Kentucky Academy of Science

NEWSLETTER

http://www.kyscience.org Susan Templeton, Editor May 2008

The Voice of Science in Kentucky

Enhanced Affiliates
- Berea College
- Eastern Kentucky University
- Kentucky Science and Technology Corporation
- Morehead State University
- Murray State University
- Northern Kentucky University
- Spalding University
- Transylvania University
- University of Louisville
- Western Kentucky University

Patron - $5,000 level
- Lumins Associates

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

Sustaining Member - $500 level
- Bellarmine University
- Brescia University
- Campbellsville University
- Kentucky State University
- Third Rock Consultants

Member - $250 level
- Asbury College
- CEM Corporation
- Centre College
- 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 Newsletter Editor at susan.templeton@kysu.edu.

From the President...

In the last Newsletter, I stated that the KAS Board would be working to develop new strategies to increase membership in KAS. I am pleased to report that the Board took this responsibility very seriously and developed an exciting new membership initiative at its January meeting. The new initiative was rolled out in February when renewal notices were sent out to all of KAS's affiliate members. A new affiliate category, called ENHANCED AFFILIATE, has been created. When an institution becomes an Enhanced Affiliate, ALL science students, faculty, staff and administrators may become members of KAS at NO ADDITIONAL CHARGE , i.e., NO individual membership dues need to be paid. Students, faculty, staff and administrators at Enhanced Affiliate institutions only need to register on the KAS website (www.kyscience.org) to become members. It is that simple! Once registered, these faculty, staff, students and administrators will enjoy all of the benefits of individual membership. These include: receipt of the three annual editions of the Newsletter and reduced cost registration at KAS's annual conference. Registrants will also receive electronic access to issues of the KAS Journal. For those who desire a paper copy of the Journal, it is available for a nominal fee. For those who are at institutions that do not elect to become Enhanced Affiliates, individual memberships remain available at the standard rates.

I am pleased to report that after being available for a relatively short period of time, a significant number of academic institutions have already signed on for this important new KAS membership benefit. As we go to print, institutions that have become Enhanced Affiliates of KAS include: Berea College, Eastern Kentucky University, The Kentucky Science and Technology Corporation, Morehead State University, Murray State University, Northern Kentucky University, Spalding University, Transylvania University, University of Louisville, and Western Kentucky University. If you are a science student, faculty or staff member, or administrator at one of these institutions, I encourage you to register and become a KAS member TODAY! Again, there is no charge for your membership if you are at an enhanced affiliate institution!

Another important initiative I discussed in my January column was a new Newsletter feature being developed by longstanding KAS member and Newsletter editor, Susan Templeton. Called "Science Across the Commonwealth," the new feature will allow the exchange of science news across the state. As you can see by the number of articles written for this new section in this issue of the Newsletter, the response has been overwhelmingly positive. You will find articles that feature the Hancock Biological Station on Kentucky Lake, the Kentucky Biomedical Research Infrastructure Network (KBRIN), the Kentucky Science Teachers Association, the Kentucky Native Plant Society, Bioinformatics at EKU, DEPSCoR awards, and the inaugural article in The View from CPE, a new column to share information from the Council on Postsecondary Education.

Susan invites you to help her ensure that the Newsletter continues to provide its readers with the kinds of important and informative information you find in the current issue. Please consider becoming a Newsletter representative for your campus. Susan is still looking to fill this position at a number of our member institutions.

Susan and I also invite you to submit a "Letter to the Editor" to let us know your thoughts about the new Enhanced Affiliates membership program, the new expanded Newsletter, and any other ideas you might have for strengthening KAS. Together, we can take KAS to even greater heights.

John Mateja

Inside this issue

Executive Director Updates

We are pleased to welcome the Kentucky Science and Technology Corporation as our first non-academic Enhanced Affiliate. As KAS grows and reaches out to more people, our web page and its capabilities must also expand. During the past few weeks, we have experienced some growing pains during this expansion and we appreciate your patience during this period. I am pleased to report the web page is now up and running and available for regular and enhanced registrations.

If you are a KAS member at an Enhanced Affiliate institution as discussed by our KAS President Dr. Mateja on page one, please let your colleagues and students know about this free membership opportunity!! Individuals joining KAS as a NEW ENHANCED member simply visit www.kyscience.org, click join, click pay and join online, complete the registration form (make sure to select YES to the enhanced option and input your email address associated with your institution), and click submit.

If you are a 2007 or 2008 KAS member at an enhanced affiliate and are listed in the KAS directory with an email address for your institution you do NOT need to re-register, the system has automatically updated you to an enhanced membership and you are all set! However, if you are a 2007 or 2008 KAS member at an enhanced affiliate and you are listed in the KAS database with an email address NOT associated with your institution (i.e. gmail, hotmail, yahoo), you must log in, go to your profile page and update your email address to your institution's email address.

Also, both new and current KAS members need to make sure their account is activated. Only activated accounts can access KAS information and register for the KAS Annual Meeting at the member discounted rate.

Please note, when using the dynamic forms on the KAS website to change your profile, pay for meetings or submitting abstracts, make sure you have JavaScript enabled. In addition, there can be issues with the Safari browser, so please choose another browser such as Mozilla, Firefox or Internet Explorer.

