Kentucky Academy of Science

NEWSLETTER

www.kyscience.org | Susan Templeton, Editor | August 2012

The Voice of Science in Kentucky

Enhanced Affiliates
- Bellarmine University
- Berea College
- Brescia University
- Centre College
- Eastern Kentucky University
- Georgetown College
- Kentucky Community & Technical College System
- Kentucky State University
- Midway College
- Morehead State University
- Murray State University
- Northern Kentucky University
- Spalding University
- Transylvania University
- University of Kentucky
- University of Louisville
- University of Pikeville
- Western Kentucky University

Honorary Patron
- Lumins Associates

Sustaining Member - $500 level
- Campbellsville University

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

Associate Member - $100 level
- WKU Crawford Hydrology Lab
- WKU Hoffman Environmental Research Institute

Faculty, staff and students at Enhanced Affiliate member organizations receive:

- ***free KAS membership***
- ***online access to KAS Journal***
- ***KAS Newsletter via e-mail***

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

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

(TENTATIVE PROGRAM)

KAS 98th ANNUAL MEETING

Hosted by Eastern Kentucky University and Berea College

FRIDAY, October 19, 2012

9:00 a.m. - 4:30 p.m.	KBRIN - NIH Proposal Development Workshop
3:00 p.m. - 5:30 p.m.	KAS Governing Board Meeting
6:00 p.m. - 7:30 p.m.	Registration
7:00 p.m. - 8:30 p.m.	SYMPOSIUM *Engaging Students in Global Health Research*
8:30 p.m. - 9:15 p.m.	KAS Sectional Officers Meeting
8:30 p.m. - 10:30 p.m.	Social

SATURDAY, October 20, 2012

7:00 a.m. - 5:00 p.m.	Registration
8:00 a.m. - 4:00 p.m.	Exhibitors
8:00 a.m. - 9:30 a.m.	Oral Presentations
8:00 a.m. - 4:00 p.m.	Scientific Posters on Display
9:30 a.m. - 9:45 a.m.	Refreshment Break
9:45 a.m. - 11:30 a.m.	Oral Presentations
10:00 a.m. - 11:00 a.m.	Kentucky Society of Professional Geologists – Business Meeting
10:00 a.m. - 11:30 a.m.	Kentucky Community & Technical College Meetings
11:30 a.m. - 12:45 p.m.	Lunch
11:30 a.m. - 12:45 p.m.	KAS Past President's Luncheon
1:00 p.m. - 2:15 p.m.	Oral Presentations
2:15 p.m. - 2:30 p.m.	Refreshment Break
2:30 p.m. - 4:00 p.m.	Oral Presentations
4:15 p.m. - 5:15 p.m.	PLENARY SESSION *Human Schistosomiasis - A Journey from Immune Responses to Mass Drug Administration* Dr. Daniel Colley
5:30 p.m. - 6:30 p.m.	Annual KAS Business Meeting & Reception
6:45 p.m. - 9:00 p.m.	ANNUAL AWARDS BANQUET

Inside this issue

Messages from the Executive Director

I look forward to seeing everyone at the 2012 (98th) KAS Annual Meeting on the campus of Eastern Kentucky University. Online pre-registration is now available. To receive a discounted rate, please pre-register for the meeting at www.kyscience.org by Friday, September 21, 2012. After this date all registrations must be completed on-site.
Meeting pre registrations rates are $10 for all students, $35 for regular KAS members and $60 for non KAS members. There will be no refunds after September 21. Onsite registration fees will be $15 for students, $50 for regular KAS members and $70 for non KAS members.

If you are not a KAS member and plan on joining KAS, please join and activate your membership prior to registering for the meeting to receive the member discount. If you have forgotten your KAS membership password you can retrieve the information as well as membership activation codes via the log in section on the KAS homepage.

KAS Annual Awards Banquet tickets remain $25/each except for students participating in the Undergraduate Graduate (URC) or Graduate Research Competitions (GRC). Banquet tickets for URC and GRC participants are $5/each. Please note we have a limited space for the banquet this year. Banquet tickets are first come first serve and tickets wi11 be taken at the door.

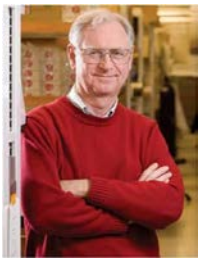
For your convenience, universities may pay for multiple meeting attendees at one time utilizing the Payment Only link found on the KAS website/annual meeting page. Payment should be made prior to attending the meeting to avoid a long wait when you arrive at the meeting. If you have questions please contact me at 859-227-2837.

