Kentucky Academy of Science

NEWSLETTER

http://www.kyscience.org | Susan Templeton, Editor | May 2009

The Voice of Science in Kentucky

Enhanced Affiliates
- Bellarmine University
- Berea College
- Brescia University
- Centre College
- Eastern Kentucky University
- Kentucky Community & Technical College System
- Kentucky Science and Technology Corporation
- Kentucky State University
- Morehead State University
- Murray State University
- Northern Kentucky University
- Spalding University
- Transylvania University
- University of Kentucky
- University of Louisville
- Western Kentucky University

Patron - $5,000 level
- Lumins Associates

Fellow - $1,000 level
- KBRIN (Kentucky Biomedical Research Infrastructure Network)

Sustaining Member - $500 level
- Campbellsville University
- Third Rock Consultants

Member - $250 level
- Asbury College
- CEM Corporation
- Kentucky American Water Company
- Kentucky Wesleyan College
- Lindsey Wilson College
- Thomas More College
- University of the Cumberlands
- Wood Hudson Research Laboratory

Associate Member - $100 level
- Hoffman Environmental Research Institute
- Pikeville College

Editor's Note: When viewing the Newsletter in Acrobat Reader the Table of Contents (TOC) contains live links to each article; at the bottom right of each page is a link back to the TOC!

The KAS Newsletter is published in January, May and August. Current and archived issues are available at http://www.kyscience.org. You may contact the KAS Newsletter Editor at susan.templeton@kysu.edu.

From the President...

In response to a question about preparing students for the 21st Century, President Barack Obama stated, "*All American citizens need high quality STEM education that inspires them to know more about the world around them, engages them in exploring challenging questions, and involves them in high quality intellectual work. STEM education is no longer only for those pursuing STEM careers; it should enable all citizens to solve problems, collaborate, weigh evidence, and communicate ideas.*"

All the winners from the 2009 KJAS Annual Meeting.

Several articles in this newsletter feature students, middle school to high school to undergraduate level, who are on their way to becoming such citizens. The KJAS winners pictured above are good examples.

An unusual anomaly occurred this past year. As far as we know, this is the first time the president of the Kentucky Academy of Science and the president of the Kentucky Junior Academy of Science were in the same family. Our photo (right) was taken in front of the KAS historical marker outside the Chem-Physics building on the UK campus.

KAS President Robin Cooper and outgoing KJAS President Ann S. Cooper.

We have another exciting new year ahead of us in KAS. Please see the newsletter for all the activities. There is a new Superlative Award category that will recognize the achievements of younger scientists in Kentucky. Please seek out nominations for this and all the awards categories.

Robin Cooper

Inside this issue

KAS Governing Board Updates

The following names were inadvertantly left off of the list of continuing board members published in the January issue: Cheryl Davis (At Large Representative), Nancy Martin (President Elect), Rob Kingsolver (Secretary), Ken Crawford (Treasurer), Richard Durtsche (Biological Sciences Representative) and Donald Frazier (Executive Secretary Emeritus). Sincere apologies are extended to these individuals by the editor.

Call for Nominations to KAS Governing Board

The Kentucky Academy of Science Nominations and Elections Committee is seeking assistance from the KAS membership in our effort to identify a ballot of quality candidates to assume leadership roles within the Academy for next year. KAS members interested in nominating colleagues for these vacant positions, or individuals willing to volunteer to be placed on the ballot, should forward the name, e-mail address/phone number for each candidate, and indicate the leadership position of interest. The Nominations and Elections Committee will contact each candidate to request the necessary information to be included on the ballot. This is an extremely important responsibility for the members of KAS and the committee needs your assistance in identifying candidates for these vacancies. The membership is being contacted at this time for nominations for the following offices:

- Vice President
- At-Large Representative
- Biological Sciences Representative

Any member may nominate another member for Vice President and/or the At-Large representative positions. However, for the Biological Sciences representative, the nominators must identify with that Division. Please send nominations by August 1, 2009 to:

Sean Reilley, Chair
KAS Nominations and Elections Comm.
Department of Psychology
601 Ginger Hall
Morehead State University
Morehead, KY 40351
(606) 783-2985
s.reilley@morehead-st.edu

Call for Nominations for Superlative Awards

The Kentucky Academy of Science seeks nominations of individuals who have made outstanding contributions to scientific research and education in the Commonwealth in the six areas designated below. June 30, 2009, is the deadline for nominations. All nominations and supporting materials should be sent in electronic format; e-mail attachments must be in MS Word format. Send to:

Dr. Barbara Ramey, Chair
KAS Committee on Awards
Department of Biological Sciences
Moore 235
Eastern Kentucky University
Richmond, KY 40475
(859) 622-1543
barbara.ramey@eku.edu

Nominations are being sought in the following categories:

- **Outstanding Academy Service:** The recipient shall have been a long-time member of the Kentucky Academy of Science and shall have made a significant contribution to the growth and development of the Academy.
- **Distinguished College/University Scientist:** The recipient shall have made some significant contribution to academic research in Kentucky.
- **Outstanding College/University Teacher:** The recipient shall have made some significant contribution primarily to science teaching but also to research at the college/university level in Kentucky.
- **Outstanding Early Career in Post Secondary Education:** The recipient shall have made some significant contributions in teaching and research and hold the rank of Assistant or Associate Professor on the faculty of a Kentucky Post Secondary Education Institution. ***New!***
- **Outstanding Secondary School Science Teacher:** The recipient shall have made some significant contribution to the teaching of science at the middle and high school level in Kentucky.
- **Distinguished Professional Scientist (in a non-academic position):** The recipient shall have made some significant contribution to science in Kentucky.

Nomination packets for all awards should include an abbreviated curriculum vitae (5 pages or less) containing information pertinent to the award, a list of publications, and letters of recommendation from at least three but not more than five professional colleagues well acquainted with the candidate's qualifications for the award. In addition:

- *Outstanding Academy Service Award* nomination packets should include documentation of special contribution to the Academy.
- *Outstanding Secondary School* and *College/University Teacher* awards nomination packets should include documentation of special accomplishment as a teacher of science, especially measures of student success, participation in student development beyond the classroom, and science curriculum development. Letters of recommendation for secondary school teachers may also come from an administrator or supervisor, a teaching colleague, a student, or a parent.

New! This superlative award has been established to recognize the efforts and contributions by a junior faculty member to teaching and research in the Commonwealth. This award will permit ountstanding faculty to be recognized more easily by KAS when they are in the early or middle stages of their career.

Messages from the Executive Director

Please welcome Brescia University and Kentucky State University as new 2009 KAS Enhanced Affiliates and thank you to Wood Hudson Cancer Research Laboratory for updating their 2009 KAS affiliation to the Member level.

Just a reminder, faculty, staff and students at KAS Enhanced Affiliates receive complimentary KAS Annual Memberships when they register with KAS at www.kyscience.org and join KAS with their institution affiliated email address. If you are already a KAS member at a new enhanced affiliate you do not need to register with KAS, your membership will be automatically updated.

All enhanced KAS members receive electronic access to the Journal of Kentucky Academy of Science. If you are an enhanced member and would like to receive a hard copy of the J-KAS please contact Jeanne Harris regarding the $20 hard copy fee.

Also, if you are a new KAS member, remember to activate your membership so that you can receive the benefits of members including access to and inclusion in the KAS membership directory and discounted annual meeting registration fees.

Lastly, if you know of an organization or institutional group interested in sponsoring or exhibiting at the 2009 Annual Meeting November 13-14 on the campus of NKU, please contact me. What a great way to reach hundreds of scientists!

Jeanne Harris, KAS Executive Director
859-227-2837, executivedirector@kyscience.org

KAS 95th Annual Meeting

Hosted by Northern Kentucky University
Tentative Program

FRIDAY, NOVEMBER 13, 2009

3:00 - 5:00 p.m.	KAS Governing Board Meeting
5:30 - 7:00 p.m.	Registration
6:30 - 8:30 p.m.	Symposium
8:30 - 9:00 p.m.	KAS Sectional Officers Meeting
8:30 - 10:30 p.m.	Social

SATURDAY, NOVEMBER 14, 2009

7:00 a.m. - 5:00 p.m.	Registration
8:00 a.m. - 4:00 p.m.	Vendor's Exhibits
8:00 - 11:30 a.m.	Paper Sessions & Scientific Posters
10:00 - 11:30 a.m.	KCTCS Faculty Meeting
11:30 a.m.- 12:45 p.m.	Lunch (on your own)
	KAS Past Presidents' Luncheon
1:00 - 4:00 p.m.	Paper Sessions & Scientific Posters
4:15 - 5:15 p.m.	Plenary Session
5:30 - 6:30 p.m.	Annual Business Meeting & Reception
	Student Reception
6:30 - 9:00 p.m.	Banquet
	Speaker: Dr. Len Peters, Secretary of the Kentucky Energy and Environment Cabinet

Research Funds Available

Special Research Program: The program of KAS special research awards is directed particularly to faculty in Kentucky higher education institutions, public or private, involved primarily in undergraduate education. Awards of up to $5,000 will be available as funding allows.

Undergraduate Research Program: KAS makes available funds for research planned and conducted by undergraduate students of Kentucky colleges and universities under the supervision of a faculty member who is a member of the Kentucky Academy of Science. Currently, two undergraduate research grant programs are available: Undergraduate Research Supply Grants with awards of up to $500 , and Summer Undergraduate Research Grants up to $2,500.

Marcia Athey and Botany Fund: The KAS Foundation makes available through the Marcia Athey Fund and the Botany Fund monies for research planned and conducted by students of Kentucky secondary schools, colleges, and universities under the supervision of a faculty member, and if funds permit, faculty research projects. Faculty sponsors/ researchers must be KAS members. Awards normally are in the several hundred dollars range, though in extraordinary circumstances some higher awards may be possible.

Funding request deadline for all programs: November 15, 2009. Detailed instructions for preparing proposals can be found on our web site at www.kyscience.org. For more information contact:

George F. Antonious, Ph.D.
Kentucky State University
Dept. of Plant and Soil Science
218 Atwood Research Center
Frankfort, KY 40601
Office: 502-597-6005
Fax: 502-597-6381
E-mail: george.antonious@kysu.edu

New! While applicants still need to submit 7 copies of their proposal, the submission format has changed. Each copy of the proposal should be submitted in Acrobat (PDF) format on a CD. Hard copy submissions will not be accepted.

REMINDER: All KAS affiliates may advertise job openings free of charge on the Employment Opportunities link below. Please forward new postion listings to KAS Executive Director Jeanne Harris at Executivedirector@kyscience.org.

http://www.kyscience.org/members/employment.php

Master's Student Position in Murray State Developmental Biology Laboratory

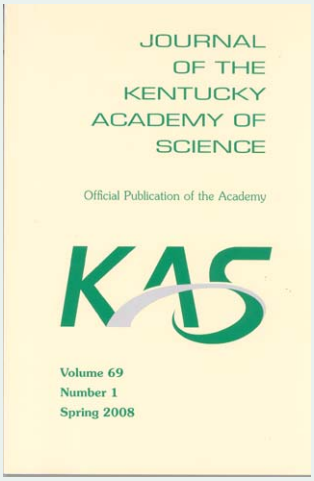
Master's Student position supported by a research grant from the National Institutes of Health is available immediately in the laboratory of Dr. Alexey Arkov, Department of Biological Sciences, Murray State University. For details see the web site above.

GOT DATA?

The JOURNAL of the KENTUCKY ACADEMY of SCIENCE (J-KAS), now in its 70th year of publication, provides an excellent venue for Research Articles, Scientific Notes, and the results of Symposiums and special Workshops in all areas supported by the Academy.

Why J-KAS? The Kentucky Academy of Science has nearly 1500 members, The Journal itself is available in a wide number of libraries, is published by Allen Press, and is a member of BioOne; thus all articles are easily searchable in national databases. Page charges are very competitive.

Research Articles are generally in the range of 8-15 printed pages; Scientific Notes are ~1-2 printed pages. For styles and formats, please see any recent issue of the Journal or visit http://www.kyscience.org. Manuscripts should be sent to the Editor as e-mail attachments. MS Word is preferred. In the cover e-mail, please give the names, addresses, and e-mail addresses of three potential reviewers, preferably not from your home institution nor people with whom you have recently published.



J-KAS is a venue for the results of special Symposiums and Workshops that may be part of a regular issue or considered for a special issue. It is up to the organizer(s) to compile manuscripts, insure correct format, as well as conduct peer reviews. The Editor of J-KAS will make final determination on all manuscripts and may seek additional peer review.

Symposium organizers should

1) Contact the J-KAS Editor about the appropriateness and timing of a particular symposium for J-KAS,
2) If at all possible, build this into the symposium organization, and have sponsor approval if needed,
3) Let participants know that their manuscripts will (can) be published as in the Journal of the Kentucky Academy of Science as a special section or edition,
4) Have manuscripts DUE at the time of the symposium (saves a lot of headaches later), and
5) Direct authors to the KAS website for proper style and format.

All manuscripts and inquiries should be directed to the Editor at david.white@murraystate.edu or

David S. White, Editor
Hancock Biological Station
561 Emma Drive
Murray, Kentucky 42071
(270) 474-2272

KAS Research Funds Awarded

Dr. George Antonious, Chair of the KAS Committee on the Distribution of Research Funds, presented the committee's grant recommendations at the January KAS Board Meeting. The Committee members (Dr. Antonious, Ky State University; Dr. Nancy Rice, Western Ky University; Dr. David Thompson, Northern Ky University; Dr. Gary Ritchison, Eastern Ky University; Dr. Ricky Cox, Murray State University; and Dr. Ilson White, Morehead State University) reviewed twenty-one grant proposals between the November 15th submision deadline and December 20th, so that their recommendations could be finalized by the January Board meeting. Their efforts are deeply appreciated. The Board approved the following grants.

Special Research Program

Grantee: Rebekah Wailkel, Eastern Kentucky University
Amount: $5,000
Project Title: Regulation of miRNAs in Estrogen Mediated Inhibition of Cardiomyocyte Hypertrophy

Undergraduate/Graduate Research Program

Grantee: Bonnie McCullagh, Western Kentucky University
Amount: $500
Project Title: DNA Sequence Variation in the Wingless Gene Product: A Putative Morphogen for patterning the Eyespot Foci of Buckeye Butterflies (genus *Junonia*)

Grantee: Joseph Marquardt, Western Kentucky University
Amount: $500
Project Title: Molecular Tools for Understanding the Population Genetic Effects of Habitat Restoration

Grantee: Alan Grubb, Morehead State University
Amount: $2,000
Project Title: Investigating the Concept of Botanical Diversity Surrogates at a Local Scale within the Critically Endangered Mixed Mesophytic Forest Ecoregion

Marcia Athey Fund

Grantee: Adrienne Cooper, Eastern Kentucky University
Amount: $915
Project Title: Locating and Quantifying Old-growth Forest in Eastern Kentucky

Grantee: Kerstin Edberg, Western Kentucky University
Amount: $1,000
Project Title: Genetic Isolation as a Results of Dam Construction

Grantee: Emily Hicks, Eastern Kentucky University
Amount: $775
Project Title: Determination of the Intergeneric Relationships in the Pitcher Plant Family, *Sarraceniaceae*

Botany Fund

Grantee: Dayle Saar, Murray State University
Amount: $712
Project Title: Chromosome Variation and Population Dynamics of a Mountain Species from Mexico (*Dahlia coccinea*), as Influenced by Climate Change

Research Reports - 2008 KAS Marcia Athey and Special Research Grants

Vertebrate Utilization of Macrotermitinae Mounds in Tsavo Region of Southeast Kenya (Marcia Athey) & **Termitaria: Engineering Biodiversity in Semiarid Lands** (Special Research)

Ms. Margaret Mahan and Dr. Michael Stokes, Western Kentucky University, Department of Biology

This research was aided in part by a KAS grant to Margaret Mahan, a WKU graduate student, during the period of July 16 - October 16 of 2008. Faculty and other students from the University of Nairobi (UoN) and Western Kentucky University (WKU) assisted during the first three weeks of the research period. Two undergraduate, biology students from WKU and four undergraduate, biology and life science students from UoN participated in the set up of the field site. Each was able to gain field experience in this biologically diverse region of the world. Two members of Tsavo East National Park's research division of the Kenya Wildlife Service also participated. A Kenyan graduate of UoN and current graduate student of WKU also participated in studies and will be returning to the area to conduct his master's research. Our local contact, Ezra Mdam, from the nearby village of Rukanga, worked as the field assistant the entire length of the trip.

The WKU-UoN African Center for Biodiversity and Conservation's camp and research site is located on Maungu ranch. This research built upon initial studies conducted on the ranch in 2007. This year's study was conducted in a new field site chosen on these criteria: 1) the site had to be within a reasonable distance from camp, to ensure safety and time concerns, 2) the site had to have an adequate density of mounds to allow for 30 randomly chosen study plots, 3) mounds chosen had to be at least 1m in height, allowing for adequate vertebrate entry sites. The third criterion was based on a statistical analysis of our 2007 research, showing that larger mounds have more ventilation holes (i.e. possible vertebrate entry points). The research site was located off a major track bisecting the ranch and covered an area of 250,000m^2 (25 ha). Thirty random sites were chosen within the area, and the nearest suitable mound to each site was located.

All 30 mounds and random sites were monitored. Due to time constraints, only 20 of the initial 30 were monitored using Reconyx Rapidfire RC55 remote cameras and Sherman and Havahart live traps, partially funded by this KAS grant. Three sets of Lascar RH/Temperature data loggers were placed at a total of 14 sites to monitor temperature and humidity in the mounds. On average, data loggers were deployed for five days to achieve adequate data to analyze daily fluctations in mounds and at non-mound sites. These data are still being analyzed.

We directly observed mounds using 5-minute focal samples for a total of 2.5 hours per day. Mr. Mdam was stationed at the non-mound site and Ms. Mahan at the corresponding mound site. Observations began at 9:30am and ended at 12:00pm. All animals seen within the area of the site were recorded for later analysis. We have a total of 1800 focal samples from mounds and a corresponding number from the random sites.

(Continued on page 12)

A phylogenetic study of the endangered species *Podarcis carbonelli* on a microgeographic scale (Marcia Athey)

Ms. Maria Figueirinhas and Dr. Nancy Rice, Western Kentucky University

I. Purpose of the study

This study investigated the genetic variation of the endangered species *Podarcis carbonelli*. *P. carbonelli*, a wall lizard endemic to the Iberian Peninsula, has recently been classified as endangered (EN) by the International Union for the Conservation of Nature and Natural Resources (IUCN).

This study focused on a particular area of this species' distribution, Peniche and the Berlengas State preserve, due to the particular geological history of the area and the occurrence of this species in isolated islands along coast.

In this study we were particularly interested in: 1. assessing the genetic variability of the island populations, due to the fact that their isolation makes this species more susceptible to the effects of genetic drift and, consequently, more vulnerable from a conservation perspective; and 2. testing whether the unique geological history of the area resulted in altered haplotype distribution in the different populations.

II. Research progress

The initial stage of the research project involved extracting genomic DNA from 50 lizard tissue samples. The extraction process was followed by the amplification of two regions of the mitochondrial DNA: the control region and the 12 S rna. Samples from fifty individuals, ten from each population, were amplified for these two regions through Polymerase Chain Reaction (PCR). The PCR products were cleaned and used as templates for sequencing reactions. The sequencing reactions were cleaned and ran on the WKU Biotechnology Center ABI/ Hitachi 3130 DNA sequencer.

The subsequent analysis of the sequences revealed a lack of genetic diversity in both mitochondrial DNA regions analyzed. There were no polymorphic sites detected across all the populations of *P. carbonelli* and only one haplotype was observed for each mitochondrial DNA region. During the month of June, the student travelled to the study sites to collect more tissue samples, as well as morphological data.

At a preliminary stage, the intron 3 of the nuclear gene for Lactate dehydrogenase B (LDH-B) was chosen as a new source of genetic diversity. Primer sequences were obtained from previously published research, but due to lack of specificity and low reaction efficiency, these were re-designed in an attempt to improve the results obtained. Nonetheless, the primers designed displayed a high level of non-specific binding and were not used in this study.

The intron 7 of the β-fibrinogen gene was selected as the new marker for genetic diversity and primers were obtained from previously published research. These primers proved to be very specific; hence this region was adopted as the new molecular marker in this study.

(Continued on page 12)

The View from CPE: Build Links!

Submitted by Dr. Michael Seelig, Interim Vice President for Academic Affairs, Kentucky Council on Postsecondary Education

Dr. Michael Seelig

At the recent Kentucky Innovation and Entrepreneurship Conference held in April, the new President of the Council on Postsecondary Education, Robert King, addressed the nearly two hundred Kentucky researchers and guests with a challenge to better link universities to each other and to the business community. He shared substantive issues related to the environment, biodegradable material, renewable energy, health, and the need for patents and technology transfer to maximize the benefits of further commercialized discoveries made at Kentucky's colleges and universities.

All of these discussions were the logical expression of the changing role of higher education and its increasingly important link to economic development and job creation. While these discussions seem commonplace today, President King noted that it was not that long ago that universities were intentionally isolated from day-to-day commerce. The image of the "Ivory Tower" accurately described a relationship between higher education and the rest of the world that limited interaction between those who create new knowledge and those who apply it. Thankfully, this imagery is changing due to the investments in innovation being made in Kentucky through the Kentucky Science and Technology Corporation, Kentucky's Department of Commercialization and Innovation, and the many public/private investors throughout the Commonwealth.

President King recounted a speech by former Duke University president, Dr. Nan Keohane, who recounted that access to higher education in the United States had been, since the American Civil War, an anomaly in the world. In contrast to universities in Europe and Asia, the U.S. had expanded access to anyone with the intellectual talent and determination to seek a college education. This notion of making higher education accessible to all did not occur in a single moment of enlightenment. President King explained that the principle was imbedded in a series of actions taken at both the national and state level starting in the 1860's with the Morrill Act which created America's "Land Grant Colleges," and continuing through the creation of the GI Bill at the end of world War II, the great civil rights laws of the 1960's, and the ongoing support of publicly financed tuition assistance programs, and low interest college loans. All of these public policies, expressed in our laws, have worked together to give real meaning and substance to the notion of nearly unfettered access to higher education to anyone in America who seeks it.

Dr. Keohane's observations about access were cause for many to ask whether or not there was a connection between this fact and the growth of the American economy? Suppose there was a G-8 Summit in the year 1820? If so, the United States would not have been a member. The economic and military powers of the day would have included England, Russia, Japan, China, France, India, Spain, and Austria. They might have assembled for their annual meeting in Davos, Switzerland. Anti-globalization protesters would not have yet been on scene. But you can imagine all the pomp and ceremony as the Kings of England, France and Spain, the Emperors of Japan and China, and the Czar get together over cocktails. Czar Alexander leans over to King Louis XVIII and says: "So, Lou, what do you think we can do, either collectively or individually, to become relatively less prosperous and less powerful over the next couple hundred years?"

That hypothetical suggestion is exactly what happened. In contrast, during that same period the United States grew from being a modest experiment into the economic and military power it is today. This result, however, was not a foregone conclusion or some predetermined outcome of history. Consider, as well, the fact that all of the nations in the 1820 version of the G-8 were blessed with large populations, access to natural resources, financial capital, established universities, established armies and various types of functioning economies. None of the largest national economies of the day intended to relinquish their relative positions of wealth and power. What were the public policy choices made by these G-8 nations compared to those made in the United States? What differentiated the behavior of the United States economy from those of the nineteenth century G-8 nations?

First, the United States embraced a free enterprise economy while the members of the old G-8 were experimenting with communism, socialism, or perpetuating old systems of feudalism. Second, the United States made secondary education (grades 9-12) universal in the early 1900's, nearly forty years before any other nation. And third, access to higher education was significantly broadened to people of all economic and social classes through a series of laws described earlier, bringing the treasure of higher education within reach of nearly every American who needed only to demonstrate the motivation to seek it.

Isaac Ehrlich, an advocate of what economists describe as the "Endogenous Theory" of economic growth once stated that, "The reason persistent growth is enabled by human capital formation is that human capital, unlike conventional physical capital, has both the direct effect on the productivity of current labor and capital inputs, and an indirect effect on the production of more knowledge. A continuous accumulation of knowledge can thus lead to a self-sustaining growth in per capita income."

The point, according to President King, is that America's workforce has historically been more highly educated than any other nation in the world, and that education has translated into more innovation and productivity than any other nation throughout the Twentieth Century. Some contend that the major factor that accounts for the United States overtaking Europe as the economic superpower of the Twentieth Century may just be educational attainment." With world attention presently focused on stimulating faltering international economies, we must not forget that human capital increases with industrial development and overall level of educational attainment, and eventually becomes the strongest driver of economic growth."

Higher education has been intimately connected to the growth of the American economy, and the ties between it to private industry, support of entrepreneurship and scholarship, human capital formation, and the commercialization of new knowledge must be at the center of any strategy to enhance America's future. Our universities and colleges cannot and should not diminish the role we can play to enhance the human condition and our nation's prosperity.

Kentucky State University MANRRS Chapter - Students Preparing for the Next Big Thing

The Kentucky State University (KSU) Chapter of Minorities in Agriculture, Natural Resources, and Related Sciences (MANRRS) is composed of undergraduate students with a variety of majors. Students pursuing degrees in biology, chemistry, business, psychology, sociology, computer science, English, and education are actively seeking professional development opportunities through MANRRS. Professional development activities conducted this year include a resume writing workshop, formal meal etiquette workshop, internship and scholarship search techniques, participation in the KSU Leaders Summit, participation in the Region III MANRRS Conference, and participation in the National MANRRS Conference. MANRRS students are also active in the Frankfort community. Their service activities include Habitat for Humanity, Frankfort Soup Kitchen, donations to the Angel Tree, Children of Promise banquet, and Reforest Frankfort. These students are BUSY!

Kentucky State University students attending the 2009 National MANRRS Conference were (left to right): Tia Williams, Jazmin Williams, Ashley Mack, and Emerald Gates.

KSU MANRRS students aspire to attend graduate school and pursue careers related to agriculture. MANRRS students are seeking input on career pathways and are open to mentorship from professionals in the industry. MANRRS students take advantage of the opportunities at KSU by assisting in the research labs of the Atwood Agricultural Research Facility. Their research includes horticulture, entomology, organic horticulture, food science and nutrition. Presentations of their research were conducted at the MANRRS 24th Annual Career Fair and Training Conference held in Indianapolis, IN March 26-28, 2009. There Ms. Jazmin Williams, a senior biology major, won second place for her research presentation titled, "Effectiveness of Corn Gluten Meal as a Natural Herbicide." She was advised by Dr. Michael Bomford, a Principal Investigator in Organic/Sustainable Agriculture Research at KSU. MANRRS students also recently attended the 15th Biennial Research Symposim of the Association of 1890 Land Grant Research Directors in Atlanta, GA. There Ms. Emerald Gates, a senior biology major and KSU MANRRS chapter president, won first place for her research presentation titled, "The Influence of Light on Annonaceous Acetogenins in the Stem and Leaf Tissue of PawPaw." She was advised by Dr. Kirk Pomper, Principal Investigator in Horticulture Research at KSU.

Employers or graduate schools seeking intelligent, prepared, and motivated employees and students can benefit from MANRRS members because of their range of experience in research, leadership, on-campus employment, and their commitment to life-long learning. Membership in the MANRRS organization is not limited to undergraduate college students. Graduate students and professionals can also join at the national level or through a local campus chapter. If you are interested in membership or would like to contribute to the development of these and future students, here are a few ways to participate:

- Provide an internship (paid/unpaid) for an undergraduate member
- Provide a tour of your facilities
- Allow your employees to conduct workshops for MANRRS
- Visit a meeting and share career opportunities
- Donate funds to support future MANRRS programming or specific programming you find important to pre-professional development.

For more information about MANRRS or to contact MANRRS students, contact Mrs. Rachael Steward (MANRRS staff advisor) at 502-597-6172 or by email at Rachael.steward@kysu.edu.

From Rachael Steward, MANRRS Advisor,
Kentucky State University

MANRRS is a national society that welcomes membership of people of all racial and ethnic group participation in agricultural and related sciences careers. The overall objective of the Society is to promote and implement initiatives which foster inclusion and advancement of members of ethnic/cultural groups.

Kentucky State University and the University of Kentucky host the only chartered MANRRS chapters in Kentucky. For information on UK's chapter, contact the chapter advisor Mr. Quentin R. Tyler, at quentin.tyler@uky.edu, or 859-257-7272, ext.252. If you are a student enrolled at an institution which does not have a chartered chapter, you may become a member of the Society by joining a chapter at another institution, or by registering with, and paying dues to, the Society as an independent Student Member (yearly dues: $10.00). For more information on MANRRS visit the Society website at http://manrrs.org.

2009 *Posters-at-the-Capitol* Student Participants

Abstracts of student presentations can be viewed in the Program Booklet available at http://campus.murraystate.edu/services/ursa/.

Eastern Kentucky University

Tina Al-Kabandi, Jessica Bartle, Bethany Bowling, Matthew Courtney, Hemal Detroja, Chad Downey, Matthew Flanagan, Emily Gilbreath, Natochia Henry, Jennifer Imel, Courtney Jackson, Darnaby Kerns, Allison Kiefner, Alyse King, Erin Madeen, Savannah Marlow, Ben Morris, Jessica Pulliam, Roger Richardson, Aumbrea Sanders, Daniel Thompson, Ted Wiersema, Virginia Wilson

Kentucky Community and Technical College System

Wade Buckley, Rachel Carry, Matthew Cody Ortt, B. Damon Wood, Andrew Fuller, Michael Gailey, Brittany Groves, Brad Hall, William Hutchison III, Anthony Karam, Jason Morris, Nancy Pettibone, Joey Pruitt, Michael Schulte, Linda Walters, Laura Wood

Kentucky State University

Leslye Brent, De'Anna Craycroft, Shandeep Dutta, Maleka Embry, Emerald Gates, Marcel Hampton, Abdul Kakar, Lauren Lobel, Ashley Mack, Elizabeth Perkins, Rodney Ripberger, John Rodgers, Kiah Rodriguez, Colby Smith, Michael Somuah, Jonathan Strayer

Morehead State University

Ashley Adkins, Erica Belmont, Michael Blankenship, Elizabeth Carson, Michelle Fiore, Nathan Fite, Courtney Forbis, Russell Fugate, Brad Galbreath, Kimberly Gibson, David Gillum, Daniel Graves, Erik Hale, Brittany Herrera, Kendrick Holbrook, Caleb Howard, Megan Huellemeier, Brian Knight, Brandon Leishman, Joseph Marin, Briteney Maynard, Rachel Messer, Steven Osborne, Nick Rose, Cory Ruffing, Misty Skaggs, Savannah Slone, Wayne Staggs, Shannon Touroo, John Wellman

Murray State University

Michael Biethman, Carrie Brazelton, Glenna Buford, Scott Coleman, James Combs, Bryan Craig, David Crouch, Wes Edwards, Carrie Elliott, Zachary Elmore, Chris Ethridge, Brittany Fiscus, Annette Fowler, William Fridy, David Fries, Kelly Harris, Berlin Haugen, Daniel Hayden, Sakura Higashi, Christina Jackson, Gretchen Kilby, Jona Kos, Andrew Mattmiller, James Mayes, William Miller, Christopher Muncie, Trent Murdock, Bradley Oliver, Justin Parrish, Benjamin Paschall, Evan Roberts, Joshua Scott, Leslie Smith, Robert Stuard, Sarah Thomason, Dan Varonin, Todd Walker, Kevin Witbrodt

Northern Kentucky University

Jacob Allen, Laine Caldwell, Lori Clark, Michelle Corbett, Kyle Corder, Justin Dean, Sarah Enzweiler, Brittany Finn, Michael Fuehner, Craig Girten, Meagan Goodwin, Justin Hartfiel, Anthony Haskamp, Kyle Holloway, Chris Kaeff, Jennifer Lantz, Remington Leach, Jeremy Orndorff, Melinda Sartwell, Heather Schlarman, Lisa Smith, Zineb Syed, Elizabeth Walsh

Presenters and mentors gathered on the steps inside the Capitol Building at the annual celebration of undergraduate research at Kentucky's public institutions, held this year on February 5th.

University of Kentucky

Mark Adams, Taylor Amerman, Jenna Brashear, James Chapman, Alecia Fields, Jason Grant, Eseosa Ighodaro, Nazeeha Jawahir, Rachel Keller, Christina Kuchle, Lesley Mann, Jessica McClanahan, Colleen McCoy, Susan Perry, Adrienne Pfendt, Tim Riley, Rebecca Russell, Michelle Seger, Jennifer Strange

University of Louisville

Katherine Davis, Patricia Harrington, Nicolette Jones, Kari Leichty, Joshua Masters, Dillon Miles, Clarisse Muenyl, Eron Roy, Vanessa States, Ashley Wade

Western Kentucky University

Derrick Bartlett, Justin Clark, Lindsey Clark, Amanda Gaddes, Ismet Handzic, Sam Hayden, Robert Hernandez, Tara Holaday, Samantha Kramer, Kristin Leftwich, Bobby Lindsey, Brett Meyer, Sara Miller, Annie Nejedly, Kalu Njoku, Mensur Paocic, Lonnie Pike, Shelby Rader, William Ritson, Jonathan Rutledge, Austin Schroll, Dalene Smith, Ben Turley, Crystal Walker

From Dr. John Mateja, Chair, Posters-at-the-Capitol

Kentucky Junior Academy of Science

The 2009 KJAS Meeting was held on Saturday, April 18th, on the campus of the University of Kentucky. There were 120 students from ten schools who participated in the event. The winners are listed below.

Behavioral and Social Sciences
1st Place: Ann Cooper
2nd Place: Mariam Abbas
3rd Place: Hannah Schmidt

Biological Topics I and II
1st Place: Greg Shoemaker, Asif Rahman
2nd Place: Thwisha Joshi, Suraj Kannan
3rd Place: Divyansh Sharma, Akash Mirchandani

Botany
1st Place: Amna Zolj
2nd Place: Jonathan Chen
3rd Place: George Nguyen

Chemistry
1st Place: Anuj Patwardhan
2nd Place: Stephanie Biecker
3rd Place: Pratik Bhade

Computer Science and Mathematics
1st Place: Ankush Gupta
2nd Place: Benjamin Wiley
3rd Place: Oreoluwa Babarinsa

Engineering
1st Place: Megan Mercer
2nd Place: Alex Haynes
3rd Place: Katelyn Stenger

Environmental Science
1st Place: Jack Grundy
2nd Place: Shelly Xu
3rd Place: Zack Uhlenhuth

Microbiology
1st Place: Lindsey Hasting
2nd Place: Vinay Raj
3rd Place: Abi Zhang

Physics, Earth and Space
1st Place: Alexandra Funk
2nd Place: Sanjana Thota
3rd Place: Lori and Leah Wilson

Zoology
1st Place: Nick Uhlenhuth
2nd Place: Pooja Matudar
3rd Place: Michael Waltman

Middle School Group 1
1st Place: Phillip An, Meyzeek M. S.
2nd Place: Richard Cooper, Morton M. S.
3rd Place: Harsh Desai, Meyzeek M. S.

Middle School Group 2
1st Place: Mahati Vavilala, Meyzeek M. S.
2nd Place: Ben Smith, St. Leo's School
3rd Place: Daniel Sedlacek, St. Leo's School

ABOVE: KJAS 2009 Grand Prize Winners (left to right): Ann Cooper, Lafayette; Ankush Gupta, duPont Manual; Jack Grundy, duPont Manual; and Lindsey Hastings, duPont Manual. BELOW: 2009-2010 KJAS officers (left to right): Anuj Patwardhan, President; Kelly Delgrosso, Vice President; and Kelly Kleier, Secretary; with KAS President Dr. Robin Cooper.

Many thanks are due to all the judges.

Middle School Judges: Manjiri Patwardhan, Deanna Morris, Sonia Bierbower, Marvin Ruffner

High School Category Judges: Susan Templeton, Sean Reilley, Dave Robinson, Cynthia Corbett, Robin Cooper, Clint Smith, Carol Baskin, Bob Creek, KC Russel, Jeff Ashley, Gazi Huda, George Antonious, Gisela Garcia- Ramos, Jennifer Myka, John Seabolt, Eric Jerde, Bruce Walcott, Sean O'Keeke, Bill Burke.

Grand Prize Judges: Martha Peterson, Todd Porter, David Feinauer, Wilson J. Gonzalez-Espada, Doug Strachan, Moshe Elitzur

From Dr. Ruth Beattie, Director of KJAS

2009 Kentucky Science and Engineering Fair (KY-SEF)

Eastern Kentucky University hosted the seventh annual KY-SEF for middle school and high school students Saturday, April 4, 2009.

BEST OF FAIR - HIGH SCHOOL

LIFE SCIENCE
1st Place: Curtis Northcutt, Lafayette H.S.
Animal Sciences
2nd Place: Sung-Hyun (Joseph) Kim, duPont Manual H.S.
Biochemistry
3rd Place: Shray Kapoor, duPont Manual H.S.
Medicine & Heath Sci.

PHYSICAL SCIENCE
1st Place: Shuang (Shelly) Xu, Paul Lawrence Dunbar H.S.
Environmental Sciences
2nd Place: Zach Branson, duPont Manual H. S.
Mathematical Sciences
3rd Place: Sanjana Thota, Ballard H.S.
Earth Science

TEAM
1st Place: Leah Wilson & Lori Wilson, duPont Manual H. S.
2nd Place: Anna Duan & Monali Haldankar, duPont Manual H. S.

BEST OF FAIR - MIDDLE SCHOOL

LIFE SCIENCE
1st Place: Kristopher Thieneman, St. Francis of Assisi
Plant Sciences
2nd Place: Daniel Sedlacek, St. Leo School
Animal Sciences

PHYSICAL SCIENCE
1st Place: Matthew Russell, Lexington Home School
Energy & Transportation
2nd Place: Richard Cooper, Morton Middle School
Environmental Management

TEAM
1st Place: Serena Lian & Robin Zhao, Meyzeek Middle School
2nd Place: Zoe Brooks-Jeffiers & Danielle Beard, Spencer Co. Middle School

A special thank you goes to all the KAS members who served as judges for this event.

Dr. Ruth Beattie, University of Kentucky
Miss Sonya Bierbower, University of Kentucky
Dr. Mark Blankenbuehler, Morehead State University
Dr. Doug Chatham, Morehead State University
Dr. Sean Clark, Berea College
Miss Laura Cockrell, Eastern Kentucky University
Mr. Jason Courter, Eastern Kentucky University
Dr. John Delfino, Midway College
Dr. Timothy Dowling, University of Louisville
Mr. Brent Eldridge, Bluegrass Community and Technical College
Dr. Charles Elliott, Eastern Kentucky University
Dr. Malcolm Frisbie, Eastern Kentucky University
Dr. Donna Gaus, University of Louisville
Miss Amy Gentry, USDA Farm Service Agency
Dr. Susan Godbey, Eastern Kentucky University
Mr. Osniel Gonzalez, Northern Kentucky University
Mrs. Jennifer Jackson, Hazard Community and Technical College
Dr. Jessica Lair, Eastern Kentucky Universtiy
Dr. Chris Laird, Eastern Kentucky University
Mr. Joseph Lutz, University of Kentucky
Dr. Christopher Mullins, Campbellsville University
Dr. Marcia Pierce, Eastern Kentucky University
Dr. Shane Redmond, Eastern Kentucky University
Dr. Tanea Reed, Eastern Kentucky University
Miss Megan Rodgers, Berea College
Dr. Robert Rosenberg, Transylvania University
Dr. Alan Schick, Eastern Kentucky University
Dr. Buchang Shi, Eastern Kentucky University
Miss Andrea Shipley, Eastern Kentucky University
Dr. Bill Staddon, Eastern Kentucky University
Dr. Patrick Sullivan, University of Kentucky
Dr. Nathan Tice, Eastern Kentucky University
Dr. Rebekah Waikel, Eastern Kentucky University
Dr. Ilsun White, Morehead State University
Dr. Andrew Wigginton, University of Kentucky
Dr. Demetrio Zourarakis, KY Division of Geographic Information

From Dr. Robert Creek, KY-SEF Director, and Dr. Barbara Ramey, Host Committee Chair, EKU; photo by John Sedlacek

Students and judges filled the EKU arena at the 2009 KY-SEF.

AP Program shows early success in high schools

When the College Board released its annual "AP Report to the Nation" a group of 12 Kentucky schools were worth noting for their serious commitment to and early impact on making measurable progress on math, science and English Advanced Placement exams.

They are taking direct aim at increasing advance placement opportunities in their schools. The success of their students in these rigorous courses already shows promising results. They are not satisfied with incremental gains and are integrating into their efforts a model with a 12-year record of student success.

Let's take note of efforts for exponential growth based on breakthrough strategies.

These schools are participating in AdvanceKentucky, Kentucky's affiliate to the National Math and Science Initiative. AdvanceKentucky is part of NMSI's roll out across the country of proven, successful math and science programs, supported by funding from the ExxonMobil, Dell and Gates foundations. NMSI recognizes the role of science and technology in regaining our competitive advantage and is demonstrating that many more students can achieve in rigorous math and science courses.

AP students in math, science and English courses in just 12 AdvanceKentucky public high schools contributed 10 percent of Kentucky's "new" growth in the number of passing scores in all AP subjects. These 12 schools represent only 5.5 percent of all Kentucky public schools reporting AP scores but they contributed 7.6 percent of the new AP exams taken in all subjects in 2008 compared to the year before.

Their math, science and English AP enrollments approached a 50 percent increase over last year and over 65 teachers attended AP summer institutes and follow-up training.

What can we learn? Why have these few schools started making a difference, even before their AdvanceKentucky efforts were fully underway?

These schools have been methodically adding new and strengthening existing AP courses—premised on open enrollment to recruit and prepare many more high school students for AP classes and college-level achievement. With support from NMSI, two recent federal grants and their own budgets, these schools have begun extensive content-focused professional development for AP and pre-AP teachers, support for exam fees, technology and supplies, local lead teachers/ mentors and teaming among content teachers—including reaching out to middle schools.

Teachers earn stipends for the extra work and training and are eligible for incentives based on student success—and so are their students. Students with scores of 3, 4 or 5 on math, science and English AP exams receive $100 per qualifying score, in addition to the new KEES feature that rewards AP qualifying scores. These incentives are but part of the solution to attracting students to these rigorous courses.

The relationship among the NMSI "Elements of Success" has contributed to this progress. Piecemeal steps, adopting just one or two elements at a time, won't lead to exponential gains. But if we relentlessly expect that more high school students can master college-level learning—and provide coordinated support and incentives for students and teachers—high expectations seem justified. This early, disproportionate impact by just 12 schools demonstrates that.

AdvanceKentucky is an initiative of Kentucky Science and Technology Corporation (KSTC), one of only six non-profit partners across the country implementing NMSI's "Elements of Success" for math, science and English AP programs.

Kentucky became a partner in this highly competitive process through collaborative efforts across state government and with community leaders. With years already invested in improving education in Kentucky, our schools and leaders were well prepared to further develop their AP programs. They were not satisfied with incremental gains.

The Advance-Kentucky public high schools are Anderson County, Barren County, Corbin, Henderson County, Marion County, North Laurel, South Laurel, Lone Oak and Reidland in McCracken County, Scott County, Shelby County and Warren East. The AP exams in May will be the first time these schools will have experienced a full year under the AdvanceKentucky initiative.

The next cohort of AdvanceKentucky schools will be announced soon—they too are not satisfied with incremental gains. All of these schools bear watching. closely.

From Joanne Lang, Executive Director of Advance-Kentucky and Executive Vice President of the Kentucky Science and Technology Corporation; originally published in the Feb. 4, 2009, edition of the Lexington Herald-Leader.

On April 2, 2009, in a briefing before the Kentucky Board of Education, AdvanceKentucky announced 15 new participating schools. The schools listed below will join 12 others already implementing the "Elements of Success" supported by the National Math and Science Initiative.

Bellevue
Bowling Green
Bryan Station
East Jessamine
Franklin-Simpson
Graves County
Highlands
Hopkins Central
Johnson Central
Madisonville North Hopkins
Montgomery County
Paintsville
Powell County
Warren Central
West Jessamine

AdvanceKentucky has launched the next cycle of selecting schools to participate in the NMSI Advanced Placement Teacher Training and Incentive Program (APTIP), beginning with activities associated with the 10/11 academic year. Public high schools are invited to apply to participate in AdvanceKY. Visit the AdvanceKentucky website for more information and to download application materials. APPLICATION DEADLINE: MAY 29, 2009.

http://advancekentucky.com

KY Girls STEM Collaborative Annual Conference & Workshop

The Kentucky Girls STEM Collaborative will host its First Annual Conference on June 15, 2009, 8:30 a.m. until 3:30 p.m., at the Hyatt Regency in Lexington. Speakers include Eleanor Jordan, Executive Director of the KY Commission on Women, and Jo Sanders, gender equity author and consultant.

The group will also host a workshop for science educators on June 16th and a "Girls Day Out" for middle and high school girls on the same day. The workshop for teachers will be held at the University of Kentucky Student Center; students will tour UK and visit surrounding industries. There is no cost for this event and lunch will be provided. If you have any questions, please contact Carol Hanley at chanley@uky.edu or Sue Scheff at suescheff@uky.edu.

For more information or to register for either event, please visit http://www.ngcproject.org/events/conferences.cfm.

Mahan continued...

Five squirrel/rabbit sized Havahart live traps and 10 Sherman traps were placed around each mound and set in the exact same arrangement at the non-mound site. The mound and corresponding non-mound site each had two remote cameras facing the monitored site from opposite sides. Cameras were initially set to take three rapid-fire sequence pictures when the motion sensor was activated and one time-lapse picture every one-half hour. Motion sensor photographs captured anything that moved in front of the camera. To increase bracketing of targets, the cameras were later set to take five pictures when tripped. Cameras were set to take time lapse photos to increase the chance of capturing vertebrates that were either too small or cold blooded to trip sensors. In total, almost 31,000 remote camera photographs were taken during this project. Data have been entered and we are beginning statistical analysis. The number total of animals captured in traps by class were: 16 birds, all crested francolins; 2 reptiles, both great plated lizards; 5 mammals, including 1 hedgehog, 3 common genets, and 1 unstriped ground squirrel. In addition, more than 260 animals were captured on cameras. We are currently correlating species to mound characteristics and comparing likelihood of appearance of animals at mounds to appearance at the random sites.

Cattle, domestic dogs, and humans were occasionally problems. Some photos were of humans and their livestock, but this represents the way the landscape is used. We believe that their presence was extremely influential on the occurrence, or lack thereof, of some of the native fauna, which we had previously seen signs of before the cattle arrived. An important aspect of international research is the cultural experience it offers students. WKU encourages international experiences such as these. The opportunity to live among local communities and with local families is transformative. In addition to her research, Ms. Mahan guest-taught at two local primary schools, describing the ecology of the local small wildlife, which is poorly known by the children. She also presented information on reptile conservation at a village meeting and undertook learning basic Kiswahili.

Figueirinhas continued...

A total of 74 sequences have been obtained and the complete sequence for the intron 7 of the β-fibrinogen gene has been reconstructed successfully for 49 individuals.

Currently, a total of 17 polymorphic sites have been found in the intron sequence, which has a length of 632 base pairs. One unique haplotype has been found for the island of Berlengas. Heterozygotic individuals were found in the populations of Berlengas, Farilhões, Peniche and Baleal.

A total of 9 distinct haplotypes have been found so far in the populations of *P. carbonelli*. The remaining samples are still being processed and the data are still under analysis.

III. Summary

The homogeneity of the mitochondrial sequences obtained in this study revealed that both island and mainland populations have the same mtDNA diversity as only one haplotype was found for each of the two regions analyzed.

The nuclear intron under analysis seems to reveal a distinct scenario as there is sequence polymorphism present in all the populations analyzed. Furthermore, some of the haplotypes appear to be unique of certain populations.

This suggests that the species might inherently have a low mitochondrial DNA diversity and only one mtDNA lineage is present in the populations sampled. Furthermore, the presence of variation in the nuclear intron under study might also suggest that this region has a higher mutation rate than any of the other regions analyzed in the mtDNA.

The next step in this study will be to quantify the genetic diversity found and determine the genetic structure of each of the populations under analysis. This will allow us to determine whether the geological events that took place in the study region influenced the genetic structure and diversity of the existing populations.

IV. Final Budget

a) WKU Biotechnology 3130 ABI SEQUENCER use - $447.70
b) Sequencing cleaning column - $2.50
c) Promega PCR cleaning kit - $322.01
d) Primer sequences - $111.50
e) ABI sequencing reagents - $281.80