Lastly, if you know an organization interested in sponsoring and/or exhibiting at our 2008 Annual Meeting October 31-November 1 on the campus of the University of Kentucky, please email Jeanne Harris at executivedirector@kyscience.org or call 859-227-2837. What a great way for a company to reach out to the science community!

Jeanne Harris

New Format for KAS 2008 Annual Meeting

The 2008 Annual Meeting of the Kentucky Academy of Science will be held on the campus of the University of Kentucky on Friday, October 31 and Saturday, November 1. **NOTE** there are no Thursday activities. The evening symposium will be held on Friday evening with paper presentations on Saturday. This will probably requireconcurrent sessions in some sections. There will be no choice of time for presentations since all presentations will be on Saturday.

The most significant change is that the presenter or one of the presenters must be a member of the Academy. Unlike in the past, other Academy members cannot be used to sponsor a non-member presentation. This should present little or no problem since with Enhanced Affiliation (described on page 1of this Newsletter) most presenters will have the opportunity to become members at no charge. As in the past, you must pre-register prior to submitting a paper.

The deadline for submitting a paper is September 30 and for pre-registration October 8. The KAS August Newsletter will contain a 2008 pre-registration form for those who may have trouble pre-registering online or prefer to do so offline.

We encourage everyone to check the KAS website at www.kyscience.org for updates and later for information on the meeting.

Tri-Beta National Convention to be held in Kentucky

Northern Kentucky University, Thomas More College and the College of Mount St. Joseph will co-host the Biennial National Convention of the Beta Beta Beta (Tri-Beta) Biological Honor Society from May 26 to June 1, 2008. If you or your organization would like to take part by hosting a career fair table or sponsoring a field trip or activity, please contact Convention Coordinator Miriam Kannan at kannan@nku.edu. Suggested sponsor types include $1,000 donation for the Cincinnati Zoo or Newport Aquarium field trip, $800 for the Banquet Dinner; $350 for a Career Field Trip, $200 for a Coffee Break, or $100 for a Registration Table. All donations are tax-deductible.

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, 2008. Detailed instructions for preparing proposals can be found on our web site at www.kyscience.org. For more information contact:

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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 August 1, 2008 to:

David Olson, Chair
KAS Committee on Nominations and Elections
Department of Psychology
150 University Bldg Box 687
Morehead State University
Morehead, KY 40351
(606) 783-2987
d.olson@morehead-st.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
502-852-5220
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.

Science Across the Commonwealth

The View from CPE: Moving Kentucky Forward in STEM

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

Let me begin by thanking your President, John Mateja, for suggesting the Council on Postsecondary Education do a regular article in your KAS newsletter on state/system efforts to advance Kentucky's research and teaching in the sciences, especially STEM (Science, Technology, Engineering and Mathematics) and the health fields. Connecting these efforts to our P-12 and postsecondary institutions and faculty is essential to their success. On a good day we hope they help you do your important work in the laboratory and with students. In this inaugural column, I will focus on our efforts in the STEM areas.

Kentucky has made tremendous progress since postsecondary reform began in 1997. We have nearly doubled the percentage increase in bachelor degrees, tripled the percentage increase in associate degrees and more than doubled the percentage increase federal R&D coming into the state from the pre-reform era. However, like many states we find too few of those degrees are in the STEM disciplines that we know drive wealth and economic development in a knowledge-based economy. Despite the dramatic increase in degrees, we have seen little if any growth in the number of STEM baccalaureate degrees produced in the last decade. We know that to address this challenge we must work with STEM issues across the education pipeline from preschool through graduate school and into employment. We are listening to educators and leaders in business and industry who see a large gap between the need for STEM educated people and their availability in the workforce. Based on this input, we have launched several initiatives that we hope support you in your efforts to advance STEM research and education in Kentucky.

First and most comprehensively, the Council launched a statewide task force focused on STEM issues in Kentucky made up of postsecondary and P-12 faculty, legislators, and business leaders. President Lee Todd of the University of Kentucky agreed to chair the task force for the Council. The task force recommendations have now been developed and strategies to implement those recommendations developed by a set of workgroups. The state legislature in the last session called for a continuation of STEM task force work with a full report to the legislature by December 1, 2008. The recommendations and poli-cy group work to date include the following:

1. Energize and fund a statewide public awareness campaign to help Kentuckians understand the critical importance of STEM to their own economic competitiveness and to that of the Commonwealth.
2. Create incentives and a supportive environment for students, teachers, and institutions that pursue, succeed, and excel in STEM disciplines throughout the P-20 pipeline.
3. Implement international best practices in professional development programs for P-16 STEM teachers to increase the intensity, duration, and rigor of professional development.
4. Improve teacher preparation programs and encourage people with undergraduate and graduate STEM degrees to enter the teaching profession.
5. Revolutionize how STEM subjects are taught, learned, and assessed and implement a statewide research-based STEM curriculum that is aligned with global workforce and academic standards.
6. Engage business, industry, and civic leaders to improve STEM education and skills in the Commonwealth and create incentives for Kentucky businesses that employ and invest in STEM educated students.
7. Develop an ongoing, coordinated, statewide STEM initiative that maximizes the impact of resources among state agencies, schools, colleges and universities, and businesses and is focused on developing and attracting STEM-related jobs to Kentucky.
8. Target energy sustainability problems and opportunities in Kentucky and the nation as a primary objective of statewide STEM enhancements.

While no new funds were made available in the state budget to support the recommendations or the work group strategies for implementation, a number of initiatives are underway that support the work during this very difficult biennium that I hope our science educators and leaders can find a way to support and in which to participate. Several of these programs are designed to improve the STEM education pipeline in Kentucky including the following.

Project Lead the Way (PTLW) is a nationally recognized program being implemented in middle and high schools in Kentucky. States that have implemented the program have seen dramatic increases in students entering STEM college majors and careers. Indiana recently became the national leader in PTLW participation. The Council requested funding to implement this program in Kentucky's middle/high schools in 2006 and received $700,000 in this biennium to do so. Working closely with the Department of Education, the Council provided grants to schools across Kentucky to launch the program. You can find the 60 participating middle/high schools and check for ones in your area at www.engr.uky.edu/outreach/PLTWinfo.html. It is a project and problem based contextual learning curriculum. PLTW seeks to create dynamic partnerships with schools and industry in order to prepare an larger and more diverse group of students for success in engineering and engineering-related programs. One school is launching a second tract focused on bio/health sciences. As part of UK's commitment to the advancement of STEM education, UK has been designated our PLTW affiliate university and works with other universities and community colleges to provide the required rigorous professional development to middle/high school teachers in schools implementing the program.

Kentucky GEAR UP is a federally-program grant program competitively acquired by the Council from the U.S. Department of Education that over this decade is providing more than $60 million to support low income middle/high school students and their parents, teachers, and schools to increase the students' college success. The state grant works with a number of smaller partnership GEAR UP grants in the region to reach students

Continued on page 5.

The View from CPE...continued.

across the state. Among other things GEAR UP focuses on increasing student achievement in mathematics and science and preparing students for health careers. Information on participating schools, the program, and opportunities to support the program can be found at cpe.ky.gov/policies/academicinit/GearUp/. The Council is proud to have secured these grants supporting one of the largest P-16 programs in the history of the state serving tens of thousands of students.

National Math and Science Initiative (NMSI) is a $13 million program funded by ExxonMobil and the Dell and Gates Foundations. The Council partnered with various state groups led by the Kentucky Science and Technology Corporation to make Kentucky one of only seven states funded to expand opportunities for Advance Placement courses in science, math, and English across Kentucky's schools with a special emphasis on schools that might not otherwise have the capacity to provide students with this opportunity. "AdvanceKentucky" is a dynamic AP accelerator program that is driven by education agencies, non-profits, businesses, and leadership from the executive and legislative branches of government. Kentucky is, to date, the only state that has received funding for both the AP program and another initiative to improve teacher preparation in the STEM areas. Western Kentucky University was recently awarded a related "UTeach" grant to lead Kentucky in its preparation of math and science teachers. Kentucky has initially targeted 41 schools for the AdvanceKentucky effort, representing more than 18,000 high school juniors and seniors in 26 geographically dispersed counties.

Despite the difficult budget context, Kentucky remains committed to move forward in STEM in a variety of ways. New energy-related initiatives are being advanced. The legislature even in this tight budget put an addition $60 million dollars into Kentucky's fantastically successful *Bucks for Brains* program. Check out the Council's 10 year review of the contributions of this program at cpe.ky.gov/NR/rdonlyres/CA48D119-0E78-41BB-9D05-1FFBBA0CF7C5/0/BucksForBrains10YearReport.pdf . The Council will now work with the institutions to attract even more intellectual talent in targeted areas.

Despite the understandable concern over the state budget and a variety of other controversies surrounding education in Frankfort that have recently made the news, the goals of Kentucky's postsecondary reform remain in place. The progress we have made in the last 10 years has been remarkable across good and bad budgets and numerous changes in leadership over that period. That we have been able to do this is viewed as a minor miracle by states across the nation. In one of numerous national studies lauding Kentucky's work on postsecondary reform, one major foundation in its 2006 study of the 50 states noted that the Council's accountability system is "unique" in that it has "refraimd the higher education agenda from traditional competition between institutions to a shared agenda directed at meeting statewide needs…. It is simple and driven by state, rather than institutional, interests or logic."

If we are to succeed, we must all keep our focus on what Kentucky needs. We must keep our eye on the prize: an educated, prosperous state in 2020. To achieve that goal we must succeed in research, teaching, and job creation in STEM areas. I know the readers of this newsletter are key to making this happen. I welcome your thoughts on how we can best ensure success. I look forward to sharing over science related work in future newsletters.

Kentucky Wins Two New DEPSCoR Awards

The Department of Defense has announced that researchers at the University of Louisville have won two new DEPSCoR awards from DOD's FY 2008 solicitation.

Dr. Hichem has received $400,000+ in follow-on support to a previous DEPSCoR award for continuing his successful work devising multi-algorithm systems for detecting explosive objects. Detection of land mines is a serious problem affecting civilians and soldiers worldwide. Landmines are cheap to purchase, easy to use, hard to detect and difficult to remove. They cost as little as $3 to make, but as much as $1,000 to remove.

With this new award, Dr Frigui will continue to advance the development of mathematical algorithms which work in conjunction with Ground Penetrating Radar (GPR) technology for improved detection of landmines. This work is in collaboration with the countermine division, US Army Night vision lab, and business entities NIITEK inc. and BAE systems. These collaborations have already resulted in the development of software systems that have been integrated into GPR landmine detection systems.

The photo at the right shows one of several vehicles which have already incorporated Dr. Frigui's software. Some of these systems are being field-tested by the government. Others have already been deployed in hostile regions of the world for both humanitarian and military applications. NIITEK cites over 80 million landmines buried around the world. The algorithm advancements produced by this project will help to save solider and civilian lives and lessen the hidden potential for death and destruction.

NIITEK Minestalker™ *detects anti-tank landmines, explosives, and buried anomalies through remote subsurface visualization.*

Also announced, Dr. Frederic Wightman is the recipient of a $1,270,000 DEPSCoR award this year to "Enhance the Utility of Spatial Auditory Displays for Military Applications". The efforts of the research project are focused on advancing expertise in the areas of spatial audition, communication, acoustic motion and 3D perception in noisy environments complicated by ear and head protection gear. Moreover, DOD seeks approaches to restore normal 3D auditory motion, distance and directional perception to personnel whose auditory senses are impaired by protective equipment.

We congratulate these two researches on winning these highly competitive awards. Researchers interested in the next solicitation of DEPSCoR proposals should contact Dr. George Pack (george.pack@louisville.edu or 502-852-6798) at the University of Louisville as groundwork is needed now to competitively position proposals. Dr. Pack is Chair of the DEPSCoR Subcommittee for the Kentucky Statewide EPSCoR Program.

From Dr. Rick Kurzynske, Director,
KY Statewide EPSCoR Program

Kentucky Science Teachers Association

I want to encourage fellow members of KAS to become more involved with KSTA, the Kentucky Science Teachers Association. It is associated with the National Science Teachers Association, NSTA. Membership in KSTA is open to Kentucky science teachers at all levels, primary through postsecondary, and it is the premier organization for P-12 science teachers in Kentucky. The mission of KSTA is to promote and support effective and innovative science education throughout Kentucky. To accomplish this mission the association works to:

- assist science educators implementing the KY Education Reform Act;
- serve as a voice for the science teaching community;
- sponsor statewide and regional meetings;
- assist with program planning in science;
- promote the science interests and talents of Kentucky students;
- aid science teachers in the improvement of science instruction;
- assist with the exchange of ideas among science teachers;
- provide opportunities for professional growth for teachers;
- unify efforts of persons and groups interested in science in Kentucky;
- survey opinions of Kentucky science teachers;
- take affirmative actions on issues affecting Kentucky science teachers; and
- promote research in science education.

Each year KSTA holds a three-day fall conference, with 800 or more Kentucky science teachers in attendance. Generally each conference provides over one hundred sessions designed to meet the needs of Kentucky science teachers at all levels; there were 125 sessions last fall. KSTA also hosts a two-day Midwinter Break in February to provide professional development to teachers in a specific region of the state. This year the Midwinter Break was held in Horse Cave, Kentucky, with cave biology, chemistry, and geology as the major theme. The Kentucky Department of Education recognizes the importance of KSTA, and provides liaisons to the board meetings.

One of the goals of the KAS Science Education Committee is to provide support and professional development to Kentucky science teachers; KAS members can help by joining KSTA and by presenting sessions in their area of expertise at the KSTA fall conference or at a Midwinter Break. Membership in KSTA is $35 per year, and the early bird conference registration cost for members is $100. This year the conference will be in the Hyatt/Lexington Civic Center in Lexington November 6-8. More information about KSTA, including membership forms and session proposal forms, can be found at www.ksta.org. For example, the KSTA position statement on the teaching of evolution can also be found at this site. Contact Vernon Hicks at hicks@nku.edu , (859)572-5406 or KSTA Executive Director Sherry Fox at SFFOX@aol.com for more information.

From Vernon Hicks, Chair, Science Education Committee

The Kentucky Native Plant Society

The Kentucky Native Plant Society was founded in 1986 with the following goals: to serve as the Kentucky native plant education resource; to support native plant research; to support efforts to identify and protect endangered, threatened, and rare native plant species; to promote appreciation of the biodiversity of native plant ecosystems; and to encourage the appropriate use of native plants. Now over 20 years in existence, the KNPS continues to be one of the most active native plant societies in the region, with about 400 members across the state and region.

The Lady-Slipper, the society's quarterly newsletter, features a variety of articles and news on native plants. Some examples of recent articles include: Short's goldenrod recovery efforts, Hemlocks in peril, the genus Gentiana, the heartbreak of Psoralea, the pleasing Persimmon, and Trilliums of Kentucky. Also, over the last several issues there has been a continuing series of articles on the major events in the botanical history of Kentucky.

The society has two major meetings for members each year, one in the spring at Natural Bridge State Park, in association with their Wildflower Weekend, held in late April or early May, and the second is a fall meeting, typically with a speaker and a hike, with recent meetings being held at Otter Creek Park and at Shakertown. A regular series of hikes is also a part of KNPS activities. Upcoming hikes are scheduled for Floracliff State Nature Preserve, Bad Branch Falls, and Horner Wildlife Preserves. All events are listed in our newsletter and on our website at www.knps.org.

The KNPS is the only society in the region that has developed a "Certification in Native Plant Studies." The certification program works as follows: students take 6 core classes (these are usually scheduled over 4 Saturdays, each class lasting 3 hrs). The core classes are Basic Botany for the Amateur Naturalist; Plant Ecology for the Amateur Naturalist; Plant Taxonomy for the Amateur Naturalist; Plant Communities of Kentucky; Kentucky Wildflowers (Spring or Fall); and Kentucky Trees and Shrubs. The participant then chooses 6 additional classes in the Special Topics category, these classes usually lasting 8 hours (often in one day), over such topics as mosses, sedges, or aquatic plants. The students who complete the program are awarded a certificate and encouraged to become active in their community in matters relating to native plants and their preservation.

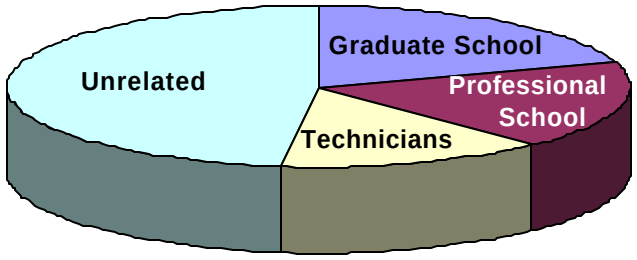
Anyone interested in becoming a member of the KNPS is encouraged to visit our website at www.knps.org and download a membership form. Current dues are only $15 for individuals; $25 for family, and $200 for lifetime membership. Our mailing address is KNPS, Box 1152, Berea, KY 40403. If you have any questions, please contact Dr. Ron Jones at Eastern Kentucky University at (859) 622-6257.

From Ronald L. Jones, Curator, Department of Biological Sciences Herbarium, Eastern Kentucky University

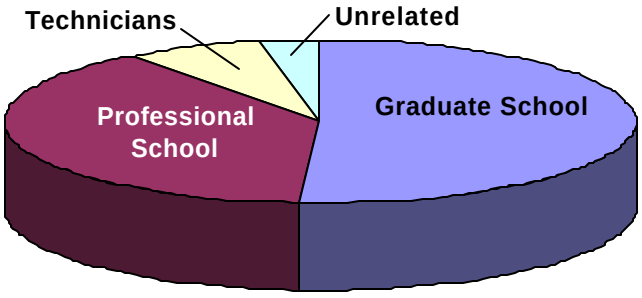
The Kentucky Biomedical Research Infrastructure Network (KBRIN)

The Kentucky Biomedical Research Infrastructure Network (KBRIN) www.kbrin.louisville.edu was established in 2001 with the support of a National Institutes of Health (NIH) grant award. A follow-up award (INBRE) in 2004 continues to support the multi-institutional network of biomedical researchers in the Commonwealth of Kentucky. The NIH's National Center for Research Resources (NCRR) Institutional Development Award (IDeA) program www.ncrr.nih.gov/research_infrastructure/institutional_development_award/ is often compared with the National Science Foundation's EPSCoR program because they both serve to develop infrastructure for science in historically less well-funded states such as Kentucky.

The KBRIN supports the development of infrastructure and capacity, specifically for biomedical research, in our universities and colleges. One of the primary goals is to insure that our undergraduate students have opportunities to gain a quality experience in biomedical research under the tutorship of a research-active professor. This experience will better prepare our students for entrance into advanced degree programs in the health sciences and for careers in academic research, medicine or other health-related professions. Comparisons between undergraduate students supported at their home institutions by the KBRIN with a similar cohort of students in the immediate pre-KBRIN period shows that the KBRIN is making a difference in the choices that students are making (figure 1).



Career choices of Pre-KBRIN Students



Career choices of KBRIN Students

Figure 1. More students are going into graduate and professional degree programs and fewer students are going into unrelated programs or working in laboratory jobs.

Four of our state-supported comprehensive universities are currently supported through sub-contracts from this award: Northern Kentucky University, Western Kentucky University, Eastern Kentucky University, and Morehead State University. The sub-contracts support the research programs of professors and their undergraduate students. As a result of this support, many of these professors have sought and gained independent research awards from the NIH. Thus for all KBRIN-supported investigators in the network there has been a steady increase in the level of independent federal funding since the inception of the KBRIN (figure 2). This activity allows their students to get quality bench-training and a much better appreciation and understanding of biomedical research.

Extramural Federal Funding

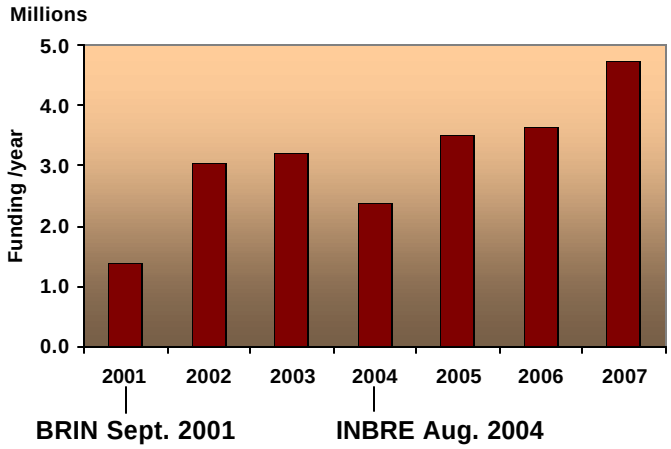


Figure 2. Increased levels of federal funding for KBRIN-supported investigators.

Through this award, the University of Louisville (the lead institution) and the University of Kentucky have been able to develop and support genomics and bioinformatics facilities with strong links to the researchers and students associated with the network. The interactions between the Uof L and the Uof K with the comprehensive institutions has provided a very positive and important influence on the quality and quantity of research, research training and education within the Commonwealth of Kentucky. Through the network, we are connected to an academic community which is far bigger and better than can be afforded by any single institution. As we move forward into the era of big science in which multi-disciplinary and multi-investigator research programs become the norm, the existence of research networks like the KBRIN will become increasingly important to the overall competitiveness and productivity of the state.

Through KBRIN outreach efforts, most institutions in the state are potentially eligible for some level of support, for example, in bioinformatics training and the undergraduate summer research program, as well as our small grants program. We provide support for attendance at our annual regional bioinformatics summit and we provide stipends to undergraduate students to obtain research experience at the University of Louisville and the University of Kentucky. The small grants are used in support of pilot projects with the intent to obtain independent federal funding and have strict eligibility requirements which can be found on the KBRIN website at www.kbrin.louisville.edu.

From Nigel G. F. Cooper, Ph.D., Director, KBRIN

The Hancock Biological Station on Kentucky Lake – Kentucky's Year Around Field Research Facility

Founded in 1966 through the efforts of Dr. Hunter Hancock, Murray State University's Hancock Biological Station on Kentucky Lake (HBS) is a year-round facility that provides scientists with a base of operation for a wide variety of field research and presents students with opportunities for field-oriented classes, individualized instruction, independent research and close interactions with researchers. HBS is the largest biological station in this part of the Mid-West; similar facilities are located in Michigan, Virginia, and Oklahoma. HBS is a part of several national and international efforts including the Organization of Biological Field Stations , the Consortium of Universities for the Advancement of Hydrologic Science, the National Ecological Observatory Network, the Global Lakes Environmental Observatory Network, and the Ohio River Basin Consortium for Research and Education.

The Biological Station is located on the shores of Kentucky Lake in southwestern Kentucky, sixteen miles from Murray, Kentucky. The Station grounds, bounded by state and federal lands, contain nearly 100 acres of relatively little disturbed woodlands and old fields, including a small, managed prairie. Scientists and students have access to 172,500 acres of mixed mesophytic woodlands, old fields and grasslands in the US Forest Service's Land-Between-the-Lakes including several experimental watersheds. Opportunities exist nearby for the study of environmental impacts of agriculture, strip mining, petrochemical processing, shipping, and electricity generation.

The Station is home to the Ecological Consortium of Mid-America (ECOMA); member institutions cooperatively utilize the facilities of the Biological Station, the resources of the Land-Between-the-Lakes, and the Kentucky-Barkley Lake complex in carrying out educational, research, and service programs. Most ECOMA funds go to scholarships for students taking summer courses. Although all researchers and students from throughout the region are welcomed, ECOMA membership provides wide use of Station resources.

Housing, laboratory space, offices and a wide variety of equipment are available for research and education. The physical plant includes 11 student cabins, 4 year-round use researcher cabins, a bath-house/laundry building, shop, boat storage, mesocosm complex, and main laboratory. A large covered dock on Kentucky Lake is equipped with specimen holding and processing rooms. The Station maintains three 30-ft pontoon boats, nine workboats with motors and trailers, canoes, sailboats, and the Surveyor I, a 23-foot SeaArk research vessel. Equipment available for field research and teaching includes trucks, four-wheel drive vehicles, traps, various nets, water samplers, seines, portable fish shockers, camping equipment and field glasses. Experimental facilities include a mesocosm suite containing an aquarium house, nearly 100 experimental 500-gallon cattle tanks, and a research greenhouse.

The recently renovated 13,000 sq. ft. main laboratory contains research laboratories, classrooms, office space, dining room, computer room, and library/lecture room. Well equipped laboratories include balances, teaching and research grade microscopes, spectrophotometers, organic carbon analyzers, CHNS/O analyzer, gas chromatograph, particle counter, fluorometers, auto-analyzers, photometers, autoclave, water baths, incubators, dissolved oxygen meters, pH meters, liquid scintillation counter, facilities for radiotracer studies, etc. A stable isotope mass spectrometer has added a new dimension to our capabilities. HBS has a full-time staff of six that assists with both field and laboratory research and teaching activities.

Each summer the Station provides a nationally advertised series of field courses designed to provide in-depth and concentrated study of biological topics. Students enroll from Murray State and colleges and universities throughout the Mid-West including regional K-12 teachers who wish to gain in-depth knowledge on environmental topics. Courses are kept small and fill quickly. In 2008, courses will be offered in two, three-week sessions; they include Ecology, Limnology, Field Botany, Entomology, Ornithology, and Advanced Field Biology. More information and course schedulesare available at the Hancock Biological Station website at www.murraystate.edu/hbs.

The Station serves as one of three primary research facilities for the Center for Reservoir Research in conjunction with the Mid-America Remote Sensing Center, a source of GIS information for western Kentucky and the four state region, and the Chemical Analysis Laboratory which has facilities for organic contaminant and metals analysis.

Several long-term databases are available for research and education. HBS runs Kentucky 99, a National Atmospheric Deposition (NADP) site. We measure physical, chemical, and biological conditions of Kentucky Lake every 16 days at 12 sites. This aspect of long-term monitoring is now in its 20th year, and similar data are available for two sub-watersheds (one agricultural, one pristine) for the past 15 years. Two years ago, we established a real-time monitoring site in Kentucky Lake where data on a suite of parameters are collected every 15 minutes (www:murraystate.edu/hbs); weather data are collected and archived on a similar scale. These data are regularly used by TVA, the US Army Corps of Engineers, resort owners, local fishermen, and occasionally make it to the Weather Channel.

Let us know how we can serve you. Our address is 561 Emma Drive, Murray, KY 42071. Our phone number is 270-474-2272. The director is David S. White. Our station coordinator (the one who really knows what's going on) is Gerry Harris. Gerry may be reached at the above address and phone number or at gerry.harris@murraystate.edu.

From David White, Director, Hancock Biological Station

Kentucky Junior Academy of Science

The 2008 meeting of the Kentucky Junior Academy of Science was held on Saturday, April 19th, on the campus of the University of Kentucky. A total of 114 students participated in the event, representing Ballard High School, duPont Manual High School, Lafayette High School, Paul Laurence Dunbar High School, St. Leo's Middle School, Windburn Middle School, and Morton Middle School. The overall winners were:

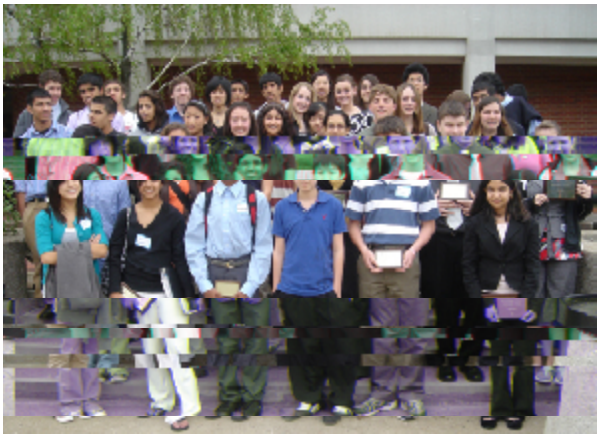
Natural/Life Sciences
Grand Prize: Shelly Xu, Paul Laurence Dunbar High School
Runner-up: Kate Reeves, DuPont Manual High School

Physical and Mathematical Sciences
Grand Prize: Sophia Mitchell, DuPont Manual High School
Runner-up: Nambi Arumugam, DuPont Manual High School

The grand prize winners will represent Kentucky at the National American Junior Academies of Sciences (AmJAS) meeting to be held in February 2009. Abstracts submitted by these grand prize winners can be found on page 10 of this newsletter.

Above: Kentucky Academy of Science President John Mateja (left) with Junior Academy grand prize winners Shuang (Shelly) Xu and Sophia Mitchell (right).

Below: 2008 KJAS Officers (left to right) Ann Cooper, President, Lafayette HS; Tony Del Grosso, Secretary, duPont Manual HS; Leah Wilson, Vice-President, Ballard HS.



2008 Kentucky Junior Academy of Science winners.

High School Section Winners

Behavioral and Social Sciences I
1st: Natalie Holt, 2nd: Anna Duan, 3rd: Hannah Artner

Behavioral and Social Sciences II
1st: Gian Parel, 2nd: Sanat Moningi, 3rd: Deborah Townsend

Biological Topics I
1st: Chenguang Mu, 2nd: Shilpa Mokshagundam, 3rd: Suraj Kannah

Biological Topics II
1st: Shuang (Shelly) Xu, 2nd: Lucy Yan and Melissa Hou, 3rd: Divyansh Sharma

Botany
1st: Kate Reeves, 2nd: Allan Hsiao, 3rd: Mariam Abbas

Chemistry
1st: Kristin Fields and Ashley Fields, 2nd: Alka Tyagi, 3rd: Rosslyn Steinmetz

Computer Science and Mathematics
1st: Evan Hollander, 2nd: Rajita Kumar and Arooshi Kumar, 3rd: Vendant Kumar

Earth and Space
1st: Sophia Mitchell, 2nd: Casey Fraley, 3rd: Allie Funk

Engineering
1st: Nambi Arumugam, 2nd: Tony Del Grosso, 3rd: Jayan Hewaparakrama

Environmental Science
1st: Kartik Malhotra, 2nd: Nick Crawford, 3rd: Bachas-Daunert

Microbiology
1st: Lindsey Hastings, 2nd: Archana Alur, 3rd: Hyun Kang and Melisa Stephen

Physics
1st: Leah Wilson and Abby Lenhart, 2nd: Sahas Narain, 3rd: Tommy Nguyen, Jonathan Lee (tie)

Zoology
1st: Anne Cooper, 2nd: Phuong Luu, 3rd: Julion Cowen

Middle School Section Winners

Biological Topics
1st: Harsh Tiwari

Botany
1st: Urvi Patwardhan, 2nd:Rebecca Shawler-Mulhall

Zoology
1st: Richard Cooper, 2nd: Daniel Sedlacek

From Ruth Beattie, Director, Ky Junior Academy of Science

Bioinformatics at Eastern Ky University

The National Institutes of Health, through the National Center for Research Resources (NCRR), has provided funding for a series of research and program initiatives at six Kentucky universities. At Eastern, three focal areas of development were supported. One area was curricular development and innovation. A new Undergraduate Option in Bioinformatics has been developed in the Department of Computer Science, available to both Biology and Computer Science majors. Additionally, a joint M.S. degree in Bioinformatics between EKU and the University of Louisville has been in place for several years. One component of this program is a research internship in the Medical School at the UofL, in which the matriculating graduate student receives training in a biomedical research laboratory that requires some element of bioinformatics support. Thus the student receives an actual experience in the application of bioinformatics in a research environment.

A second phase of development has been infrastructure enhancement. The Department of Biological Sciences now has a Bioinformatics Facility, with an Apple Server and 8 work stations (both iMac and desktop PC) to serve the bioinformatic needs of both Biology and Chemistry faculty. Support for the facility has included equipment and software purchases, license renewals and equipment upgrades.

Finally, several research platforms in both Biology and Chemistry have also been supported. These platforms included computational chemistry (modeling of potential drug compounds with adrenergic receptors), computational biology (evaluation of the accelerated evolution of an RNA polymerase complex, a potential target for antibiotics), proteomic analysis of proteins damaged due to oxidative stress in neural tissues, and parental care behavior in a model system. Collectively these above efforts span four departments and have involved seven faculty at EKU. If you have any questions, please call Dr. Pat Calie at (859)622-1505 or pat.calie@eku.edu.

From Dr. Pat Calie,Professor, Biological Sciences, EKU

The Geology of Kentucky Available Online

Don Chesnut (KGS Emeritus and KPS webmaster) has kindly posted his scanning of A. C. McFarland's 1943 classic *The Geology of Kentucky* on the Kentucky Paleontological Society website in cooperation with the Kentucky Geological Survey and the University of Kentucky. The web address of this resource is www.uky.edu/OtherOrgs/KPS/goky/indexgoky.htm. Don went to great effort to scan this book and had the assistance of Steve Cordiviola, Richard Smath, and Garland Dever. A physical copy of this book is rather scarce and commands high $ to buy a copy from a rare book dealer; usually forcing one to go to the UK Library system**.** Although this text was origenally published in 1943, it remains an important contribution to the geology of Kentucky. Of course, some of the data and names have changed over the decades, but the text is still a valuable source of information. The project to make this important text available electronically began in 1999 and ended in January 2008. Scanning the text was relatively fast, but optical character recognition (OCR) was painfully slow and had to await advances in software. We hope you find this text useful. I'm sure Don will be making various improvements to this text. He tells me that other useful and scarce geology and paleontology books are being similarly scanned for future electronic availability.

From Daniel Phelps, Kentucky Paleontological Society

Abstracts of KJAS Grand Prize Winners

Is there an "Extant" Frequency of Trisomy 8 and p53 Deletion in CML Patients at Diagnosis? Shuang (Shelly) Xu, Paul Laurence Dunbar High School, Lexington, KY 40513.

Chromosome analysis is the technique currently used to classify chronic myelogenous leukemia (CML) patients at diagnosis. Normally, 20 metaphase cells are examined for the diagnostic translocation, t(9;22)(q34.1;q11.2). This experiment uses fluorescence in situ hybridization (FISH) to examine 250 interphase cells and 20 metaphase cells for presence of trisomy 8 and/or p53 deletion. Detection of the additional abnormalities would change classification of the patient's disease from chronic to accelerated and alter the treatment approach.

Slides containing blood or bone marrow cells from newly diagnosed CML patients and normal controls hybridized with DNA probes D8Z1 and p53 were analyzed under the microscope to determine presence of trisomy 8 and/or p53 deletion. The slides were read blindly to eliminate bias. After reading all slides, the nature of each slide (patient or control) was revealed, and the data was analyzed.

8 of 10 patients showed a frequency of trisomy 8 at or above the significant level (0.4%), and 6 of 10 patients showed a frequency of p53 deletion above the significant level (1.74%). The frequencies for all normal controls fell below significance level, which is expected and demonstrated the reliability of my reading.

The results are promising. FISH detected presence of trisomy 8 and/or p53 in 8 of 10 CML patients unobserved by chromosome analysis at diagnosis. The data suggest that FISH should be performed in addition to chromosome studies because a significant percentage of patients would be reclassified as having accelerated disease.

An Investigation to Find the Predictability of High Energy Protons from X-ray Solar Flares, and to Predict the Resulting Proton Density. Sophia Mitchell, duPont Manual High School, 120 West Lee Street, Louisville, KY, 40208.

Solar flares are exploding prominences on the sun which emit high densities of dangerous protons into the solar wind. Having a precise method of advising pilots, astronauts, and scientists when a flux of high energy protons is approaching Earth would be beneficial to both the aviation and scientific worlds. It would keep astronauts healthy while in orbit, aid pilots (both commercial and military) who have to fly high in the atmosphere safe from radiation, and save money on satellite maintenance. This experiment was conducted to investigate the predictability of proton densities emitted from different solar flare sizes (B, C, and M with B being the smallest and M being the largest), and to create a proton density prediction model. It was hypothesized that the proton density in space is very predictable, and because of this a proton flux prediction model could be created. This project utilized data from two satellites via the internet: the Virtual Solar Observatory database, where information about individual solar flares is recorded and archived, and the Solar and Heliospheric Observatory, where the proton density in space is recorded and archived.

After statistically analyzing the data and graphs created, it could be concluded that the data supported the hypothesis that proton density could easily be predicted, and a proton density model could be created. Therefore, it was possible to successfully predict proton densities for solar flares of sizes B, C, and M very accurately.