Many of the 2012 KAS Annual Meeting functions will be held in the EKU New Science Building (below). Tours of this state of the art facility will be given during the upcoming meeting.

See you in October!

Jeanne Harris, KAS Executive Director

Annual Meeting Plenary Speaker & Symposium Panelists



Dan Colley is a University of Georgia Distinguished Research Professor of Microbiology and Director of the UGA Center for Tropical and Emerging Global Diseases, and a past Director of the Parasitic Diseases Branch of the US Centers for Disease Control and Prevention. Dr. Colley has worked extensively on the immunology of human parasitic infections in Brazil, the West Indies, Egypt, and Kenya. In 2008, he received a $19-million award from the Bill & Melinda Gates Foundation to find ways to identify, control and eliminate schistosomiasis. Dr. Colley's Plenary topic will be *Human Schistosomiasis - A Journey from Immune Responses to Mass Drug Administration;* his symposium panel topic is *Lessons Learned through Global Health Research in St. Lucia, Brazil, Egypt, Kenya and CTEGD.*

Nancy Rice is an Associate Professor of Biology at Western Kentucky University, where she developed the Partners in Caring: Medicine in Kenya (PiC:MiK) program, now in its fifth year. The program's aim is to stimulate global health awareness in pre-medical undergraduate students through hands-on international medical service-learning and research experiences. Currently, Dr. Rice and her students are examining the molecular mechanisms that lead to the high prevalence of essential hypertension (EH) in rural Kenya in a project funded through a KBRIN-AREA award. Her panel topic will be *Integrating Undergraduates in Substantive Global Health Research Projects: Lessons from Kenya.*

Carol Etherington is an Associate Professor of Nursing at Vanderbilt University and Associate Director of Community Health Initiatives for Vanderbilt's Institute for Global Health. She has worked with traumatized populations around the globe. She established one of the first police based counseling programs within the Nashville Metropolitan Police Department and has worked throughout the U.S. during times of natural and man-made disasters including earthquakes, hurricanes, school shootings and New York City post 9/11. She served on an international emergency medical team in the aftermath of the Pol Pot genocide. In the early 90s, she completed four missions in war-torn Bosnia, and since 1996, has worked with Médecins Sans Frontières (Doctors Without Borders) in Bosnia, Poland, Honduras, Tajikistan, Kosovo, Sierra Leone, Angola and in the Darfur refugee camps of Eastern Chad. Her panel presentation is *Perspectives on the Evolving Roles and Responsibilities of Academic Institutions in Global Health.*

Submitted by KAS President-Elect Cheryl D. Davis

NIH R15 AREA Grants - Proposal Development Workshop

Friday, October 19th, EKU, Location: To be announced

The Kentucky Biomedical Research Infrastructure Network (KBRIN) will again offer an intensive workshop on the development of National Institutes of Health (NIH) R15-Academic Research Enhancement Award (AREA) proposals. AREA grants are specifically designed to support small research projects in the biomedical and behavioral sciences conducted by faculty and students in colleges/universities and health professional schools that have not received more than $6 million in NIH research grants in four of the last seven fiscal years. Thus, faculty at all colleges/universities in Kentucky, except U of L and UK, are eligible.

The three main goals of the AREA program are: (1) to support meritorious research; (2) to strengthen the research environment of the institution; and (3) to expose students to research.

The workshop will be led by faculty at KBRIN institutions that have been successful in competing for AREA grants. The morning session is designed for faculty with little of no NIH grant writing experience, whereas the afternoon session is designed to enhance the competitiveness of more experienced faculty. Depending upon level of experience with the NIH, registrations will be accepted for the either the full day workshop or the afternoon workshop only.

The morning workshop will begin at 9:00 am EST and the afternoon session will begin at 1:00 pm EST. Lunch will be provided at noon.

The workshop is free and open to interested faculty at all Kentucky public and private institutions. As space is limited, please register by Friday, October 5th, by contacting Ms. Whitney Rogers, KBRIN UBM at whitney.rogers@louisville.edu or 502-852-3045.

For additional workshop information, contact Dr. Nigel Cooper, KBRIN PI (nigel.cooper@louisville.edu) or Dr. Bruce Mattingly, KBRIN program coordinator (b.mattingly@moreheadstate.edu).

This workshop is sponsored by the Kentucky Biomedical Research Infrastructure Network (KBRIN), which is supported by grants from the National Center for Research Resources (5P20RR016481-12) and the National Institute of General Medical Sciences (8 P20 GM103436-12) from the National Institutes of Health.

Submitted by Bruce A. Mattingly, Program Coordinator, Kentucky Biomedical Research Infrastructure Network (KBRIN)

Guidelines for Presentations

Oral: All presentations should be compatible with Power Point version 2007 for Windows and brought on a USB drive as the computers will not have a CD drive. You must be in your assigned room 15 minutes before your session is scheduled to start in order to load your presentation.

Poster: Each presenter will be provided with an easel and a 4x4 ft. poster board identified with a number that matches the presenter's number in the program booklet. All posters will be located in the New Science Building. This year the poster presentations will be divided into a morning (AM) session and an afternoon (PM) session. The week prior to the meeting the program will be listed on the KAS website and will show the AM and PM sections.

	Morning Session	***Afternoon Session***
Set up	7:30 - 8:00 a.m.	12:00 - 1:00 p.m.
Judging	9:00 a.m. until done	2:00 p.m. until done
Removal	11:30 a.m. - Noon	4:00 p.m.

If you have any questions, please contact Dr. Robert Creek, Program Coordinator, at robertcreek@bellsouth.net.

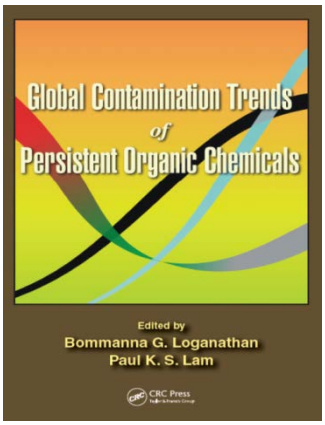
Abstract Submission Guidelines

The DEADLINE for submitting an abstract for presentation is SEPTEMBER 21, 2012. Forms will not be available after this date. There are a limited number of positions available for Oral presentations so submit as soon as possible. If a position is not available upon receiving your abstract you will be notified and given the opportunity to present a poster.

To submit an abstract for presentation, either Oral or Poster, go to the KAS website at http://www.kyscience.org. On the left side of the page click on ANNUAL MEETING and then select SUBMIT AN ABSTRACT. This page will allow you to log on as a member or non-member and then go to the form for Submitting an Abstract. YOU MUST BE PRE-REGISTERED in order to submit an abstract. If you have not there will be a link to the pre-registration page that will allow you to do so after which you will return to the Abstract Submission Form to submit your abstract. It is recommended that you go to the GUIDELINES FOR PREPARATION OF ABSTRACTS to make sure your abstract is in the proper format. Your abstract needs to be submitted in one of the following: Word 2007 (.doc), Rich Text Format (.rtf) or Acrobat PDF (.pdf). 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 time and location of your presentation. All presentations will be on Saturday, October 20. If you have any questions, please contact Dr. Robert Creek, Program Coordinator, at robertcreek@bellsouth.net.

Submitted by Robert Creek, Program Coordinator

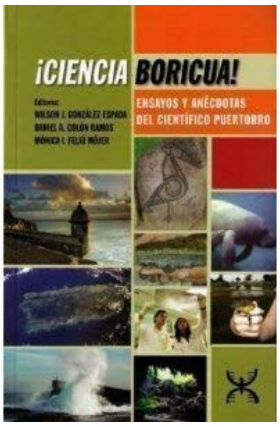
KAS Author's Corner



Loganathan, B.G. and Lam, P.K.S. (Editors). 2012. *Global Contamination Trends of Persistent Organic Chemicals*. CRC Press. Boca Raton, FL. 638pp . ISBN: 978-1-4398-3830-3.

Bommanna G. Loganathan, Ph.D., is a professor of environmental/analytical chemistry at the Murray State University (MSU), Kentucky, USA. His current research involves investigations on the distribution, environmental transformation, and fate of persistent organic/organometallic pollutants in the environment and their effects on wildlife and human health. A major focus of his research is to evaluate status and trends of classical as well as emerging pollutants in man-made freshwater lakes such as Kentucky Lake in comparison with natural lakes and marine ecosystems, and to assess the effects of these compounds on human natural killer cells' ability to kill cancer cells using in vitro assays. Paul K.S. Lam is Chair Professor of biology at the City University of Hong Kong with extensive research experience in marine environmental research. He is particularly interested in the responses of organisms to toxic chemicals and algal toxins, as well as the risk assessment of these compounds.

Environmental pollution by man-made persistent organic chemicals (POCs) has been a serious global issue for over half a century. Exposure to certain POCs may result in environmental and health effects including birth defects, diminished intelligence and certain types of cancers. Therefore, POCs have been the subject of an intensive regional, national and international effort to limit their production, use, and disposal of these chemicals. Since POCs are prevalent in air, water, soil, tissues of organisms (including wildlife and humans) throughout the world and cause long-term effect in organisms, trend monitoring studies are essential to make clear the behavior and fate of these compounds and to protect our environment and living resources. *Global Contamination Trends of Persistent Organic Chemicals* provides comprehensive coverage of spatial and temporal trends of "classical" as well as emerging contaminants in aquatic, terrestrial and marine ecosystems, including the Arctic and Antarctic ecosystems. Compiled by an international group of experts, this volume covers the history, present status, and projected future trends of environmental contamination by certain highly toxic synthetic chemicals. Relevant to professionals and students alike, this book facilitates the understanding environmental and biological behavior of these chemicals and development of strategies/practices for protecting the global environment for future generations.



Wilson J. González-Espada, Daniel A. Colón Ramos, and Mónica I. Feliú Mójer (Editors). 2011. *¡Ciencia Boricua!* CAPRIIC. ISBN-13: 978-1881748830. Language: Spanish.

Morehead State University's Dr. Wilson González-Espada, associate professor of physics and science education, along with Dr. Daniel Colón-Ramos, assistant professor of cell biology at Yale School of Medicine, and Mónica Feliú-Mójer, a Ph.D. candidate in neuroscience, Department of Neurobiology, Harvard Medical School, were editors of the book *¡Ciencia Boricua! Ensayos y Anécdotas del Científico Puertorro* (Boricua Science! Essays and Anecdotes by Puerto Rican Scientists).

According to Dr. González-Espada, the book "is culturally relevant, family-oriented, and accessible for the general public. We are convinced students will enjoy reading it because they will read about familiar places, neighboring communities and local contexts. Ciencia Puerto Rico also decided to publish the book because we noticed that most people were not aware of the high quality science that goes on in the Island."

The 235-page book aims to foster an interest in science among Puerto Ricans and Hispanics. Twenty-three Puerto Rican scientists from the Island and abroad collaborated in this effort, writing 61 short essays on diverse topics such as astronomy, biomedical sciences, geology, chemistry, and scientific research. *¡Ciencia Boricua!* was published by Ediciones Callejón and is available at Amazon.com. Proceeds from the sale of the book will help fund several of Ciencia Puerto Rico's educational projects.

Information is available from Dr. González-Espada at 783-2927; you can contact Ciencia Puerto Rico directly at contact@cienciapr.org for additional details.

Author Information Wanted!

If you are a KAS member and have recently published a science focused book please forward this information to the KAS newsletter editor (susan.templeton@kysu.edu) so that your accomplishment can be shared with other scientists in Kentucky. Please include the title of the book, your name/other authors and affiliation, and a brief synopsis regarding the subject matter of the book. KAS promotes the dissemination of the scientific interests of the Commonwealth of Kentucky. We look forward to hearing from you!

Updates from the KAS Journal

The next issue of the *Journal of the Kentucky Academy of Science* (Volume 72, Issue2) will be available shortly. Journal Editor Marty Matisoff has been working diligently to get the JKAS back on schedule.

We would like to acknowledge the following authors and thank them for their contributions to this issue:

- Tyler Morgan and Charles L. Elliott: "Comparison of Camera vs. Howling Surveys for Estimating Coyote (*Canis latrans* Say) Abundance in Central Kentucky."
- Jessica C. Lair and Jerry D. Cook: "A Study of a Common Misconception in Appalachian Kentucky Seventh and Eighth Grade Science Students: Free Fall and Inertia."
- Valerie Pence, David Taylor, Bernadette Plair, Susan Charls, and John Clark: "Micropropagation, Cryopreservation, and Outplanting of *Minuartia cumberlandensis*, the Cumberland Sandwort."
- Jaffer Mohammed, Moses Henderson, