention section of the ASRS, the AD/HD group only scored significantly higher than the low anxiety group and the control group. A similar pattern emerged for the Hyperactive/Impulsive section of the ASRS. These findings are the first to suggest that the reported magnitude of attention problems on the ASRS may be similar in college individuals with AD/HD, and non-AD/HD individuals who report high levels of anxiety and/or depressive symptoms. Further evaluation of this possibility and implications for using the ASRS are discussed.

86. Lindsey Jay Stallons

University of Louisville
Faculty Mentor: Glen McGregor

Chronic Inflammation Does Not Alter Patterns of Gene Expression in Carcinogen-Initiated Lung Cancer

Tobacco smoke is directly related to ~90% of human lung cancers. Relevant physiologic responses to inhaled smoke include the induction of potentially mutagenic adducts in DNA from direct carcinogen exposure and inflammatory responses. We are examining the hypothesis that the carcinogenic potential of environmental mutagens is enhanced by inflammation and that mutagenesis has a direct role in this enhancement. To do this, we are using a mutagen initiated-inflammation promoted mouse model of lung adenocarcinoma followed by tumor analysis using gene expression profiling. We exposed BALB/c mice to a single injection of the cigarette smoke-associated mutagen benzo[a]pyrene (B[a]P) followed by 6 weekly injections of the pulmonary irritant butylated hydroxytoluene (BHT) or vehicle. The mice were examined for tumor burden ~16-32 weeks after B[a]P injection. There were no tumors in control mice or in mice exposed to BHT alone. In contrast, B[a]P alone induced an average of about 1 grossly visible adenoma on the surface of each lung. However, addition of BHT to carcinogen administration drastically increased tumor multiplicity and size. We hypothesized that

Stallons Cont'd.

tumors that arose in the face of chronic inflammation would have different patterns of gene expression. To examine this, we used the Pixcell II laser capture microdissection (LCM) microscope to isolate and capture tumor tissue from three mice that were exposed to B[a]P or from three mice that were exposed to B[a]P /BHT. RNA was extracted and amplified from each sample using Arcturus technology. Affymetrix microarray technology was used to generate and analyze gene expression profiles for >40,000 murine genes. Analysis of the data indicated chronic inflammation did not alter gene expression, that is, patterns of gene expression in tumors that arose in the BHT - and BHT + treatment groups were not significantly different. These data are consistent with the notion that the causative events in inflammation-promoted tumorigenesis occur well before hyperplasia and adenomas are observed. To explore this possibility we are currently examining gene expression profiles in treated but non-dysplastic bronchial epithelium derived from the same mice.

87. Silas Menser

Murray State University

Faculty Mentor: James Rogers

Alternate Fuel Sources

The purpose of this project is to explore alternative power sources. The project will be completed in three phases. First, a comparative power analysis of fuel efficiency will be conducted. To maximize consistency, each fuel source will utilize the same independent mechanical setup. This setup will allow different fuels and methods of delivery to be tested and measured without change to its configuration. To achieve this, an external combustion engine, named for its external rather than internal heat exchanger, utilizing a Stirling cycle will be manufactured. Second, this engine will then be assembled into a working mechanical system optimizing mechanical efficiency by reducing damping forces (such as friction, vibration, etc…) and maximizing heat transfer. Lastly, this setup will test and evaluate different fuels, helping to structure the design of a new engine prototype.

88. Joel Deye, Tiffany Tanner, Nicole King, and Amber Shiveley

Northern Kentucky University
Faculty Mentor: Keith Walters

Continued Synthesis of a Fullerene-bipyridine Ligand for Photoelectric Applications

The goal of this research project is to synthesize a super-molecular system that will transfer charge when exposed to a photon of light. The system consists of two parts that will be coupled to form a rigid, conjugated ligand. The first piece is a bipyridine "bridge," the second is a fullerene "handle" that will be attached to each end of the bridge. Currently the syntheses and characterizations of the fullerene end pieces, and the bipyridine bridge are underway. Once these two pieces are finished a coupling will be attempted. Upon completion of the fullerene-bipyridine ligand, a transition metal will be coordinated with the system and its photochemical properties will be investigated. The target molecule, when coordinated with a metal, could have great potential for uses in solar cells, molecular devices, or other applications where molecules need to react with light.

89. Joshua Hoskins and Kevin Roberts

Eastern Kentucky University
Faculty Mentor: Christopher Kulp

The Dynamics of the Double Pendulum

The double pendulum is a classic example of a physical system which can display chaotic behavior. In this study we investigate the motion of a double pendulum through a numerical simulation as well as data taken directly from the pendulum during its motion. We attempt to compute the Lyapunov exponent for our system using some methods of nonlinear time series analysis on the data taken from the pendulum. We compare the Lyapunov exponent measured from the experiment to the one measured from the numerical simulations.

90. Dottie Batte and Cara Moreland

Western Kentucky University
Faculty Mentor: John All

Integrating Hydrologic Features with RCRA Information to Improve Local Water Quality Monitoring, Warren County, KY

Many regulations and programs have been created to ensure that hazardous waste is handled in a manner that protects human and environmental health including the Resource Conservation and Recovery Act (RCRA). In an effort to analyze the current distribution of hazardous waste in Warren County and how that distribution could impact the county's water quality, a RCRA database was created. This information was combined with water wells data, karst water table contours, and soil contamination risks for Warren County. This database will allow better targeting water quality monitoring, especially in cases of spills.

91. Shon Simpson, Katherine Tapp, and Stephanie Webb

Morehead State University
Faculty Mentor: Zachary Bortolot

Does Travel Time and Distance to Higher Education Institutions Affect Participation?

In this study, the impacts of distance and travel time to higher education institutions on higher education participation in Appalachian Kentucky were assessed. Three types of high school-level data were used. First, a mapping website was used to find the driving time and distance to the nearest public university, private college or university, public / private college or university, community college, and higher education institution of any sort. Second, the average 11^{th} grade math score on the Kentucky Core Contents Test (KCCT), the drop out rate, and the percentage of students attending college, vocational / technical training, and work plus part time school were obtained from the Kentucky School Report Cards. Finally, data on the percentage of people in the county with a bachelor's degree, the percentage of people in poverty, the average family income, the population density, and the unemployment rate were obtained from the US Census. Simple and multiple regression models were then created. For the simple regression models, each predictor variable was used to predict enrollment at a college, vocational / technical school, or any higher education institution. In the multiple regression, four predictor variables were used to predict enrollment. The results show that as travel distance and time from the nearest public university increase, higher education participation increases, which is a surprising result. However, participation decreases with increasing travel time and distance to the nearest community college, and with increasing travel time and distance to the nearest higher education institution of any sort. Travel time and distance to the nearest private college or university were poorly correlated with higher education participation.

92. Amanda Ables

University of Kentucky
Faculty Mentors: Richard Milich and Elizabeth Lorch

Story Comprehension in Children with ADHD: A Story Mapping Intervention

Children with ADHD have significant problems in story comprehension. To date, no study has investigated whether intervention may help ameliorate this problem. My research is testing whether a story mapping procedure can help improve these children's comprehension of stories, including improved recall of important events, goals, and causal relations. Our study involves children with ADHD and a comparison group, ages 9-13. The children listen to a tape recorded version of a story and then recall the story immediately after hearing it and then again after either a study session or a session involving training in story mapping. This is done in a training condition and a generalization condition, with two different recorded stories. The dependent variable is number of idea units recalled. The study is a 2(ADHD v Comparison) x 2(Study v Story Mapping) x 2(Pre-Condition v Post-Condition) design. We expect that all children will remember more information in the post-condition session and that children trained in Story Mapping will recall more than children who simply studied. Similarly, while we assume that the comparison children will remember more, we hope to find that the children with ADHD will show more improvement from the training condition to the generalization condition. Implications for improved academic performance and school interventions will be discussed.

93. Becky Mann

Murray State University
Faculty Mentor: James Hereford

Robot Dispersion: An Algorithm for the Dispersion of Miniature Robots

In this study, we investigate the best way to scatter or "disperse" particles around a room. Our intended application is for many small, mobile robots to search for a "hot spot" such as a bomb or a fire in a room. There are search techniques that are good for coordinating the movements of robots in a cluster to search for hot spots. However, most of these search techniques assume that the robots are randomly distributed around the search space. For our robot application, it is more likely that the robots will be placed in a room or space at a common point (such as a door or window) and thus they will need to spread throughout the space. Once the robots are spread throughout the space, then a search algorithm can be initiated. We developed a dispersal algorithm to spread a group of robots throughout a search space. We simulated the algorithm and showed that it works in several different cases. Once the robots are dispersed throughout the space, the final search for the hot spot is begun.

94. Laura Ashley, Christine Pendleton, Kelli Trent, and Eric Nickel

Morehead State University

Faculty Mentors: Darrin DeMoss, Micheal Fultz, David Peyton, and Carol Wymer

Influence of Calcium Channel Antagonists on Estrogen-Regulated Bone Resorption

Bone metabolism is invariably correlated with calcium transport. Calcium channel antagonists are utilized therapeutically and experimentally to decrease the influx of calcium into cells by blocking voltage-regulated L-type calcium channels. The established principle that bone formation decreases following the attainment of peak bone mass, illustrates the need for a more comprehensive understanding of the action calcium channel antagonists have on bone turnover and an improved understanding of the protective action estrogen exerts on skeletal mass. Experimentation utilized female Brown Norway Rats six months of age to compare the effects of estrogen and the antagonists on blood pressure and bone turnover from both the amorphous and calcified compartments. In order to evaluate the positive or negative impact of estrogen and various calcium channel antagonists on bone loss, bone resorption parameters were compared between normal females, estrogen-deficient females, females receiving hormone replacement therapy, and females receiving calcium channel antagonists (Diltiazem, Nifedipine, Verapamil), or females receiving a combination of the two agents. The models utilized to study bone turnover were the pharmacokinetic loss of the tracer ^{3}H-tetracycline, a compound deposited in the active mineralization front and freely released in urine and the measurement of various bone degradation markers (deoxypyridinoline, pyridinoline, and helical peptide) in urine collected throughout the experimental period. Ovariectomized females display an increased turnover rate while those receiving hormone replacement therapy were not significantly different from controls. Data obtained suggest that calcium channel antagonists potentially elicit their actions through alternative mechanisms in each of these highly regulated calcium pools.

95. Joseph Blackmon

University of Louisville

Faculty Mentor: Carolyn M. Klinge

Role of Caveolae in Cardioprotective Activity of the Red Wine Polyphenol Resveratrol

Epidemiological studies have demonstrated that the consumption of polyphenolic-rich foods and beverages reduce the incidence of mortality and morbidity from coronary heart disease and arthrosclerosis. Moderate consumption of red wine has been under scrutiny due to its speculative role in the reduced incidence of coronary heart disease among the French, despite their high fat diet - termed the “French Paradox.” More specifically, the key polyphenol implicated in the cardioprotective effects of red wine is *trans*-resveratrol (*trans*-2,5,4’-trihydroxystilbene). Resveratrol is a phytoestrogen because it binds estrogen receptors (ER) alpha and beta, albeit with lower affinity than estradiol (E2). E2 has well-established cardioprotective effects including direct effects in endothelial cells (EC) through its genomic (transcription-dependent) and non-genomic (transcription-independent) activities. Previous studies in EC showed that nanomolar concentrations of E2 and resveratrol rapidly activate mitogen-activated phosphokinase (MAPK) signaling in an ER-dependent manner, leading to activation of endothelial nitric oxide synthase (eNOS) and the release of nitric oxide (NO) which is vasodilatory

Blackmon Cont'd.

and vasoprotective. EC have caveolae that serve as anchoring sites for Src, components of the MAPK signaling pathway, and ERalpha. Specifically, caveolin-1, is responsible for the formation of the caveolae and is involved in the signaling cascade associated with NO release. This project tested the hypothesis that resveratrol, like E2, induces ERalpha-Src-Cav-1 interaction and phosphorylation in human umbilical vein endothelial cells. Results demonstrated that resveratrol, like E2, rapidly induced Src and ERalpha phosphorylation and interaction with Cav-1. These data support the hypothesis that resveratrol activates ERalpha and activation of a phosphorylation cascade leading to eNOS stimulation and NO release.

96. Kimberly Dunlap and Anna Brown

Murray State University

Faculty Mentor: Bommanna Loganathan

Atrazine Levels in Water, Sediment, and Amphibian Tissue Samples from Selected Ponds in Westernmost Kentucky

Atrazine (2-chloro-4-ethylaminio-6-isopropylamino-1,3,5-triazine) is one of the major herbicides used in Kentucky (approximately 1 million pounds annually), primarily on corn crops. Widespread use of atrazine causes environmental contamination. Exposure to atrazine causes endocrine disruption leading to harmful effects in aquatic organisms including reproductive toxicity and immunotoxicity. However, very little is known on the levels of atrazine contamination in regional ponds and the amphibians inhabiting the ponds. The objective of this study is to determine the levels of atrazine compounds present in water, sediment, and amphibian tissue and to explain the distribution, environmental transformation, and fate of atrazine in ponds in Western Kentucky. Ten sampling sites were selected including: Terrapin Creek, Terrapin Ditch, CLBL, Golden Pond (LBL), Elk and Bison pond, LBL-142, Starcamp, LBL Powerline pond, LBL-Cedar Skunk and Grand Rivers pond were sampled for water, sediment, and amphibians (frogs and salamanders). For water and sediment analysis of Atrazine, twenty-eight sites were selected. Atrazine analyses were done using RaPID Assay Atrazine Test Kit. Results revealed that triazine concentrations in water samples ranged from below detection limit (0.05 ppb) to 0.4 ppb. Amphibian tissues contained concentrations that ranged from our detection limit to 0.1 ppb. All of the sediment samples from the ponds showed the concentrations below the detection limit.

97. Yoon Hyeon Hu and Daddy Boateng

Kentucky State University
Faculty Mentors: George Antonious and Tejinder Kochhar

Variations in Capsaicinoids Content of Hot Pepper Extracts

Environmentally compatible pest-control agents for use on vegetable crops are needed to replace pesticides that are ineffective, that have been withdrawn for regulatory reasons, or whose costs are prohibitive. Ninety Capsicum accessions selected from the USDA Capsicum germplasm collection were screened for their capsaicinoids content using gas chromatography (GC/NPD). Fresh fruits of *Capsicum chinense, C. frutescens, C. baccatum, C. annuum, and C. pubescens* were extracted with methanol, and analyzed for capsaicin, dihydrocapsaicin and nordihydrocapsaicin. Mass spectrometry of the fruit crude extracts indicated that the molecular ions at m/z 305, 307, and 293 which correspond to capsaicin, dihydrocapsaicin, and nordihydrocapsaicin, respectively, have a common benzyl cation fragment at m/z 137 that can be used for monitoring capsaicinoids in hot pepper fruit extracts. Concentrations of total capsaicinoids varied from not detectable to 11.2 mg fruit-1. Statistical analysis revealed that accession PI-441624 (*C. chinense*) had the highest capsaicin content (2.9 mg g-1 fresh fruit) and accession PI-497984 (*C. frutescens*) had the highest dihydrocapsaicin content (2.3 mg g-1 fresh fruit). Accessions PI-439522 (*C. frutescens*) and PI-497984 contained the highest concentrations of total capsaicinoids. Quantification of capsaicinoids in the selected accessions allowed us to identify genotypes with high levels of total capsaicinoids and enabled the prediction of the amount of each component that can be obtained per kg and per acre of hot peppers produced. Accessions PI-441624, PI-497984, and PI-439522 were identified as potential candidates for the mass production of capsaicinoids, or for the breeding of varieties having greatest capsaicin content.

98. Richard Walters

Western Kentucky University
Faculty Mentor: Mike Carini

The Effect on Light Observed from Relativistic Beaming of Active Galactic Nuclei Jets

Active Galactic Nuclei (AGNS) are a special group of galaxies whose centers contain supper massive black holes. Material from an accretion disk surrounding the black hole is ejected and forms jets perpendicular to the accretion disk. The jets travel outwards at relativistic speeds, and as a result have the property of relativistic beaming. We studied the effects this beaming had on the data observed from various AGNS.

99. Daniel Hawkins

Western Kentucky University

Faculty Mentors: Andrew Wulff, Glen Mattioli, and Pamela Jansma

Database of Volcanic Edifices with Emphasis on Symmetry/Asymmetry Using Shuttle Radar Topography Mission Imagery

The symmetry of volcanic edifices reflects not only the dominant eruption style, but also tectonic setting, glaciation, uplift, and erosion. Edifice symmetry was examined in this project as a first parameter for cataloguing volcano type, using a database of digital topographic elevations generated by the Shuttle Radar Topography Mission (SRTM). A database of 100 Chilean stratovolcanoes and 150 worldwide shield volcanoes has been developed and studied for variances in volcano morphology as a function of volcano type and tectonic setting as well as coalescence of volcanoes, plate motion, erosion, and last eruption. Using ENVI 4.1 geographic image analysis software and SigmaScan Pro software, SRTM images of volcanoes are analyzed for maximum elevation, geographic location and measures of the semi-major and semi-minor axes using a color saturation function. The intersection of these axes is analyzed for geographic position, elevation, and distance and direction from the maximum elevation. These metrics determine a percentage for the symmetry of the volcano from the ratio of the semi-major and semi-minor axes. Future work involves the addition of other volcanoes from different tectonic settings. Databases for planetary volcanoes will be added and compared to the terrestrial database to look for analogues between the volcanoes of Earth and other volcanically active bodies in the solar system to better understand volcanic processes. The database will facilitate the generation of volcanic hazard maps, and will also move volcano data from an image-based system to a quantitative system, allowing for quicker searches of volcanoes across the globe.

100. *Agmatine Reduces the Effects of "3rd Trimester" Ethanol Exposure on Balance Coordination and Deficits in Response to Social Cues in a Rodent Model*

University of Kentucky
Faculty Mentor: Susan Barron

Patricia Amber Estes

Agmatine Reduces the Effects of "3rd Trimester" Ethanol Exposure on Balance Coordination

Fetal Alcohol Syndrome is the leading preventable cause of mental retardation. In both human studies and animal models, balance and coordination are often impaired. This is explained, in part, because the cerebellum seems particularly sensitive to prenatal alcohol exposure. In our laboratory, we use a rodent model to study the effects of alcohol during a period of CNS development that overlaps the human 3rd trimester "brain growth spurt". The present study examined the effects of neonatal alcohol exposure on balance in adolescent rats. In addition, we wanted to assess whether agmatine, which is neuroprotective, could reduce these deficits. Rat pups received alcohol twice daily on either postnatal days (PND) 1-7 or 8-15. Five treatment groups were included; alcohol, agmatine, alcohol plus agmatine (during alcohol withdrawal) and 2 controls. Subjects were tested on PND 31 to 33 on a task that required the use of balance and fine motor coordination. Alcohol exposure on PND 1-7 significantly impaired balance, and the addition of agmatine reduced these deficits. In contrast, exposure to alcohol on PND 8 – 15 had no effect on performance. These findings are very intriguing and provide further support for the possible use of agmatine to reduce brain damage in the developing CNS. This research also suggests that timing of alcohol and agmatine exposure (PND 1-7 or PND 8-15) play a critical role in predicting motor deficits.

Keshia Simmons

Agmatine Reduces Deficits in Response to Social Cues Following "3rd Trimester" Alcohol Exposure in a Rodent Model

Fetal Alcohol Syndrome has life-long consequences for the individual and their family. One of the many effects associated with prenatal alcohol exposure are problems in social interactions. Our laboratory studies prenatal alcohol exposure during CNS development overlapping the human 3rd trimester "brain growth spurt" in rodent models. We have previously reported deficits by pups in communication with their mom. The current study examined social communication among young adolescent rats. Furthermore, we wanted to assess whether agmatine, a potential neuroprotective agent, would reduce some of alcohol's effects. Neonatal rats received alcohol twice daily on either postnatal days (PND) 1-7 or 8-15. The 5 treatment groups included alcohol, agmatine, alcohol plus agmatine (during alcohol withdrawal) and 2 controls. Offspring played with a non-treated same sex partner in one environment on PND 23-24 and were then placed in a 2nd environment alone. On PND 25, each subject's ultrasonic vocalizations were recorded in each test chambers. Typically, young rats vocalize in anticipation of play.

Simmons Cont'd.

Offspring exposed to alcohol on PND 1–7 did not show the typical anticipation for play displayed by the other groups. Agmatine treatment during ethanol withdrawal eliminated this deficit. Ethanol had little effect on offspring when exposure was on PND 8-15. These are the first data suggesting that there are critical times during brain development that ethanol has its damaging effects on social communication. More importantly, agmatine may be useful in reducing ethanol-related damage during development.

101. Marcus Hundley, Richard Cates, and Tiffany R. McNabb

Morehead State University

Faculty Mentors: Wesley White and Clinton Blair

Continuous Progressive Ratio Schedules as an Assessment of the Effects of Amphetamine on Motivation

Animals appear to pass through a sequence of physiological/ psychological states following amphetamine administration (stimulant, depressant, and recovery states). The purpose of this research was to see if the presence of these states could be inferred from changes in performance on a progressive ratio schedule. On a progressive ratio schedule, the number of responses required to obtain reward is increased after each reward, and changes in progressive ratio breakpoint (the highest ratio the subject completes) have been used to assess the effects of treatments on motivation. Subjects were eight female Sprague-Dawley rats. Animals were trained in one of four operant conditioning stations to respond on a progressive ratio schedule for food reward. Once trained, animals were transferred to one of eight monitoring stations where they could be continuously housed and where they could initiate responding on a progressive ratio schedule at different times during the light-dark cycle. When the pattern of breakpoints across the light-dark cycle stabilized, animals were administered a dose of amphetamine, and breakpoints at different times in the light-dark cycle were again assessed. Compared to baseline, amphetamine caused a change in the pattern of breakpoints seen at different times in the light-dark cycle. The change in the pattern of breakpoints suggested that the animals were in different physiological/ psychological states at different times post amphetamine administration. Continuous progressive ratio schedules could be used to assess a wide variety of treatments on motivation.

102. Tyson France

University of Louisville
Faculty Mentor: Patricia Cerrito

The Impact of International Culture on Learning at the University of Louisville

A survey was conducted to determine various attitudes in regards to international faculty and students and how they affect the learning culture at the University of Louisville. In addition to basic demographic information, questions were asked concerning the impact of International/American students and faculty on learning and to what extent language was a barrier to that learning. Data were collected through a survey of 103 randomly selected students and 100 randomly selected faculty members. The survey was conducted at various spots around the University of Louisville Belknap and Health Science campuses where students are known to congregate. The data were collected during the morning and afternoon hours of Fall 2005 to ensure that the sample was representative of the university community. Chi-squared tests show that students who experience a language barrier tend to be less satisfied with international faculty ($p<.0001$) and their international classmates ($p=.0203$). Likewise, Chi-squared tests on the data show that academic major affects faculty preference ($p=.0127$) as does academic level ($p=.0018$).

103. Anthony DiBello

Northern Kentucky University
Faculty Mentors: Charles Acosta and Gail Mackin

Modeling Population Dispersal of Reef Species

The extinction of reef species due to over fishing is a major problem in today's world. We are using modified diffusion equations to create predictive models that will help conservation biologists in Belize to design better and more efficient nature conservatories. These models describe the dispersal of populations of organisms using ideas from Fickian diffusion. Currently, we are focusing on a certain species of conch from Belize.

104. Carrie Mills and Vera Vaughan

Eastern Kentucky University
Faculty Mentors: Jon McChesney and Shellie McChesney

Memorial Day: More than Picnics and Softball

Memorial Day dates to 1868, although it was not until 1971 that Congress officially recognized this day of remembrance with the National Holiday Act. Counter to what many Americans think, Memorial Day is not a day set aside for picnics and softball tournaments. As we continue to be mired in war in Iraq and a global war on terrorism, the time is right for parks and recreation professionals to pause and consider their philosophical perspectives on Memorial Day. Should organized recreation activities and sports events be played on this day? This qualitative study focused on the perceptions of veterans and their families towards Memorial Day. Those interviewed affirmed the importance of recreation to community building, but indicated the sacrifices our soldiers made to nation building are worthy of our focus one day each year. One veteran's daughter summarized the feelings held by most study participants: *Organized recreation activities should not be played on Memorial Day. It is just like sports being played on Thanksgiving Day. People are looking to something to entertain them, when they should be looking to thank the people that have allowed them to have what they have today. I was angry when I learned I had a softball game on Memorial Day. I felt as though I was letting my deceased father down. I can't even describe in words how proud I am of my father and grandfather. They fought for a country that they believed in and to this day I thank them for it.*

105. *Traffic Safety: Rollovers and Seatbelts*

Murray State University
Faculty Mentors: David Fender and Brian Parr

Melissa Burcham and Lauren Ashley Robbins

Murray State University Seatbelt Survey

In October 2004, at nine locations on the campus of Murray State University, observations were made regarding seatbelt use by vehicle occupants. A total of 1477 observations were made, including 1348 drivers and 129 front seat passengers. Results of the survey indicated that 50.2% of the drivers and 43.4% of the front seat passengers were restrained. Other results of the survey indicated that females were more likely to be restrained than males, faculty and staff were more likely to be restrained than students, and passengers were more likely to be restrained if the driver was wearing a seatbelt. Overall seatbelt use by residents of the Murray community was significantly lower than Kentucky and national usage rates. This survey was again performed in November 2005 and a comparison of the two years will be made along with the Kentucky and national rates.

Jessica White and Jason Massey

How Two Seconds Can Save Your Life in a Roll-Over

Reality is faced by many people when they see demonstrations done by the roll-over simulator that was created to show the importance of wearing a seat-belt. The roll-over simulator is a device that offers a very unique look at accidents. The roll-over demonstrator utilizes a pick-up truck body sitting on a special hydraulic suspension system that simulates a vehicle rolling over and flipping during a crash. In the vehicle is an adult-sized dummy and a child-size dummy in a car safety seat. In the first simulation, the adult and child are wearing seat belts. In the second, neither the child nor adult is buckled up. The roll-over demonstrator unambiguously shows the outcome differences between those wearing and those not wearing seatbelts during a roll-over. Our hope is that the new demonstrator will encourage drivers to “buckle up” when driving in Kentucky.

106. Boram Lee

Kentucky State University
Faculty Mentors: Changzheng Wang, Lingyu Huang,
Jo Sloan, and William Graham, Jr.

Behaviors Related to Body Weight Status of Children Participating in the National Youth Sports Program

National Youth Sports Program provides opportunities for children from low-income families to participate in sports activities in the summer. The objective of the study was to study the critical knowledge, attitude and behaviors related to the body weight status of children participating in the National Youth Sports Program. A survey questionnaire was filled out by the children after they were examined for their blood pressure, body weight, and height. Their body fat percent was measured with a Tanita TBF-521 body composition analyzer. Body mass index (BMI) was calculated from the body weight in kg divided by the square of body height in meters. Majority of the children had positive view of milk, vegetables, fruits and physical activities, but 25% of the children consumed one cup or less of milk per day, 31% of them consumed one or fewer servings of vegetables, 30% of them consumed one or fewer servings of fruits and 16% of them had one hour or less of activities. A majority of the children had positive views of soft drinks and TV watching. Over 80% of the students had 2 or more soft drinks and watched TV for two or more hours per day. It appears that the low consumption of milk, vegetables and fruits, high intake of soft drinks and lengthy periods of TV watching may help to explain the relatively high incidence of overweight among these children. Preventive programs are needed to modify their attitudes about the adverse effects of soft drinks and TV watching, in addition to their access to sports activities.

107. Kathleen Nagle

University of Louisville
Faculty Mentor: Nancy Potter

Femininity and Levels of Depression in Adolescents

Upon investigating the rates of depression in both adolescents and adults, I found that "Major Depressive Disorder (Single or Recurrent) is twice as common in adolescent and adult females as in adolescent and adult males". Various philosophers of psychiatry and psychology have theorized the reasons for the overrepresentation of depression in females. To examine the possibility of a correlation between depression and femininity, I will study high school students eighteen and nineteen years of age. They will complete two surveys, one being the Bem Sex-Role Inventory, and the other being the Beck Depression Inventory. The results of these surveys will provide numerical values for masculinity/femininity/androgyny and depressive symptoms. A two sample t-test will be used to compare the data. The discussion will include a philosophical perspective on the reasons for any correlations found.

108. Railey White

University of Kentucky
Faculty Mentor: David Atwood

A Method for Arsenic Removal Using a Chelatine Water Insoluble Thiol

Research at the University of Kentucky has revealed that a series of water-insoluble thiolates can be dispersed in a column containing either silica or activated carbon to remove both arsenite and arsenate under a variety of conditions. The system was tested with water containing 300 ppb arsenic and the resulting samples after filtration had less than 1ppb arsenic. The filtration system may be assembled using PVC tubing and plastic hoses and the actual arsenic binding media is created from inexpensive proprietary thiol compounds. An example of one such compound is benzenediethanethiol (BDT) for which a great deal of information is known. BDT is a University of Kentucky-patented class of compounds that has been shown to irreversibly bind Hg under a wide range of laboratory conditions1,3,4 as well is in the field for gold mining effluent (Matlock et al. (2002) acid mine drainage, and for soil-borne mercury. The BDT- Hg precipitates that result show no leaching under both basic and acidic conditions. Mercury and Arsenic are "soft" elements and form strong bonds to sulfur. In fact, the bonding of arsenic to sulfur (~370kJ/mol) greatly exceeds the bonding to mercury (~ 200kJ/mol). Thus, it was anticipated that BDT would bind arsenic in a manner similar to mercury as demonstrated in the previously cited publications. This was found to be the case; BDT binds arsenic and removes the element from water and with no subsequent leaching. It should be noted that the formation of As-S bonds is partially responsible for the toxicity of the element in living systems.

109. Anthony DiBello

Northern Kentucky University
Faculty Mentor: Stefan Paula

Cation Permeation Mechanisms in Artificial Lipid Bilayers

Two distinct mechanisms are most frequently discussed to describe the permeation of ions across the lipid bilayers of cells: the solubility-diffusion mechanism and the pore mechanism. In the solubility-diffusion mechanism, ions dissolve into the hydrophobic phase of the bilayer, diffuse across, and then leave the membrane at the opposite side. According to the pore mechanism, ions cross the bilayer through momentary hydrophilic defects, temporary pores caused by thermal fluctuations within the membrane. We were able to discern which model better explains the passive permeation of sodium ions across the lipid bilayer. This was accomplished by comparing the theoretical predictions of both mechanisms with experimentally determined permeability coefficients as a function of bilayer thickness and ionic radius. Phosphatidylcholines with chain lengths between 12 and 20 carbon atoms were used to systematically vary the bilayer thickness. A sodium selective electrode was used to measure the escape of sodium ions from the liposomes over time. The permeability coefficients ranged between 10^{-12} and 10^{-14} and tended to decrease as bilayer thickness increased.

110. Juli Taylor

Morehead State University
Faculty Mentor: Sean O'Keefe

Preliminary Survey of the Faunal Succession of Necrophilous Insects Associated with Pig Heads in Rowan County, Kentucky

Numerous species of insects utilize carrion as food in at least one stage of their life cycle, which is commonly the larval stage, while other insects are attracted to the larvae feeding on the carrion. Geographical region, type of habitat, and time of year largely influence the faunal succession of necrophilous insects. To generate a taxonomic list and record the faunal succession of necrophilous insects for Rowan County, two pig heads were placed in full sun and a third was placed in complete shade. To prevent large scavengers from disturbing the research each specimen was placed in a cage. The studies were run for six weeks. Within the first ten hours adult Phaenicia sp. (Diptera: Calliphoridae) deposited eggs on all three pig heads, which matured to larvae within 36 hours. Fly larvae were then collected daily in order to monitor their growth rate. Several Creophilus maxillosus (Linnaeus) (Coleoptera: Staphylinidae), which are known predators on fly larvae, Necrophilia americana (Linnaeus) (Coleoptera: Silphidae), and Nicrophorus sp. (Coleoptera: Silphidae) appeared on all three pig heads the same day the blow fly larvae emerged. Other necrophilous insects were collected from various carrion in the region. The first studies were completed from late-August through September (summer season) and from late-October through mid-November (fall season). The research will also be repeated for the winter and spring seasons.

111. Aaron Scruggs

Morehead State University
Faculty Mentor: Ignacio Birriel

New Rotational Bands in Strontium-81.

High-Spin states in Strontium-81 have been studied using the reaction Ni-58 (Si-28, alpha 2 proton) with a 128 MeV Si-28 beam from the 88-Inch Cyclotron at Lawrence Berkley National Laboratory. The Ni-58 target had an effective thinkness of 0.246 mg/cm^2. Three of the previously existing seven bands and two feeder bands were modified. The level scheme was extended by 68 new transitions and 2 rotational bands. Statistical analysis shows the possible start of shape change in the 2 new rotational bands. The data was analyzed using the Radware software package. The hardware was a Solaris based workstation.

112. Ellen Savelli

University of Kentucky
Faculty Mentor: Tonglei Li

Investigation of Surface Energy of Aspirin Crystals Using a Contact Angle System

Almost 90% of pharmaceutical materials are in a solid dosage form. A major hurdle during the development and manufacturing of these compounds is being able to characterize the best morphology and stable polymorph. An essential parameter that is being used to help elucidate the differences in surface characteristics is surface free energy. The conventional method for obtaining surface energy is through measuring contact angles and applying an indirect model to derive surface energies between various interfaces. The objective of this study is to measure the contact angles on the (100) and (001) faces of aspirin and observe how each face interacts differently with a specific solvent. A video-based contact angle device is used to record and measure contact angles. The sessile drop method was employed with three solvents (water, glycerol, and diiodomethane) on each major face. Results of this investigation reveals the (100) aspirin growth face having the larger contact angle in all three solvents water, glycerol, and diiodomethane, 66.9 ± 1.2, 65.1 ± 1.1, and 41.2 ± 1.1 respectively. The smaller contact angle results seen on the (001) aspirin face in water, glycerol, and diiodomethane were: 56.4 ± 1.4, 56.5 ± 0.9, and 36.2 ± 1.2 respectively. These results suggest cleavage of the (100) face does not expose the carboxylic group which would cause a stronger interaction between the crystal surface and the solvent. Therefore, the stronger interaction between the solid surface and liquid is seen on the (001) face.

113. Lindsay Wenz

Eastern Kentucky University
Faculty Mentor: Rose Perrine

Contrast Effects and Graduate School Applications

In the present study, I will explore the effect of contrast on judgments of graduate school applications. Participants will be students from Eastern Kentucky University. Subjects will be randomly assigned to a positive or negative condition and will rate the hypothetical graduate school application. Subjects in a positive context condition will view and rate a good application first and then will rate the average application. Subjects in the negative context condition will view a poor application first, and then will rate the average application. I hypothesize that subjects who view the good applications first will rate the average application lower than those who view the poor application first.

114. Michael O'Brien and Jessica Shaw

Murray State University
Faculty Mentors: Howard Whiteman and Leon Duobinis-Gray

Blood and Fecal Parasites of the Tiger Salamander (*Ambystoma tigrinum nebulosum*) According to Life Stage

This study provides a unique look at differences in parasite prevalence within two life stages of tiger salamanders, *Ambystoma tigrinum nebulosum*. Individuals in the paedomorphic life stage reach maturity while retaining larval characteristics such as gills and a membranous tail. It is also these characteristics that bind them to an aquatic lifestyle. Metamorphic individuals commonly transform before becoming adults and lose their larval characteristics, allowing them to enter the terrestrial environment. These life stages separate the individuals into two ecosystems (aquatic and terrestrial) that suggest that differences between parasites in the same host species might occur according to life phase. Juveniles were also sampled for parasites, providing a third life stage for comparison. Within juvenile stages a cannibalistic morph, characterized by a wider mouth and enlarged "teeth", also occurs. We hypothesized that metamorphic adults should have higher prevalence of blood parasites (e.g., trypanosomes) due to increased exposure to vectors and that cannibals should have a higher prevalence of intestinal parasites because of increased exposure after eating infected larvae. Blood and fecal samples of tiger salamanders were collected from ponds in south-central Colorado in 2004-05. Blood smears (N =128) were prepared in the field while parasite eggs (N > 100) were separated from fecal samples with a sucrose gradient floatation and prepared for observation under a microscope. Results of both analysis will be presented.

115. Ben Hughes and Kami Macdonald

Western Kentucky University
Faculty Mentor: John All

Cave Surveying for Rural Land use Planning in Western Kentucky

Karst landscapes are areas underlain by caves, crack and other fissures formed by the dissolution of carbonate rocks. A substantial portion of Kentucky is made up of karst and this poses problems for rural planners as they attempt to preserve water quality and other environmental parameters. A cave in northern Warren County, Kentucky, is surveyed in three dimensions and georeferenced on USGS 7.5 minute topographical quadrangles. This information is correlated to subsurface and surface water flows and current toxic waste sites in the area to determine contamination risks for the cave and the likelihood that the cave would accentuate a spill. County planners should have accurate cave surveys for the entire county available when approving heavy industrial or other toxic land uses.

116. Kristin Landfield

University of Kentucky
Faculty Mentors: Monica Kern and Richard Milich

Friend Over Foe: The Protective Function of Friendship Quality for Children with a History of Chronic Victimization

My research builds on the extensive literature in the field of peer victimization. Specifically, it examines whether friendship is a moderator in the relation between victimization history and the development of implicit victimization beliefs among children ages 9-13. The Emotional Stroop Task and the Implicit Associations Task are tasks that attempt to measure the degree to which certain children implicitly develop victimization beliefs. By measuring participants' response time to provocative social words and categories, these tasks register the internalizing effects of perpetual peer harassment. After giving a series of responses to questionnaires and ambiguous stories relating to their peers, the children described their best friends and offer specific narrative accounts of their experiences with friends. As a corollary to the current social support literature, it is the researchers' belief that friendship quality will moderate the development of negative affect from victimization experiences. The precise role of friendship quality for those who suffer from chronic victimization is yet to be determined, and this study is unique in its efforts to explore this construct by analyzing rich narrative data. Implications for various social interventions among these peer groups will be discussed.

117. Diana Knoll

Morehead State University
Faculty Mentor: Greg Detweiler

Performance, Practice, and Analysis of Selected Caribbean Region Repertoire for the Choral Ensemble

The research project will investigate the musical language, compositional style, expressive aspects, and cultural/historical context of selected choral works from the Caribbean region for the purpose of performance interpretation. In relation to cultural context, literature will be linked to dances and instruments of the region. Stylistically, the use of the basic elements of music will identified, compared to the style of Northern American choral music, and used to determine stylistic qualities that are unique to the region. The modifications of bright vs. dark vowels will be addressed as well as the essence of inhalation vs. exhalation when singing the text. The text will also be used with its translation to create an image that promotes an understanding of the cultural context as well as a connection to the expressive aspects of the piece.

118. Andrew Greer, Eric Dedert, Andrea Floyd,

Inka Weissbecker, and Barbara Stetson

University of Louisville
Faculty Mentors: Jamie Studts and Sandra Sephton

The Effects of Lifestyle on Psychological Distress in Lung Cancer Patients

Kentucky leads the country in lung cancer deaths at a rate 41.1% higher than the U.S. average. Both biomedical and psychosocial investigations of this disease are therefore especially relevant for Kentuckians. Lung cancer patients experience greater psychological distress than patients with all other cancer types. For example, a recent study reported psychological distress in nearly half (43%) of a sample of lung cancer patients. Lung cancer patients with high distress also have lower quality of life. We examined the relationships between lifestyle factors and psychological distress among 56 non-small cell lung cancer patients, with the hypothesis that health-related behavior (i.e. diet, exercise) would be associated with lower psychological distress (anxiety, depression). Patients completed the National Institutes of Health Fruit and Vegetable Screener, NIH Fat Screener, the exercise scale of the Behavioral Risk Factor Surveillance System-Exercise, the Beck Anxiety Inventory, Beck Depression Inventory, and Taylor Manifest Anxiety Scale. Statistical analyses (bivariate correlations, hierarchal regression) will control for patients age, cancer stage at diagnosis, and relevant medications. Relationships between health behavior and psychological distress will be reported.

119. David Rothgeb

Northern Kentucky University
Faculty Mentor: Stefan Paula

Computational &Experimental Structure-Activity Relationships of Digoxin Analogues

A better understanding of interactions between cardiac glycosides and Na/K-ATPase is required for better drug development for the treatment of congestive heart failure. Current drug therapy includes the use of cardiac glycosides which inhibit the sodium/potassium ATPase (Na/K-ATPase) enzyme causing myocardial cells to pump harder and more efficiently. Many cardiac glycosides excessively inhibit the Na/K-ATPase enzyme which can cause toxic side effects. Therefore more research is required to specify the molecular interactions between Na/K-ATPase and the cardiac glycoside. Since the lactone functional group is the most active part of the cardiac glycoside, modifications at this site have the highest potential for modulating inhibition. Modifications to the lactone ring are originally visualized by modeling digoxin analogues from the literature. Compounds are subjected to energy minimization techniques and aligned according to a shared steroid backbone. The effects of such modifications are then analyzed by comparative field analysis (CoMFA) and comparative field similarity index analysis (CoMSIA). CoMFA and CoMSIA contour plots highlight regions that are affected by changes in steric bulk, electrostatics, hydrogen bonding, and hydrophobicity. The contour maps indicate the type and location of the compound-enzyme interactions by generating three-dimensional images around the compound. Molecules with the desired modifications are inserted into the models and their activities are predicted. Compounds with high predicted bio-activities will be purchased and evaluated experimentally. Ultimately, this knowledge will aid in the synthesis of novel and safer drugs for the treatment of congestive heart failure.

120. Elizabeth Whittle

Northern Kentucky University
Faculty Mentor(s): Andrew Long and Richard Boyce

Moving Mountains: Mapping Alpines in Colorado

Physical coordinates have not been routinely collected nor considered when examining ecological data sets; this even though we intuitively know that spatial relations are important. We explore the idiosyncrasies and methods that arise when making sense of a particular set of ecological data that has both spatial and environmental components. In particular, we will discuss the application of multiple types of spatial analysis and try to gauge the successes of each.

Oral Presentations (Alphabetical Order by University)

Michelle Shouse

Eastern Kentucky University
Faculty Mentor: Catherine Clement

The Effect of Attachment Style on Autobiographical Memory

An individual's attachment style affects many aspects of their behavior and personality. The purpose of the proposed study is to further evaluate attachment style and its effect on autobiographical memory. It is proposed that securely attached individuals have more positive autobiographical memories compared to insecurely attached individuals. Subjects will be recruited from Eastern Kentucky University. Participant subjects will write a paragraph describing an interaction between themselves and a professor or high-school instructor. They will then complete a questionnaire measuring their overall feelings about that interaction and a questionnaire measuring their attachment style. I expect securely attached students to have more positive autobiographical memories regarding the interaction than insecurely attached students.

Boram Lee

Kentucky State University

Faculty Mentors: Changzheng Wang, Lingyu Huang, Jo Sloan, and William Graham, Jr.

Behaviors Related to Body Weight Status of Children Participating in the National Youth Sports Program

National Youth Sports Program provides opportunities for children from low-income families to participate in sports activities in the summer. The objective of the study was to study the critical knowledge, attitude and behaviors related to the body weight status of children participating in the National Youth Sports Program. A survey questionnaire was filled out by the children after they were examined for their blood pressure, body weight, and height. Their body fat percent was measured with a Tanita TBF-521 body composition analyzer. Body mass index (BMI) was calculated from the body weight in kg divided by the square of body height in meters. Majority of the children had positive view of milk, vegetables, fruits and physical activities, but 25% of the children consumed one cup or less of milk per day, 31% of them consumed one or fewer servings of vegetables, 30% of them consumed one or fewer servings of fruits and 16% of them had one hour or less of activities. A majority of the children had positive views of soft drinks and TV watching. Over 80% of the students had 2 or more soft drinks and watched TV for two or more hours per day. It appears that the low consumption of milk, vegetables and fruits, high intake of soft drinks and lengthy periods of TV watching may help to explain the relatively high incidence of overweight among these children. Preventive programs are needed to modify their attitudes about the adverse effects of soft drinks and TV watching, in addition to their access to sports activities.

Christine Pendleton and Sourik Ganguly (GS)

Morehead State University
Faculty Mentors: David Peyton and Darrin DeMoss

Development of an [i]in vintro[/i] Protocol to Study Estrogen-Mediated Osteoblast Activity in the Absence of Fetal Bovine Serum

Estrogen plays an important role in skeletal physiology by maintaining a remodeling balance between the activity of osteoblasts and osteoclasts. Experimental studies of estrogen-mediated osteoblast culture [i]in vitro[/i] show that estrogen directly acts on osteoblasts. In order to determine the mechanism by which estrogen elicits this action in osteosarcoma cells (7F2), experiments were carried out in the absence of estrogenic compounds. The culture medium (OPTI-MEM supplemented with 0.1% FBS) was changed to FBS-free medium 48 hrs before the start of an experiment to eliminate the estrogenic activity of FBS, and the use of OPTI-MEM medium eliminates phenol red, another potential estrogenic factor. This protocol development did not change the viability or the morphology of the cells as compared to control cells grown with FBS. Experimental results show that estrogen at both low and high doses (0.1nM to 1.9mM) stimulate cell proliferation of the 7F2 cells after 24 hours of incubation; demonstrating estrogen's osteoblastic activity. Estrogen upregulates the transcription of osteoprotegerin (OPG), a decoy receptor, which antagonizes receptor activator of nuclear factor kB (RANK) preventing the differentiation/activation of osteoclasts. These experimental findings thus support the hypothesis of an antiresorptive role for estrogen in skeletal turnover.

Mitchum Owen

Murray State University
Faculty Mentor: Jeremy McKeel

Postcards from Spain

In preparation for my semester of study abroad in Segovia, I created what would become a year-long project titled, "*Postcards from Spain*." Over the following year, this documentary television series grew to include discussions of Spanish architecture, history, cuisine, transportation, and several other characteristics of this beautiful country. For the series, I obtained grants, recorded 20 hours of on-site footage, conducted research, wrote scripts, interviewed students, faculty, and Spaniards, composed theme music, and edited using Media100 I-Finish. After many months of work, the original 20 hours of footage were condensed into the final series consisting of (11) 15-minute episodes, including infomercials for various study abroad programs.

Lauren Petrzilka

Northern Kentucky University
Faculty Mentor: Michael Baranowski

Popular Culture and Political Socialization of College Students

Few people would disagree that popular culture figures have played a large role in youth vote efforts with major youth voter awareness campaigns seen from P. Diddy ("Vote or Die"), MTV ("Choose or Lose") and even the world of professional wrestling (the WWE's "Smackdown Your Vote!"). We believe that the study of popular culture's influence on the political attitudes and activities of college students is both important and very timely. While there has been some previous work done in this area, most notably David Jackson's 2002 book "*Entertainment & Politics: The Influence of Pop Culture on Young Adult Political Socialization*," we believe this to be an under-researched area with the potential to generate a number of interesting findings.

Nicolas Badre

University of Kentucky
Faculty Mentor: Robin Cooper

Reduced Calcium Channel Function in the Drosophila cacTS2 mutant on Vision, Olfaction and Regulation of the Heart

The cacTS2 Drosophila line have reduced Ca^{2+} channel function at raised temperatures. The inhibition of calcium to flow inside the neuron causes a reduction in synaptic transmission at the neuromuscular junction. When the adults of cacTS2 are exposed to 38°C for a few minutes they rapidly stop flying and walking which implies the alterations measured electrophysiologically in the skeletal muscles of larvae also apply to motor units in skeletal muscles of adults as well as to possibly other sites of depressed synaptic communication. Here we used the cacTS2 strain to investigate the potential actions in vision and olfaction in adult Drosophila. Where as in larval Drosophila, we further assess sensory regulation of heart rate as well as direct action in the heart at restrictive temperatures to further delineate the properties of the cacTS2 strain. Mutations that are temperature sensitive provide a good means to study the mechanisms of regulating homeostasis over time. Since clinically the regulation of calcium channel function in conditions of epilepsy and convulsions are used, the long-term effect of reducing calcium channel function is of interest. We will report on the effects of varied heat pulses during formation of the adult CNS for the cacTS2 and CS lines.

James Cripps

University of Louisville
Faculty Mentor: Rafael Fernandez-Botran

Modulation of Acute Inflammation by Targeting Glycosaminoglycan-Cytokine Interactions

Glycosaminoglycans (GAGs) located on cellular membranes and the extracellular matrix (ECM) are able to interact with chemokines and pro-inflammatory cytokines, leading to local cytokine/chemokine accumulation. The tissue-bound cytokines/chemokines function in promoting leukocyte migration and activation, contributing to local inflammation. Hence, targeting of GAG/cytokine interactions may provide an avenue for the attenuation of inflammatory responses. A cationic peptide (MC2) derived from

Cripps Cont'd.
the heparin-binding sequence of mouse IFN-gamma was previously shown by our laboratory to delay allograft rejection in an animal model. In order to further investigate the immunomodulatory properties of the MC2 peptide, we have studied its activity in an acute peritoneal inflammation model. Groups of C57Bl/6 mice were injected intraperitoneally with either ConA or thioglycollate and treated with saline (control), the MC2 peptide or two control cationic peptides, poly-L-lysine (PLL) and poly-L-arginine (PLA). Treatment with the MC2 peptide, but not PLA or PLL, resulted in statistically significant reductions in total cell numbers, concentration of total proteins, and concentrations of pro-inflammatory cytokines (TNF-alpha, IL-6, or IL-1beta) in peritoneal lavage fluids, without alterations to the qualitative cellular composition of the exudate. These results suggest that targeting GAG/cytokine interactions is a viable approach to reduce inflammation.

Ashley Williams

Western Kentucky University
Faculty Mentors: Andrew Wulff and Harry Rowe

Interpreting Trace-element and Stable Isotopic Results Recorded in a Holocene Stalagmite from Buckeye Creek Cave, West Virginia

Speleothems collected from Buckeye Creek Cave, Greenbrier County, WV, exhibit growth records for much of the Holocene, as has been determined through Th-230 dating of multiple specimens. Samples from growth bands were microsampled and trace-element ratios and stable isotopic data for stalagmite BCC-2 have been used to infer paleoenvironmental changes that occurred above the cave during the last ~7500 years. Mg/Ca and Sr/Ca ratios co-vary suggesting similar controls on concentration. Ba/Ca ratios vary inversely with Mg/Ca, Sr/Ca ratios and $\delta^{13}C$. Trace elements may be interpreted to reflect growth rate, mineral-solution reaction, and position of samples along a growth layer along with temporal changes in temperature and precipitation. Carbonate mineral morphology has been examined by SEM, and basic elemental ratios have been obtained on mineral phases using the SEM-EDS at WKU. A deviation in trace elements at ~2700 years BP to 1200 years BP may suggest climatic warming. Century-scale oscillations in $\delta^{18}O$ during the pre-4000 year BP period abruptly give way to less oscillatory, slightly more depleted $\delta^{18}O$ values suggesting a significant shift in climatic conditions ~4000 year BP. The last 2000 years of the record are characterized by increasing Mg/Ca and $\delta^{13}C$. During the same period Ba/Ca increases and then abruptly decreases, while Sr/Ca decreases and then abruptly increases and stabilizes. These data may reflect land-use practices such as deforestation by the indigenous people inhabiting this area.