



Kentucky Academy of Science

NEWSLETTER

*The Voice of Science
in Kentucky*

<http://www.kyscience.org>

Susan Templeton, Editor

August 2008

From the President...

It has been both an exciting and rewarding year to be serving as President of the Kentucky Academy of Science (KAS). Over the past 12 months, KAS hosted a very successful annual conference at the University of Louisville, published (and made available electronically) two issues of the KAS Journal, published (with enhanced coverage of science activities around the Commonwealth) three issues of the KAS Newsletter, and made nominations to Governor Beshear who then appointed these individuals to several important science-related advisory positions. Most importantly, however, KAS has changed the way in which individuals can now become members of the Academy. With our new Enhanced Affiliates program, any faculty member or student at an Enhanced Affiliate institution can become a member of KAS at NO additional charge. Many of Kentucky's colleges and Universities have already become enhanced affiliates (see listing at left). This change, which will enable KAS's membership to grow significantly, is important to scientists and science students in Kentucky as it will provide them with a "voice" to help shape the future of science in the Commonwealth.

Why is it important that you have a voice? Kentucky, like the U.S. itself, is struggling economically and is trying to find its place in the new world order. Strong science will play an important role in the economic future of the U.S. It is not clear, however, that the United States is making the kinds of investments in the scientific infrastructure and human resources that will ensure our continued world leadership. Particularly troubling is the level of development of human resources in science, technology, engineering and mathematics (STEM) areas.

At the high school level, the Program for International Student Assessment (PISA) of students in 29 industrialized countries places U.S. 15-year-olds at 21st and 24th in science and math achievement, respectively. At the undergraduate level, the Organization for Economic Cooperation and Development lists U.S. student attainment of science bachelors degrees far below countries such as China, Finland, France, Korea and Germany. Finally, while the U.S. has the world's finest graduate programs, nearly 40% of the students enrolled in these programs are not U.S. citizens. While the science pipeline has been problematic for many years, what is changing dramatically and rapidly is that new STEM employment opportunities are appearing in other countries. STEM graduate students from other countries who once had no option but to remain in the U.S. and therefore aid the U.S. economy now have the opportunity to return to their home countries to pursue STEM careers. These individuals will, of course, now be our competitors.

Where does Kentucky stand economically and in terms of science capacity and human resources? Unfortunately, Kentucky lags behind most states in all these areas. If Kentucky hopes to become more competitive, the Commonwealth needs to rethink the educational strategy it has employed. For the past decade, Kentucky has emphasized increasing the number of Kentuckians with college degrees. While important, it is not only about how many Kentuckians have college

Continued on page 2

Enhanced Affiliates

- Berea College
- Centre College
- Eastern Kentucky University
- Kentucky Science and Technology Corporation
- 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

- Bellarmine University
- Brescia University
- Campbellsville University
- Kentucky State University
- Third Rock Consultants

Member - \$250 level

- Asbury College
- CEM Corporation
- Kentucky American Water Company
- Kentucky Wesleyan College
- Lindsey Wilson College
- Madisonville Community College
- Thomas More College
- University of the Cumberlands
- West Kentucky Community & Technical College

Associate Member - \$100 level

- Hoffman Environmental Research Institute
- Pikeville College
- Wood Hudson Research Laboratory

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

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Executive Director Updates

KAS Enhanced Affiliate Membership Opportunities

KAS is pleased to announce Centre College and the University of Kentucky are now enhanced affiliates! The new KAS Enhanced Affiliate Program is providing a great opportunity for many current and future scientists in Kentucky. If you are associated with a KAS enhanced affiliate, please make sure your colleagues are aware of this program and encourage them to take advantage of a complementary KAS annual membership.

If you are a current KAS member associated with an enhance affiliate and are in the database with an email suffix for your institution, your membership has been automatically updated to an enhanced membership and no action is required. If you are a current KAS member at an enhanced affiliate and are listed in the database with an email address not affiliated with your institution, please log into www.kyscience.org, visit your profile page, and update your email address to your institution's email format.

If you are not currently a member, joining KAS is simple and quick to complete! Visit the KAS website www.kyscience.org and click on the Join tab on the top of the page.

- Select Join and Pay Online (enhanced members will not be asked for payment)
- Select Yes to Enhanced on Join as Member Page and click Submit
- Supply your Institution/organization email address (you must use your Institution/organization email address for enhanced memberships) and click Submit
- Provide information on the Join as Enhanced Member Page and click submit.
- Please note the enhanced membership includes electronic access to the JKAS via the KAS webpage; if you would like a printed copy of the journal mailed to you select the \$20 payment option.

Note: Please make sure your Java Script is enabled; please use numbers/letters for passwords. Note MAC Safari users: The functionality of the KAS website site works best when viewed with Firefox, IE, Netscape or Opera. Please activate your account as soon as you receive the message to do so. You will NOT be able to register for the 2008 KAS Annual Meeting, view the journal, or access other membership benefits until you activate your account.

If you have questions, please contact Jeanne Harris, KAS Executive Director, at executivedirector@Kyscience.org or 859-227-2837.

KAS Membership Approves Changes to KAS Constitution

The KAS membership has approved the addition of the membership category Friends of KAS to the Constitution as listed below.

Section 6. Friend of KAS. A Friend of KAS shall be an individual who has made a contribution that promotes the progress of science in our Commonwealth. They shall enjoy all the privileges of active membership except holding office and shall be free from all dues. The list of Friends will be reviewed and amended as needed by the KAS Governing Board at the winter governing board meeting.

The KAS membership has also approved the following change to Section 5, Honorary Member of the KAS Constitution as listed below.

(APPROVED) Section 5. Honorary Members. Honorary

Members shall be persons who have acquired national or international renown in science. They shall enjoy all the privileges of active membership except holding office and shall be free from all dues. The list of Honorary KAS members will be reviewed and amended as needed by the KAS Governing Board at the winter Governing Board meeting.

(Replaces the following: Honorary Members shall be persons who have acquired national or international renown in science. They shall enjoy all the privileges of active membership except holding office and shall be free from all dues. The number of Honorary Members shall not exceed twenty at any time.)

The 94th KAS Annual Meeting Reminder

The 94th KAS Annual meeting is right around the corner—it is a little earlier this year!! As in past years, you will be able to pre-register for the meeting online or by mail. Registration fees are unchanged from 2007; KAS member registration fee is \$30, \$55 for non-members, and \$5 for students. Please pre-register and take advantage of the discounts; if you register after October 8, the rates increase to \$45 for KAS members, \$65 for non-members, and \$10 for students \$10. Contact me if you have questions regarding the meeting registrations. If you have questions regarding the paper/poster presentations, please contact Dr. Bob Creek, KAS Annual Meeting Program Coordinator at robertcreek@bellsouth.net or 859-623-6646.

Lastly, exhibitor space for the KAS Annual Meeting is still available. If your organization is interested in exhibiting please contact me as soon as possible.

I always look forward to seeing everyone at the Annual Meeting.

Best wishes,

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

From the President...continued.

degrees; it is about how well prepared and well educated Kentuckians actually are. If we are to catch and surpass other states, Kentucky must not only increase its number of college graduates (a goal most states now have) but must work to see that each student attains his or her true potential - meaning that many Kentuckians can and should be attaining advanced degrees. More highly educated graduates will enable Kentucky to compete for better and higher paying jobs and industries.

We all know that change must occur if Kentucky is to make economic headway relative to the other 49 states. It is the responsibility of each of us to help Kentucky improve the quality of education in the Commonwealth and, working collectively, we can make the needed improvement happen. I believe that KAS has an important role to play in bringing together the needed expertise to help Kentucky develop a successful STEM strategy for the state. I encourage all those interested in the future of Kentucky to become members of KAS to ensure that there is a strong "Voice of Science" in the state and to work to ensure that this voice is heard by the leadership of the Commonwealth.

John Mateja

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
- Social & Behavioral Sciences Representative
- Physical Sciences Representative

Any member may nominate another member for Vice President. However, for Social & Behavioral Sciences and Physical Sciences representatives, the nominators must identify with those Divisions. Please send nominations by September 15, 2008 to:

David Olson, Chair
KAS Committee on Nominations and Elections
150 University Bldg Box 687
Morehead State University
Morehead, KY 40351
(606) 783-2987
d.olson@moreheadstate.edu

Call For Papers

The *Journal of the Kentucky Academy of Science*, now in its 68th year, is published through Allen Press each spring and fall and is abstracted through BioOne. The *Journal* publishes peer reviewed articles from all disciplines within the Academy. Turnaround time usually is six months or less, and page charges (\$35/page) are very reasonable. The *Journal* accepts regular articles (12-20 manuscript pages), scientific notes (2-5 pages), and Letters to the Editor. The *Journal* also seeks series of manuscripts that result from special workshops or conferences. In these cases, a special editor may be appointed. All manuscripts should be sent to:

David White, Editor J-KAS
Hancock Biological Station
561 Emma Drive
Murray, KY 42072

Instructions for authors can be found at www.kyscience.org. Please e-mail the editor at david.white@murraystate.edu or call 270-474-2272 or for more information.

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 five areas designated below. September 19th, 2008, 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:

Nancy Martin, Chair
KAS Committee on Awards
Professor of Biochemistry and Molecular Biology
Louisville, KY 40292
502-852-5226
nancymartin@louisville.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 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.

Notice: The Kentucky Academy of Science Newsletter is seeking articles and announcements of interest to our readers. If you would like to share information about science-related projects, organizations, or upcoming events, please send it to Newsletter Editor Susan Templeton at susan.templeton@kysu.edu. The deadline for submissions to be published in the January 15, 2009 issue is December 15, 2008.

2008 Annual Meeting Tentative Agenda

KENTUCKY ACADEMY OF SCIENCE 94th ANNUAL MEETING

October 31- November 1, 2008

University of Kentucky

Lexington, KY

FRIDAY, OCTOBER 31, 2008

11:00 a.m. - 2:00 p.m.	KAS Governing Board Meeting	Student Center
4:00 p.m. - 5:00 p.m.	KAS ANNUAL BUSINESS MEETING	Student Center
5:30 p.m. - 7:00 p.m.	Registration	Student Center
6:30 p.m. - 8:30 p.m.	SYMPOSIUM: The Status of Education in Kentucky	Student Center
8:45 p.m. - 9:15 p.m.	KAS Sectional Officers Meeting	Student Center
8:30 p.m. - 10:00 p.m.	Social	Student Center Small Ballroom 3rd Floor

SATURDAY, NOVEMBER 1, 2008

7:30 a.m. - 5:00 p.m.	Registration	
8:00 a.m. - 5:00 p.m.	Vendor's Exhibits	White Hall Classroom Building 2nd Floor
8:00 a.m. - 11:30 a.m.	Paper Sessions (with concurrent sessions if needed)	White Hall Classroom Building 2nd Floor
8:00 a.m. - 11:30 a.m.	Scientific Posters on Display (Session 1)	Student Center Grand Ballroom
9:00 a.m. - 10:30 a.m.	Judging of URC Posters	Student Center Grand Ballroom
10:00 a.m. - 11:30 a.m.	Kentucky Community Colleges Faculty Meeting	White Hall Classroom Building 2nd floor
11:30 a.m. - 12:45 p.m.	Lunch (on your own)	
11:30 a.m. - 12:30 p.m.	KAS Past President's Luncheon	
1:00 p.m. - 4:00 p.m.	Paper Sessions (with concurrent sessions if needed)	White Hall Classroom Building 2nd floor
1:00 p.m. - 5:00 p.m.	Scientific Posters on Display (Session 2)	Student Center Grand Ballroom
1:30 p.m. - 3:00 p.m.	Judging of URC Posters	Student Center Grand Ballroom
4:15 p.m. - 5:15 p.m.	PLENARY SESSION: Cave Microbiology/Ecology	Student Center Theater
	Speaker	Dr. Hazel A. Barton Ashland Endowed Professor of Integrated Science at Northern Kentucky University
6:00 p.m. - 7:00 p.m.	Presidential Reception	Hyatt Regency
7:00 p.m. - 9:00 p.m.	ANNUAL AWARDS BANQUET	Hyatt Regency
	Speaker	Dr. Roger Quinn Director of the Biologically Inspired Robotics Lab at Case Western Reserve University

2008 Society of Kentucky Lepidopterists Meeting

The Society of Kentucky Lepidopterists is a group of about 100 professional scientists and amateur enthusiasts dedicated to the study of the butterflies and moths of the Commonwealth. The members of the society are pleased to have their 35th Annual Meeting in conjunction with the Kentucky Academy of Science. All KAS attendees are invited to examine the UK Entomology Collections in the Agriculture Building on October 31 and in the morning on November 1. Conference goers are also invited to attend the oral presentations hosted by the Society of Kentucky Lepidopterists on November 1. There is no additional registration fee for attending the Kentucky Lepidopterists meeting, but if people would like to join the Society, annual membership is available for \$12. For more information about the Society or a membership application form, the Society web site is: <http://www.kylepidopterists.org>.

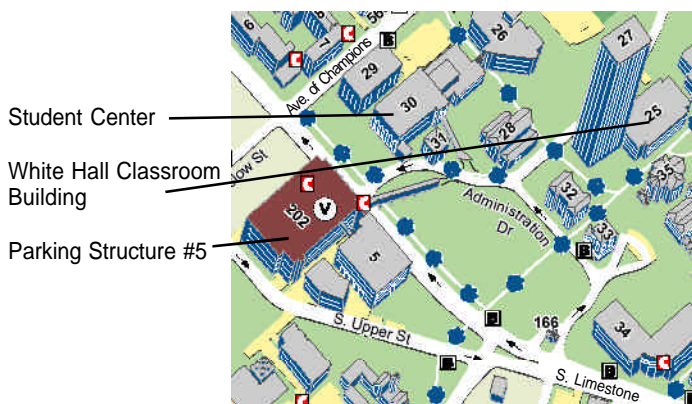
2008 KAS Annual Meeting Information

Driving Directions and Parking Information

Friday: Friday: Park at your hotel and walk, or park at the PARKING STRUCTURE #5 on Limestone. This is across the street from the Student Center. Drive in and obtain your parking tag. Take the tag with you to be exchanged for a free parking pass when you register or when you attend any of the KAS events. The parking garage will be open to 10 PM to drive in and out. This is the only free place to park and not get a ticket.

Saturday: Free parking for KAS members in PARKING STRUCTURE #5 across from the Student Center on Limestone Street. Take the foot bridge from parking lot over Limestone to the Student Center where posters are displayed (approximately 100 feet) and the Classroom Building where oral presentations will be held (approximately 300 feet).

A detail is shown below from the UK campus map available at www.ppd.uky.edu/campusmaps/2008_visitor_map.pdf.



Deadlines

September 30, 2008 is the last day to submit an abstract.

October 8, 2008 is the last day to pre-register for the meeting.

Guidelines for Submitting an Abstract

To submit an abstract for presentation, either oral or poster, go to the KAS website at www.kyscience.org. On the left side of the page click on ANNUAL MEETING then select SUBMIT AN ABSTRACT. This page will allow you to log on as a member or non-member and then to the form for submitting an abstract provided you have pre-registered. YOU MUST PRE-REGISTER PRIOR TO SUBMITTING AN ABSTRACT. If you have not pre-registered, there will be a link to the pre-registration page after which you will return to the abstract submission form to submit your abstract. A change this year is that the presenter or one of the other listed authors must be a member of the Academy. With enhanced affiliates, this requirement should not be a problem for students or faculty, however, if you have any questions, please contact me at robertcreek@bellsouth.net. The poster presentations will be displayed as explained below. You will receive a notice via e-mail that your abstract has been received. The program, upon completion, will be placed on the website at which time you will be able to determine the date, time and location of your presentation.

Guidelines for Poster Presentations

As was done last year, the URC poster presentations will be divided into a morning session and an afternoon session according to sections and will be on Saturday rather than Friday. The submissions of a poster abstract will be done on-line as explained above. The two sessions are as follows:

<u>Sections</u>	<u>Set-up</u>	<u>Judging</u>	<u>Removal</u>
Agr. Science thru Ecology & Environ. Science	7:30-8 a.m.	9 a.m.	11:30-noon
Engineering thru Zoology	12-1 p.m.	1:30 p.m.	5:00 p.m.

Undergraduates not entering the URC, professionals, and graduate students may set their posters up at 7:30 a.m. on Saturday and leave them up for the duration of the meeting.

Guidelines for Power Point Presentations

All presentations should be compatible with Power Point version 2003 and brought on a USB flash drive; the computers will not have CD drives. You must be in the assigned room at least 15 minutes before the sessions is schedules to begin in order to upload your presentation.

Hotel Accomodations and Rates

University Inn Motel*

1229 South Limestone Street; 859-278-6625, 866-661-9676
Rooms: 1 full bed, \$69/night (7 blocked) ; 1 king, \$79/night (10 blocked) ; 2 double beds, \$85/night (33 blocked); reserve by September 30; ask for KAS rate. Free wireless; free continental breakfast; free parking.

Holiday Inn Express*

1000 Export Street (off Virginia Ave.); 859-389-6800
\$79 for first 10 rooms (UK rate); otherwise \$150/night. Free wireless; free continental breakfast; free parking.

Hyatt Regency

401 West High Street ; (859) 253-1234
\$169 per night, one king or 2 double beds

Radisson Downtown

369 W Vine St, (859) 231-9000
\$169 per night, 2 queen beds, 1 king bed, or 1 queen bed
WiFi Internet included

Red Roof Inn Lexington South

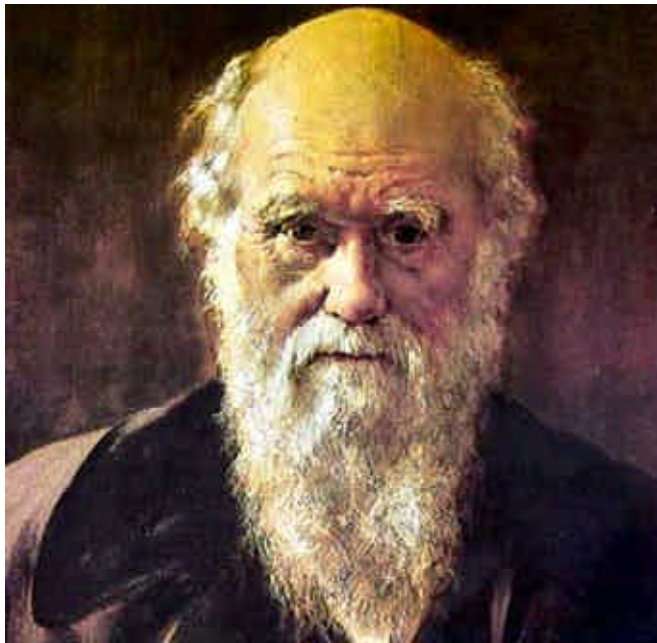
I-75 at SR 922/418, Exit #115/#104
2651 Wilhite Drive, (859) 277-9400
King \$71 w/ internet; 2 beds \$66 w/o internet

Hilton Suites Lexington Green

245 Lexington Green Circle, 859-271-4000
2 double, \$159; 1 king size, \$179

*About a 10-15 minute walk to the Student Center.

Note: Keeneland is in session, so book accomodations early!



Darwin Day Celebration

February 12, the birth date of Charles Darwin in 1809, is officially known as Darwin Day. On or around this date, colleges and universities, along with many other organizations around the world, recognize the contributions of Darwin through celebrations, symposia and other ways. This year is particularly significant as it is Darwin's 200th birthday. There is a Darwin Day Celebration website (<http://www.darwinday.org/>) that highlights many of the events planned for 2009 and provides resources and publicity for Darwin Day events. More information can be found at various websites including The National Center for Science Education (<http://www.ncseweb.org/>).

The Science Education Committee of KAS would like to hear about events planned in Kentucky and throughout the region. Please send any relevant information to Dr. Vern Hicks (hicks@nku.edu), Chair of the Science Education Committee or Dr. Chris Lorentz (chris.lorentz@thomasmore.edu), Committee member. We will be compiling and distributing this information to any interested parties and hope to coordinate all of these events to generate a larger interest in Darwin and evolution.

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.

Mateja to Spend a Year at the National Science Foundation

Murray State University is pleased to announce that Dr. John Mateja, Director of MSU's Office of Undergraduate Research and Scholarly Activity, will be on a one-year assignment to the Division of Undergraduate Education (DUE) at the National Science Foundation (NSF) in Washington, D.C. DUE works to strengthen undergraduate science, technology, engineering and mathematics (STEM) education across the U.S. as well as bridge pre-college and undergraduate education and promote advanced study in STEM fields.

As a DUE Program Director, one of Dr. Mateja's responsibilities will be to oversee proposal reviews in physics for the Course, Curriculum and Laboratory Improvement (CCLI) program. "This is an interesting development," Dr. Mateja said. "While I was Dean of MSU's College of Science, Engineering and Technology, three MSU departments – biology, chemistry, and physics and engineering – were able to secure NSF CCLI awards. Of course, that was seven years ago and the cutting edge has changed," Dr. Mateja went on to say. "This appointment will give me an opportunity to see what faculty around the country are doing to enhance undergraduate education today."

"I'm not surprised the NSF was interested in having Dr. Mateja come to Washington," said Dr. Gary Brockway, MSU Provost. "John is very active in the undergraduate education community at the state and national levels. He serves on numerous boards, including a recent appointment to the Board of Governors of the National Conference on Undergraduate Research. In early April, he chaired the Southern Association of Colleges and Schools Quality Enhancement Plan (QEP) committee for the University of Houston. He was invited to chair this committee because undergraduate research was the focus of the University of Houston's QEP."

The National Science Foundation is an independent federal agency created by Congress in 1950 "to promote the progress of science..." With an annual budget of about \$6.06 billion, the NSF is the funding source for approximately 20 percent of all federally supported basic research conducted by America's colleges and universities. In many fields such as mathematics, computer science and the social sciences, NSF is the major source of federal backing.

Dr. Mateja's appointment will begin in August.

From Jody Cofer, Murray State University

Funding request deadline for all programs: November 15, 2008. 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
Water Quality/Environ. Toxicology
218 Atwood Research Center
Frankfort, KY 40601
Office: 502-597-6005
Fax: 502-597-6381
E-mail: george.antonious@kysu.edu

Science Across the Commonwealth

The View from CPE: Advancing STEM in Kentucky: Be Involved!

Dr. Jim Applegate
Vice President for Academic Affairs
Ky Council on Postsecondary Education



In the last issue, I shared some of the Kentucky STEM (Science, Technology, Engineering and Mathematics) initiatives in place to connect P-20 educational efforts across the Commonwealth. Since then, the 2008 Kentucky General Assembly enacted legislation we now refer to as Senate Bill 2 to further the recommendations of the Council's 2007 STEM Task Force Report (www.cpe.ky.gov). The Council is now charged with facilitating further work with STEM educators, government and the economic development community to respond to Kentucky's STEM pipeline and workforce needs. SB2 mirrors the recommendations of the 2007 Task Force Report calling for a business plan by the end of the 2008 defining implementation and funding strategies. Given the work already conducted, the TF will work with stakeholders to review the recommendations and contribute suggestions to move the agenda forward. Dr. Lee Todd, University of Kentucky President and Deborah Clayton, Commissioner, Department of Commercialization and Innovation, Kentucky Cabinet for Economic Development are serving as Chair and Co-Chair. The membership of the task force and updates on its work will be posted on the CPE website (www.cpe.ky.gov). Input of KAS members is welcome.

Also, in the last issue, I described the successful launch of Kentucky's Project Lead the Way (PLTW). The Council secured funding for this nationally recognized middle/high school program that prepares students for college majors and careers in the STEM disciplines. We collaborate with the Kentucky Department of Education and the private sector in delivering this program. The University of Kentucky serves as the PLTW national affiliate preparing teachers and students for engineering and engineering technology postsecondary education. Being the national university affiliate requires implementation and adherence to rigorous data collection and research efforts which focus on sustained success. UK's College of Engineering has accepted the challenge, expanding the development beyond teachers to include school district decision makers and career counselors. More than 94 Kentucky schools have registered for PLTW with over 50 teachers participating in the 2008 Summer Institute. Both teachers and students are experiencing renewed interest by the PLTW curriculum in pre-engineering which uses an applied approach to learning. The national program also has developed a Health Sciences curriculum and is working on a similar curriculum for Energy Education. Engineering, health care and energy are all areas of high workforce need in Kentucky. I again urge each of you, whether in postsecondary or P-12 sectors, to consider implementing PLTW in your area if it is not already there. For additional information on the program contact the College of Engineering at the University of Kentucky or Henry Lacey at the Kentucky Department of Education. You may also want to check out the website at <http://www.engr.uky.edu/outreach/PLTWinfo.html>.

The \$13 million National Math and Science Initiative (NMSI) administered by the Kentucky Science and Technology Corporation (KSTC) under the name of "Advance Kentucky" continues working to dramatically expand Advance Placement course offerings in math, science, and English across Kentucky. It is focused on schools that might not otherwise be able to make AP opportunities available to students. With rigorous courses taught by master teachers and a parent leadership component the program is putting all the pieces together to ensure that more students not only take AP courses but successfully complete them for college credit. Check out the schools currently involved and see how you can support expanded science AP opportunities for students across Kentucky at the KSTC web site (www.kstc.com).

On July 14, Kentucky Space (www.kentuckyspace.com), supported by the Kentucky National Guard and the Department of Homeland Defense, successfully launched from the Bowling Green/Warren County Regional Airport a high altitude balloon to the edge of space. Students of all ages participated, some launching payloads retrieved for inspection to determine how increased altitude may impact their belongings, others being awed just to witness the event. The student excitement of being a part of a space program was phenomenal. A part of the Kentucky Space Consortium, the Kentucky Science and Technology Corporation works with engineering colleges across Kentucky to interest and teach STEM disciplines through innovative space exploration. Students of all ages have been attracted to the Kentucky Space Enterprise activities. If you would like to see how your students might be involved in Kentucky's work to launch small payload satellites into space and high altitude balloons while attracting top students into science careers, check out the site.

These are tough budget times at every level. However, as I hope what I have been sharing here makes clear, Kentucky is not declaring any hiatus on its efforts to advance STEM education and workforce development. We cannot. Our future economy depends on educating and attracting to the state people in STEM careers who will drive entrepreneurship and wealth creation in the Commonwealth. As always, thanks to the member of KAS for your contributions to this work. Should you have other ideas about furthering STEM educational efforts in Kentucky, please contact us at the Council on Postsecondary Education.

One final note that may or may not be of interest to you but will be important to our work at the Council to support you. Governor Beshear recently announced he is restructuring to returning things to the way they were in the Patton administration when reform was first launched so that the Council has a direct line of communication with the Governor's office. We are working with Governor Beshear in the development of a strong agenda for postsecondary education (and STEM!) and believe this direct relationship will better support that work.

Science, Technology, Engineering, and Mathematics (STEM) Summer Programs at Kentucky State University

According to Dr. Charles H. Bennett, Dean of the Kentucky State University (KSU) College of Mathematics, Science, Technology, and Health, KSU's commitment to STEM initiatives extends beyond the traditional school year and enrolled student body. The College also conducts summer programs targeting wider audiences.

The **Louis Stokes Alliance For Minority Participation (LSAMP) Summer Bridge Program** for rising 11th and 12th grade students is designed to increase the number of minorities pursuing careers in science, mathematics, engineering, and technology. Program components include inquiry-based physical and biological science workshops as well as presentations, tours, and field trips.

Eighteen students participated in this program in 2007 and twenty-three took part in 2008. Participating students live on campus during the three-week program and receive a weekly stipend. Applicants must have overall and math/science GPAs of at least 3.0 and an ACT score of at least 20. You may contact Dr. Kazi Javed, Associate Professor of Chemistry and LSAMP Coordinator (e-mail kazi.javed@kysu.edu) for information on the 2009 program.

This program is funded by the National Science Foundation through the Kentucky-West Virginia LSAMP.

A **Workshop on Techniques in Molecular Microbiology** was offered June 9-11, 2008, for Franklin County K-12 teachers. This non-residential workshop was sponsored jointly by the National Science Foundation, Kentucky State University, and the Franklin County Public Schools. Understanding molecular technique is essential to understand the molecular aspects of many biological sciences including Microbial Ecology and Environment.

Dr. Narayanan Rajendran, an Assistant Professor in Biology at KSU, conducted the program where experts from Indiana State University and KSU presented technical seminars in molecular techniques and methods. Teachers also learned about nanobiotechnology, emerging educational technology for student learning, and instruction and innovations in the context of molecular microbiology and in inquiry-based learning. This ultimately helps them to expose Franklin County's youth to higher scientific thinking. Workshop participants also received a lab manual with research methodology information, 1.8 Continuing Educational Units (CEUs), and a \$300 stipend.



LSAMP Summer Bridge Program students and mentors tackled a rocky hillside on a field trip to Red River Gorge in 2008.



In 2007, science teachers counted macroinvertebrates to calculate stream diversity during the Environmental Education Workshop.



Franklin County teachers learned hands-on lab techniques at the 2008 Workshop on Techniques in Molecular Microbiology.

The **Kentucky State University Summer Environmental Education Workshop** is designed to encourage middle and high school science teachers to incorporate environmental topics and issues in their school curriculum. Forty-two teachers attended the 2007 Workshop focusing on Stream Ecology, and fifty-two attended the 2008 Workshop focusing on Suburban and Urban Ecology. This year's attendees represented schools from over fifteen Kentucky counties.

The week-long workshops are offered in July. They include classroom and field experiences, and integrate technology such as digital photography, GPS and GIS into data collection and presentation activities. In addition to equipment and materials kits for their own classrooms, participating teachers also receive stipends for both the summer workshop and a one-day fall follow-up workshop. The fall workshop allows these teachers to share their implementation results with others. Travel expenses are included in both stipends. In their 2008 evaluations, participants rated how prepared they felt to apply the information at 4.7 on a 1 to 5 scale.

This program is funded by a grant from the United States Department of Agriculture and is coordinated by Dr. Kazi Javed, an Associate Professor of Chemistry at KSU. You may contact Dr. Javed via e-mail at kazi.javed@kysu.edu for more information.



KSU is an 1890 Land-Grant Institution. One way in which the Land Grant Program (LGP) carries out its mission of research, service, and teaching in the food and agricultural sciences is by providing quality summer programs, including four STEM-related programs that have been nationally recognized. Collectively these programs are called COLTS (Creating Opportunities for Leadership Transformation and Scholarship).

These programs provide educational opportunities to student leaders from the 5th grade to the 12th at no cost to the participant. According to Jason Couch, LPG State Specialist for Innovative Learning, "The KSU Land Grant Program has established these programs and curriculum to meet, exceed, and assist the needs of our future leaders and school districts. The participants of these programs have received great insight into educational and career possibilities. They have also been given an array of tools to help build their and our futures."

The KSU Land Grant Program initiated the *Pathways and Access to Careers in Technology (PACT)* program in the summer of 2006. PACT is a week-long residential summer program for students completing fifth, sixth and seventh grades. The program focuses on exposure of participants to science, technology, engineering, and math applications. A problem-based learning curriculum is implemented in the program which fosters critical and creative thinking in group and individual projects. This method is supported by current research as one of the most effective teaching methods in math and science for middle school learning goals.



Grade 7 PACT students were amazed by the insect world.

The PACT Program provides hands-on experiences tailored to each grade level based on Kentucky Department of Education benchmarks. The participants, of whom there are approximately 130, are guided through the experience by professional educators certified in science, math, or technology, and by college students selected through a competitive application process. Each grade level is given a challenge for the week; activities are designed to allow the participants to collect data to meet and solve the challenge. By the end of the week each group of students has created a final product and a PowerPoint presentation explaining the process used to solve the challenge.

The PACT Program is provided at no cost to the participant and their family. To be added to the mailing list please e-mail Rachael Steward at pact@kysu.edu with your mailing address and the student's 2008/2009 grade level.

The KSU *Summer Transportation Institute (STI)* is hosted by the Land Grant Program's Office of Educational Outreach. Funding from the Federal Highway Administration, Kentucky Transportation Cabinet, and in-kind support from the KSU Land Grant Program make STI a successful enhancement for Kentucky's college-bound high school students.

The format of the program centers on exposing students to the range of careers available within the field of transportation. A large factor in its success is the residential aspect. Students experience living on a college campus for four weeks. The schedule allows students to work at an intense level to fully grasp the concepts presented and set goals based upon their new interests.

The 2008 STI schedule included hands-on projects, math workshops, writing components (a research paper and newsletters), as well as in-state and out-of-state field trips. The impact of these activities on the students was great due to the high quality staff and volunteers that worked with the students throughout the program. Professional educators, engineers, government employees and model college students were recruited to be role models for the participants. For more information contact Rachael Steward, STI Program Director, at 502-597-5585 or e-mail rachael.steward@kysu.edu.



A REAP Intern in Nutrition Research analyzed salt content of smoked paddlefish meat.



Robot construction was one of the hand-on projects tackled by this STI student.



AgDiscovery students got up close and personal with the elephants at the Louisville Zoo.

The *Research and Extension Apprenticeship Program (REAP)* was founded in 1989 by Dr. Harold Benson, Director of the Land Grant Program. The REAP Program was designed to provide a summer of learning to motivated high school students who were interested in gaining first hand experience in various fields of agriculture and natural resources. Interns are chosen to participate because of their high academic achievements and their interest in pursuing careers related to biology, chemistry, physics, agriculture, medicine and related majors. This year's 21 Interns experienced life as a college student by living, learning, and working for six weeks on the KSU campus. The REAP Interns participated in experiential learning, conducting laboratory/field research with a researcher acting as their mentor. These Interns were required to give a PowerPoint presentation at the end of the program.

The REAP Interns also participated in community service projects and attended educational lectures and workshops during the evening, and classes on Fridays. On weekends, Interns took field trips to the Cincinnati Zoo, The National Underground Railroad Museum, small farms tours, the Kentucky Horse Park, and Mammoth Cave. The interns also visited Walt Disney World's Epcot Center. At an exhibit called The Land, the Interns were exposed to new innovative ways of growing the same types of fruit, vegetables and fish they themselves had been doing research on.

For additional information contact John Walker, REAP Program Director, at 502-597-6172 or john.walker@kysu.edu.

The LGP's *AgDiscovery Program (AgD)* is a 2-week residential summer program that targets students 12-16 years of age who are interested in learning more about animal science and/or veterinary medicine. The sixteen students chosen to participate in AgDiscovery this year gained experience through hands-on labs, workshops, and field trips. Locations visited this year included Churchill Downs, Kentucky Down Under, the Gainesborough-Darley Horse Farm, the Woodford Equine Hospital, the Louisville Zoo, the University of Kentucky Sheep Unit, the Ripleys Believe-It-Or-Not Aquarium in Gatlinburg, Tennessee, and the University of Tennessee College of Veterinary Medicine.

Students also participated in character- and team-building activities and diversity workshops. The cost of tuition, room/board, and lab supplies for the program is covered by the KSU Land Grant Program and the USDA Animal and Plant Health Inspection Service's Veterinary Service; students are only responsible for their transportation to and from the University. For more information contact Cicily Smith, AgDiscovery Program Director, at (502) 597-6799 or email her at cicily.smith@kysu.edu.

Contributors Dr. Charles Bennett, Dr. Narayanan Rajendran, Dr. Kazi Javed, Jason Couch, Rachael Steward, John Walker, and Cicily Smith, Kentucky State University

Preliminary Results of KAS Advanced Placement Survey

At the spring KAS Governing Board meeting, Board members expressed concerns about an increased emphasis at the state level on Advanced Placement (AP) courses in high schools as a means of promoting careers in STEM disciplines. Some educators feel that this will encourage students to enter these fields by reducing the number of courses taken at the college level and by providing more challenging courses at the secondary level. However, many colleges and universities are reluctant to allow students to bypass their introductory course for science majors as that course provides the background and the laboratory experiences necessary for subsequent courses. Recent studies at the national level support this concern:

- Study Faults Advanced-Placement Courses (*The New York Times*)¹
- High school AP courses do not predict college success in science (*Harvard University Gazette*)²

Kentucky colleges and universities have different ways of handling AP credit. The KAS Science Education Committee was asked to conduct a survey to determine how colleges and universities across the state handle AP credit and to try to determine how well students with AP credit handle the curriculum required for science majors. Two survey instruments were developed, an institutional one and a departmental one. The surveys were sent via email to Kentucky public institutions and to private institutions listed as members of the Association of Independent Kentucky Colleges and Universities. An institution AP survey was sent to provosts and deans of science colleges (24 in all). Separate department surveys were sent to chairs of science departments/divisions (50 in all). The return rate was about 40% for each survey. No surveys were sent at this time to the two-year Kentucky community colleges.

Although all the institutions responding to the surveys accepted AP courses for college credit, assuming the student achieved a sufficiently high exam score, not all accepted AP courses as a substitute for the introductory science courses required for a major in that science discipline. Furthermore, the exam score required and the number of semesters of credit awarded varied from institution to institution; some colleges/universities allowed credit for the lecture but not for the lab. Some specific findings (note that many departments did not respond):

Institutions not allowing AP courses to substitute for introductory courses in the major:

Biology:	Chemistry:	Physics:
Bellarmine	Bellarmine	Bellarmine
Berea	Centre	EKU
Lindsey Wilson	Murray	Thomas More
Murray	U. Cumberlands	U. Cumberlands
Pikeville		
U of L		

Institutions allowing credit for introductory courses in the major: (Minimum AP exam scores in parentheses; two numbers given if higher score required for the second semester.)

Biology:	Chemistry:	Physics:
EKU (3)	EKU (4,5)	NKU (5)
KSU (4)	KSU (3)	Transylvania (4)
NKU (4)	Lindsey Wilson (3)	UK (3)*
Thomas More (3)*	NKU (3,4)	U of L (3)
Transylvania (4)	Pikeville (4)*	WKU (4)
U. Cumberlands (3)	Thomas More (3)*	
UK (4)	Transylvania (4)	
Union (3)	UK (3)**	
	Union (3)	
	U of L (3,4)*	

* no lab credit

** not 2nd semester lab

Some departments advise students who could bypass the introductory course for the major due to their AP experience to forego credit and enroll in the freshman course anyway; these include NKU (biology, physics), Thomas More (biology if exam score of 3, chemistry in some cases), WKU (physics), Transylvania (biology), U of L (all STEM). The reasons given generally are the same given by the institutions not allowing students to bypass the introductory course: lack of specific lab skills, content (especially evolution theory for biology courses), and "bonding" with other freshman students in that major. Other departments find that the AP students do very well in advanced courses after bypassing the introductory course (Lindsey Wilson, Union, U. Cumberlands, Transylvania {after raising the minimum grade to 4, except in biology}). Most do feel that AP courses do a good job of preparing students to take the introductory course for the major.

The Science Education Committee is considering using this information to draft a KAS Position Statement on AP credit, subject to Board approval. If your Institution or Department is not represented in the data above, or if you wish to correct a mistake, contact Vernon Hicks, hicks@nku.edu, (859) 572-5406. We are particularly interested in comments from two-year institutions. The Science Education Committee thanks all who participated in the survey.

*From Vern Hicks, Chair
KAS Science Education Committee*

¹<http://www.hscoop.uconn.edu/docs/NYT20020215.htm>

²http://www.cfa.harvard.edu/msg/ficss/research/articles/Harvard%20Gazette%2002_17_06%20APs%20.pdf

EPSCoR: Helping Build Kentucky's Research Competitiveness

The principle objective of Kentucky's Experimental Program to Stimulate Competitive Research (EPSCoR) is to enable Kentucky's institutions of higher learning to compete more effectively for federal academic research funds. The KY EPSCoR program meets this objective by collaborating with university faculty to competitively win research grants from Federal EPSCoR programs in the fields of science, technology, engineering and mathematics (STEM). Through EPSCoR funding channels, investments are being made statewide in human capital and physical infrastructures necessary to expand the Commonwealth's research capacity and increase the state's research competitiveness and productivity.

Today, seven federal agencies (NSF, NIH, NASA, EPA, DoD, DOE and USDA) sponsor EPSCoR or EPSCoR-like programs, providing over \$400 million annually in support. Twenty-five states, Puerto Rico, and the Virgin Islands are eligible to compete for EPSCoR support.

Funding for Kentucky's EPSCoR program comes primarily from three sources: federal, state and institutional, with the majority (81%) coming from the participating federal agencies. As seen in the chart below, from 2001 to 2008 KY EPSCoR supported 417 projects at 13 of the Commonwealth's universities and colleges.

KY EPSCoR Award Recipients (FY 2001-08)	Total Amount Awarded	Number of Projects
University of Louisville	\$83,854,921	62
University of Kentucky	\$76,011,371	137
Western Kentucky University	\$3,780,768	78
Murray State University	\$3,006,792	44
Eastern Kentucky University	\$1,549,069	21
Morehead State University	\$1,217,217	32
Northern Kentucky University	\$1,015,458	26
Kentucky State University	\$268,771	8
Thomas More College	\$26,611	1
Transylvania University	\$23,516	3
Centre College	\$23,033	2
Bellarmino University	\$21,818	2
Bluegrass Community and Technical College System	\$10,000	1
Total Projects:	\$170,824,916	417

KY EPSCoR's five priority research areas, established by the Commonwealth's Science and Technology Strategy, are broad enough to cover new and diverse STEM ideas. The pie chart at the right lists KY EPSCoR's five priority areas and the amounts that have been invested in each area during the 2001 - 2008 period.

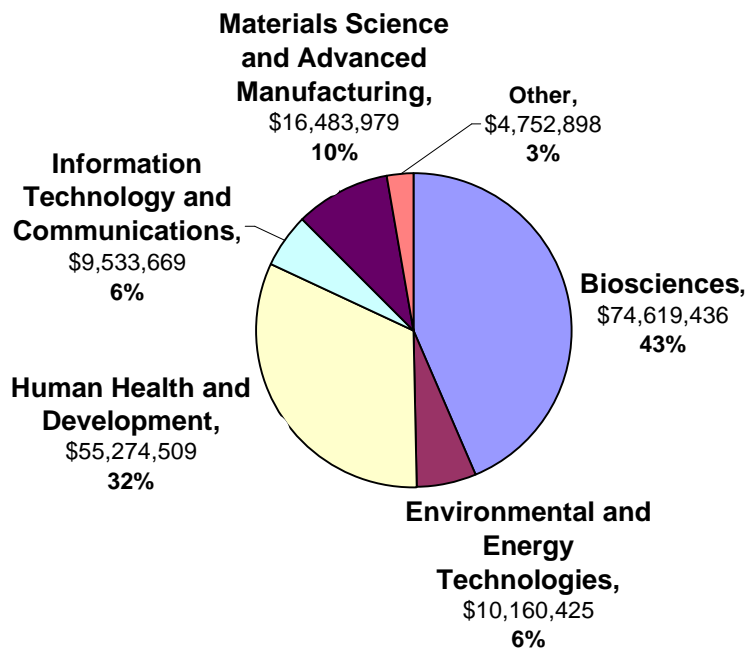
Examples of research projects supported by KY EPSCoR include: 1) University of Louisville's Spinal Cord Injury Center, whose mission is to find successful spinal cord repair strategies in the laboratory and to transfer laboratory advances to clinical settings in a timely fashion, 2) University of Kentucky's Center for

Computational Science, which supports a broad array of computational studies including an investigation to determine how DNA repair systems recognize damage within cells and another study to simulate and predict the optimal atomic structures of nanowires, 3) Northern Kentucky University's medical and environmental applications of cave microbiology, which will enable a better understanding of how microbes use the geochemistry of rocks to fuel the microbes' metabolic activity in harsh environments similar to those found on Mars and the Moon, and 4) Western Kentucky University's Blazar studies, which will enable the science community to better understand the relativistic jets of unusually bright light associated with black holes.

In addition to supporting a broad array of research activities, KY EPSCoR recognizes and supports programs to develop Kentucky's scientific talent. The Research Start-Up Fund (RSF) provides Kentucky's six comprehensive colleges (EKU, KSU, NKU, MSU, MuSU and WKU) with resources to develop attractive start-up packages to enable these institutions to bring research-active faculty to Kentucky. At the undergraduate and graduate level, KY EPSCoR has developed the Research Scholars Program to increase participation of under-represented students in STEM fields.

To learn more about the KY EPSCoR program and about funding opportunities available through the program, please visit the KY EPSCoR web site at www.kyepscor.org.

KY EPSCoR Funding Amounts by Research Focus Area (FY2001-08)



Total Funding (Federal, State, & Institutional) for 417 trackable projects = \$170.8 Million

EKU Environmental Research Institute (ERI) Impacts the Region

Undergraduates, graduate students and community members are receiving a hands-on education in environmental studies through the research activities taking place at the Environmental Research Institute (ERI) at Eastern Kentucky University. Project leader Dr. Alice Jones is instrumental in providing practical and pertinent research opportunities for EKU students that impact their communities.

One example of these engaging ventures is "The Big Dip". In this project, over 30 volunteers and researchers logged over 7,000 miles and collected 900 water samples in southeast Kentucky to assess the health of local rivers and streams. Results show that two-thirds of the samples possess extreme values of pH, conductivity or iron.

"The Big Dip" project kicked off with a four-day environmental field camp at Lilly Cornett Woods preserve in Letcher County. Researchers from three Kentucky universities were joined by nine eastern Kentucky high school teachers enrolled in a summer "Ecology for Teachers" class. Also joining the research were twelve area high school students from Appalshop's Appalachian Media Institute who produced a short documentary film.



High school students learn the art of documentary film-making at the Appalshop Media Institute as conservation biologist Tom Edwards (kneeling) helps "Big Dip" volunteer Andrew Jones of Hazard, Kentucky (seated) identify microinvertebrates collected in a nearby stream.

The ERI was created in 2005 with support from the Kentucky National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR), a state-federal partnership that works to improve the research infrastructure at academic institutions in Kentucky. The EPSCoR program seed-funds research programs with the potential to be self-sustainable in the future via competitive federal grant support. While the EPSCoR investment in the ERI has ended, the Institute continues to thrive with new financial support from a variety of federal, state and private sponsors. (See more at www.kynsfepscor.org/success.html#initiative and www.kynsfepscor.org/success.html#waterquality.) Additionally, other active projects involving the ERI are detailed on the Institute's website at www.eri.eku.edu.



EKU Earth Sciences undergrad Erin Jolly (left) and grad David Diegert retrieve lake chemistry samples at Wilgreen Lake, Madison County, Kentucky.

For information about other KY NSF EPSCoR initiatives and funding opportunities, visit www.kynsfepscor.org.

From Alice Jones, Director, Environmental Research Institute, Eastern Kentucky University

Experimental Program to Stimulate Competitive Research (EPSCoR) 14th Annual Statewide Conference

Cyberinfrastructure - Connecting with the Future

Friday, October 3, 2008
Galt House
140 North Fourth Street
Louisville, KY 40202

On October 3rd, 2008, KY EPSCoR will be hosting its 14th Annual Statewide Conference at the Galt House in Louisville, KY. The conference agenda will explore the importance of Cyberinfrastructure to our state's future research competitiveness.

Prompting the conference theme, the National Science Foundation has asked KY EPSCoR to coalesce the development of a Cyberinfrastructure Strategic Plan for the Commonwealth. Significant federal funding for cyber research and infrastructure development is anticipated. The intent of the plenary session of this conference is to spur thinking about actions Kentucky needs to pursue in preparing itself for the future cyberworld. Moreover, it will focus on how we can take advantage of the quickly evolving cyberworld to increase the Commonwealth's competitiveness in research and other areas of economic endeavor.

In addition to the plenary session in the morning, an afternoon poster session will display ongoing Science Technology, Engineering, and Math (STEM) research being funded through the EPSCoR program. All KY EPSCoR/NIH-IDEA awardees are encouraged to submit an abstract to reserve a spot for a poster presentation of their work.

Following the poster presentations, there will be robust break-out sessions in the afternoon that will report on the myriad research activities ongoing and planned with EPSCoR funding from the various federal agencies.

Please visit the Ky EPSCoR website www.kyepscor.org to register by Monday, September 29, 2008. There is no cost to register or attend this conference. However, space is limited and registrations will be taken on a first come basis.

Parking is available in the hotel's attached, covered garage. Parking stickers will be provided to waive the cost for conference participants. Without the sticker, parking is \$12.00 per night for self-parking and \$18.00 per night for valet parking.

A special room rate of \$125 for single, double, triple, and quad rooms (excluding state and local taxes) is available for conference attendees. To obtain this rate, you must reserve accommodations at the Galt House by Tuesday, September 2, 2008. When calling the reception desk (800-The-Galt or 502-589-5200) ask for rooms reserved under the KY EPSCoR block.

*From Kentucky Statewide EPSCoR Office
859-246-3245
kyepscor@kstc.com
7 August 2008*



Space Science Center Underway at Morehead State University

A new space age has begun. NASA's Constellation program has begun the development of a new series of manned spacecraft and powerful rockets with a goal of returning to the moon, and exploring more distant solar system bodies including Mars. In support of this national initiative, and the new space age, the Ronald G. Eaglin Space Science program at Morehead State University was established in 2004. Since that time, MSU has completed the design and begun construction of a \$15.4 million Space Science Center (SSC) facility that when complete will be a 45,000 square foot state-of-the-art research and development and instructional facility. MSU's Space Science Center will provide a research and educational facility with laboratories for undergraduate students in space science. SSC laboratories support R & D in antenna design, satellite telecommunications, micro/nano systems, and astrophysics.

Ground was broken for the new facility on September 20, 2007 and construction is expected to be complete in April 2009. The facility will house a state-of-the-art Space Mission Control Center, RF and electronics laboratories, an anechoic chamber that mimics the electromagnetic environment of space, a rooftop antenna test range, a digital Star Theater, and ultimately a Class 100/1000 clean room (which will include a micro-nano laboratory and a space systems development laboratory). The facility will serve as an R&D facility for fundamental and applied research with these specialized laboratories, classroom facilities, faculty offices, and undergraduate student research space.

Space Mission Control Center

The Space Mission Control Center will remotely operate the 21 M Space Tracking Antenna, a 13 M antenna system, a 24 ft. antenna system and VHF/UHF antenna systems utilized for satellite mission support and research in radio frequency astrophysics. The 21 Meter radio telescope and satellite tracking antenna, the Center's flagship instrument is engaged in astrophysical research and NASA missions--providing space mission support (telemetry, tracking and control). The 21 M is the primary Earth station for the KySat series of orbiting satellites. All of the Space Tracking systems will be semi-autonomously operated from the center which will schedule satellite passes, acquire telemetry from satellites, and operate the 21 M in radio telescope mode.

The Digital Star Theater

The Star Theater will be a 110 seat multi-function, state-of-the-art digital classroom. This auditorium will have a full dome (360 degree) projection dome with six digital star projectors and surround sound systems. The Star Theater will be used as an instructional tool for MSU space science students, K-12 student groups, and for general public programs. The Star Theater will host special events such as planetarium shows, NASA produced videos and commercial IMAX-style movies. The use of the all-dome video will allow a broad range of programming: including simulated travel through deep space and through the deepest depths of the ocean. With the digital theater, the user can move freely through a 3-D universe viewing endless astronomical phenomena (such as comets, planets and supernovae) with full motion and 3-D texturing: advanced teaching aids will be employed to help augment the educational impact of the shows. The theater will be used for workshops with local teachers, outreach events with visiting school groups and sky viewing shows that will be open to the public.



Architect's drawing of the MSU Space Science Center. Completion is expected in April 2009.

Space Systems Development Laboratory

Small satellite systems (primarily pico-class, microsats, and Cubesats) for instructional training and research will be built in the Center's Space Systems Development Laboratory. MSU faculty and staff have engaged in the design of five spacecraft to date, including KySat-1 Orbital, which is scheduled to be launched in January 2009. The staff-produced hardware is currently orbiting the Earth. The Space Systems Development Laboratory will facilitate these efforts, greatly expanding the capabilities of Morehead State to design and fabricate satellite subsystems, including transceivers, antennas and other satellite communication systems.

Micro/Nano Fabrication Center

A class 100/1000 clean room, the only component of the SSC facility not currently funded, will support the development and fabrication of RF MEMs systems including reconfigurable MIMO antennas and devices. Plans for the Micro/Nano lab include wet etch, photolithography, e-beam lithography, material growth, and metallization processes. This facility will greatly enhance the faculty's ability to develop micro/nano systems for space applications.

Completion Expected in April 2009

When the Space Science Center facility is complete in April 2009, it will greatly enhance the Commonwealth's R&D infrastructure and support the Kentucky Space initiative—a collaboration of six universities in Kentucky led by the Kentucky Science and Technology Corporation, to enhance Kentucky's space capabilities and to develop a technological, space-related workforce. Kentucky Space (formerly KySat) plans to design, build, fly and operate a satellite every 12 months beginning in 2009, giving Kentucky a permanent presence in space.

Morehead State University offers degree programs in Space Science (B.S.) and Astrophysics (B.S. in Physics with an Area in Astrophysics) which are unique undergraduate programs in the Commonwealth. The B.S. in Space Science is one of only five such undergraduate programs that focus on astronomical engineering technologies in the country. The new facility will greatly enhance MSU's R&D capabilities and ability to deliver these outstanding space-related programs. Additional information may be obtained by visiting the Space Science Center's Web site at <http://ssc.moreheadstate.edu>, or contacting Dr. Ben Malphrus, professor of space science and director of the Space Science Center, at b.malphrus@moreheadstate.edu (606) 783-2381.

*From Dr. Benjamin K. Malphrus and Jason Blanton
Morehead State University*

Kentucky Conservation Committee Special Announcement

The Kentucky Conservation Committee (KCC) board is pleased to announce keynote speakers at the September 20, 2008 KCC annual meeting. Speakers include:

- The Honorable Rocky Adkins - House Majority Floor Leader will discuss his initiatives in HB1 and 2 to make Kentucky more energy efficient and more energy independent while protecting the environment. Representative Rocky Adkins (D) represents House District 99: Boyd, Elliott, Lawrence and Rowan Counties
- The Honorable Robin Webb, Vice Chair of the House Appropriations and Revenue Committee and the primer sponsor of the legislation creating the Land Stewardships Task Force will discuss the work of the Task Force and the future of land conservation and stewardship in Kentucky. Representative Robin L. Webb (D) represents House District 96: Carter and Lewis Counties
- The Honorable Joni Jenkins, Vice Chair of Labor & Industry Committee and Chair of the Licensing & Occupations Committee, and Chair of the Jefferson County Delegation will bring greetings and remarks on behalf of the Jefferson County Delegation. Representative Joni L. Jenkins (D) represents House District 44: part of Jefferson County



The mission of the Kentucky Conservation Committee is to work for sustainable use of renewable natural resources, prudent use of non-renewable resources, conservation and preservation of critical and unique areas, and a healthful environment for all Kentuckians. We accomplish our mission by working with a coalition of environmental organizations and individuals to influence public environmental policy and legislation.

Blackacre State Nature Preserve will be the site of the KCC's annual meeting. The theme of the meeting will be "Conserve Kentucky" an initiative begun two years ago with a LRC sponsored task force, charged with studying: "The Commonwealth's strategy for the protection of natural areas, farmlands, habitats and forests and produce recommendations for a comprehensive land stewardship and conservation program." For more information on the 2008 Land Stewardship and Conservation Task Force, visit www.lrc.ky.gov/Committee/Special/Conserv%20TF/home.htm. The annual meeting will provide participants with an update of the Task Force's progress, solicit suggestions for the Task Force's consideration, and involve them in discussions of where to go from here regarding proposed legislation.

To register for the Kentucky Conservation Committee Annual Meeting visit www.kyconservation.org.

*From Dr. David Wicks
KCC Board Member*

Kentucky Conservation Committee Annual Meeting Agenda

Saturday September 20, 2008: 10 am to 3:30 pm
Blackacre State Nature Preserve,
Kentucky's First State Nature Preserve
3200 Tucker Station Road , Louisville , KY 40299

- 8:30 Registration and exploration of the Blackacre Homestead
Coffee and light continental breakfast in the 1790 farm house
Open exploration of the preserve and the Kentucky Biodiversity Exhibit
- 10:00 Welcome
Dr. Vicki Holmberg, KCC President
Katie Greene, Blackacre Conservancy President and Host
Don Dott, Ky State Nature Preserves Commission Director
Honorable Joni Jenkins, Jefferson Co. Delegation Chair
- 10:30 State Approaches to Land Conservation
Keynote by the Trust for Public Trust on State Approaches to Land Conservation
- 11:00 Concurrent panel discussions
State Agencies: What are the critical conservation issues that state agencies see facing the Commonwealth? Discussion of the various approaches to land conservation ability to address these issues.
Educational Approaches: How can the state improve statewide awareness of, and support for biodiversity? Discussion of activities and approaches taken by educational groups.
- 12:00 Lunch - Locally grown Kentucky food
- 12:30 **Honorable Rocky Adkins:** "Energy Efficiency, Energy Independence and Kentucky's Environment"
Honorable Robin Webb: "Tasks before the Land Stewardship and Conservation Task Force"
- 1:30 Questions, Comments and Remarks
- 2:00 Concurrent panel discussions
Biodiversity Supporting Organizations: What are the critical conservation issues that public organizations see facing the Commonwealth? Discussion of the various approaches to land conservation ability to address these issues.
Scientific Research: What are the scientific research needs necessary to support the protection and enhancement of biodiversity in Kentucky ? Discussion of activities and approaches being taken by groups.
- 3:00 KCC annual meeting
KCC election of new board
Priorities for the 2009 legislative session
Concluding Remarks - Dr. Vicki Holmberg
- 3:30 Optional Post-Meeting Activities
Floyds Fork Tour - Dr. Dan Jones, 21st Century Parks
Blackacre Tour - Katie Green, Blackacre Conservancy

Many thanks to the C.E.S. Foundation, Heine Brothers Coffee, and the Blackacre Conservancy for their support of the KCC annual meeting

Third Rock Consultants and Restoration in the Little Laurel River

Third Rock Consultants, LLC, an environmental consulting firm located in Lexington, Kentucky, was established in the fall of 2000 in response to the increased need for innovative, yet professional environmental consulting services. Third Rock capabilities include a variety of environmental services such as engineering design and construction, biological surveys (macroinvertebrate, fish, mussel, bat and botanical surveys), environmental permitting and mitigation (stream and wetland restoration), National Environmental Policy Act (NEPA) documentation, statistical data analysis and water quality services (watershed assessments, microbial source tracking, water quality sampling/ analysis and bacteriological analysis). Third Rock serves a wide range of private and public clients, including industry and government agencies, who are faced with challenges that demand environmental experience and technical expertise. Today Third Rock is recognized as a leading environmental firm in the region, achieving this distinction through a combination of superior technical skills and commitment to meeting clients' needs.

The company is a certified woman-owned business enterprise owned and managed by Molly Foree, president of Third Rock. Ms. Foree is a graduate of the University of Kentucky College of Law. Prior to entering the consulting business, she specialized in environmental law at a prominent Lexington law firm. Under Ms. Foree's leadership, Third Rock has achieved a reputation for providing quality environmental services in a challenging regulatory climate. In just under eight years, Third Rock has grown from a staff of 16 to 34 and was recently named on Inc. Magazine's 5000 fastest growing privately owned companies in America. Third Rock has been an affiliate of the Kentucky Academy of Science since 2003.

One of Third Rock's leading areas of service is water quality consulting. Third Rock's engineers, aquatic ecologists, wetland scientists, and data analysts combine to provide a level of excellence unique and unequalled in environmental consulting. The staff has years of diverse and collective experience in the areas of watershed assessment and planning, water quality and hydrologic modeling, stream and wetland restoration, and design and implementation of agricultural and stormwater best management practices. They utilize a watershed-scale approach to restoring waters to swimmable, fishable resources. Third Rock assists local groups (i.e. community governments, environmental advocacy groups) in developing and implementing watershed monitoring schemes, and subsequently watershed planning documents.

From 2003-2006, Third Rock studied the watershed of the Corbin City Reservoir to determine the sources of pollution causing impairment in the urban drinking water supply. With assistance from a Clean Water Act 319(h) grant, Third Rock was able to determine that the most significant source of silt, pathogens, and nutrients to the reservoir was the Little Laurel River; more specifically, runoff from the city of London. To solve these problems, Third Rock proposed the implementation of projects that would slow the runoff of rainfall in the urban areas and therefore reduce the concentration of pollutants

reaching the tributaries of the Little Laurel River and ultimately the Corbin City Reservoir. In February of 2008, after the award of a second 319(h) grant, the Restoration Action Initiative in the Little Laurel (RAILL) was formed by Third Rock to implement these water quality improvement projects and facilitate the development of green infrastructure in and around London and Laurel County. After months of planning and design by Third Rock biologist Tony Miller and environmental engineer Jennifer Shelby, a list of best management practices (BMPs) were proposed for the area.

Levi Jackson: A stormwater wetland is designed and slated for construction in fall 2008 at Levi Jackson State Park. This wetland will retain sediment, nutrients, and pathogens from the Little Laurel River after flooding events thereby reducing the downstream pollutant loadings. This wetland is also expected to alleviate some of the sedimentation problems in Mill Pond.

Rain gardens: Three rain gardens are currently being designed for the London area to capture runoff from impervious areas thereby promoting infiltration and an overall reduction in pollution to the tributaries of the Little Laurel River. Areas along Main Street in London are being targeted for rain gardens at businesses and private residences. In addition, one rain garden is being designed for a residential area adjacent to the Corbin City Reservoir.

Transfer Station: Design is near completion on a joint wetland and stream restoration project adjacent to the KY 192 garbage transfer station in London. The primary focus of the restoration is to stabilize the badly eroding stream and reconnect it to its adjacent wetland. This restoration will promote the reduction of downstream

pollutants by reducing streambank erosion and by capturing pollutants in the wetland during storm events where they will be naturally treated.

Smith/Little Property Restoration: The Smith/Little property is an 85-acre tract of prior-converted, bottomland forest wetland with a bisecting stream (Whitley Branch) between US-25 and KY-229. Decisions should be made in August regarding a Kentucky Heritage Land Conservation Fund grant that would allow for purchase of the land for restoration. Design of the restoration would focus on re-establishing the site to pre-development bottomland forest with an emphasis on education. Specific tasks would include stabilization of the heavily incised stream, removing drainage features in the wetland, and replanting the site with native wetland vegetation. Additionally, walkways would be installed for educational tours of the wetland.

In addition to planning and designing BMPs, Third Rock efforts for RAILL include conducting public meetings to spread awareness and to encourage community interest and participation, developing a RAILL logo, the production of project newsletters, post card announcements for meetings and the development of a project specific website www.RAILL.org, which was designed to be a learning tool for visitors.

For more information regarding Third Rock services, please contact Tony Miller at 859.977.2000 or by email at tmiller@thirdrockconsultants.com.

Artist Rendering for Proposed Stormwater Wetland
Levi Jackson State Park



KAS Joins The Society for Evolution Education

The Society for Evolution Education (SEE) is a non-profit membership organization with a mission to help people understand and appreciate the science of evolution. Established in 2007, SEE provides educational programs for families, middle and high school students, and other groups in the Northern Kentucky and Greater Cincinnati area. These programs range from introductory sessions that translate scientific concepts into simple language that can be understood by children, youth, and adults with little to no background in evolution science, to advanced sessions for more sophisticated learners. Annual lecture series with speakers from local and regional universities and museums offer adult learners current theory on a range of evolutionary topics with a discussion forum following talks. SEE collaborates with scientists at Northern Kentucky University, University of Cincinnati, the Cincinnati Museum Center, and the Krohn Conservatory, and is committed to a respectful dialogue with a broad spectrum of diverse groups of learners in the community. Dr. Frank Traina of Sunrock Farm founded the organization, and uses the facilities at the farm to make the concepts of evolution, like natural selection, easy to observe and interpret. All the education programs involve animals from the farm, plants from the "Evolution Garden," or fossils from the stream bed on site.

KAS joined SEE at the Darwin level this spring, and was instrumental in helping establish SEE as a non-profit 501(c)3 organization. As the voice of science in Kentucky, what better way to help communicate the importance of an understanding of evolution than to team up with an organization with the sole mission of evolution education. SEE held "Evolution on the Farm" programs throughout the spring and summer. Eight lectures were held during the spring lecture series with topics ranging from Darwin's Finches by Dr. Kenneth Petren, to Sexual Selection and the Evolution of Communication Signal by Dr. Bernie Lohr, to The Darwin Menagerie by Dr. Gene Kritsky. An exciting year is anticipated for SEE with growing numbers of students, families, community groups, and the public at large participating in the education programs. If you would like to learn more about SEE and participating in any of the programs, or are a professional interested in becoming part of the lecture series, you can call 859-781-5502 or visit the website at www.evolution-education.org.

Mark your calendars—during the Great Outdoor Weekend (September 27 & 28, 2008) SEE will offer free "Evolution on the Farm" tours (10-12 noon & 2-4 pm) at Sunrock Farm (see the website for directions). "Milk a goat and learn how farmers use the principles of evolution to change the characteristics of their milk herds."

From Dr. Richard D. Durtsche, Associate Professor of Biological Sciences, Northern Kentucky University

The highlight of the Sunrock Farm Evolution Garden is the Wollemi pine, a "living fossil" thought to be extinct until 1994. After an Australian bushwalker named David Noble came upon a remote grove of 135-foot high evergreens, a botanist identified the trees as conifers that dated back to the time of the dinosaurs!



Science Over Lunch: Evolutionary Biology

One objective of the Kentucky Academy of Science is to promote the diffusion of scientific knowledge. In order to accomplish this objective, KAS has assisted in the coordination of the following Science Over Lunch event. Please join Dr. James Krupa, University of Kentucky Associate Professor in the Department of Biology, on Wednesday, September 17, at noon in the Central Lexington Public Library to learn more about Evolutionary Biology. This free event is open to the public; feel free to bring your lunch. The Central Lexington Public Library is located at 140 East Main Street in down-town Lexington, Ky. Parking is free if you park in the library parking structure and have your parking ticket validated by the library.



Dr. James Krupa will talk on Evolutionary Biology at the *Science Over Lunch* event to be held at the Central Lexington Public Library on September 17th.

In science the word "theory" refers to a very powerful tool. Theory does not mean hunch or guess or speculation as most use it. Rather, in science, theory is a comprehensive explanation of the natural world generating testable and falsifiable predictions. Theories are the foundation on which all science is built. Theories explain facts, facts support theories. Cell theory, germ theory, atomic theory, gravitational theory, the theory of general relativity all provide explanations of the natural world. Grand theories withstand the test of time, grow and become more encompassing. Einstein's theory of special relativity and Darwin's theory of evolution by natural selection are two of the most eloquent and powerful theories in science, yet seemingly simple. These have grown and matured and become far more powerful than Einstein or Darwin could have imagined at the time their theories were created.

In biology, evolutionary theory is the foundation on which all biology is built. As the great geneticist Theodosius Dobzhansky said: "Nothing in biology makes sense except in the light of evolution". What many outside biology do not realize is that it is not just the single theory of evolution that comprises the foundation of biology, but rather an interconnected group of theories including Darwin's many theories: descent with modification, descent from a common ancestor, multiplication of species, natural selection, sexual selection among others. These explain why humans and mice have hair and three ear bones, why male birds of so many species are more brightly colored than females, why so many species of plants have flowers and produce brightly colored fruit, and why so many species of sunfish live in Kentucky; all clearly similar yet distinctly different. To understand evolution is to understand biology. To understand theory is to understand that when someone says "evolution is just a theory, not a fact" they are unknowingly explaining the power of evolutionary theory: "evolution is just the most powerful predictor of life, not a fact".

For more information please contact KAS Executive Director Jeanne Harris at 859-227-2837.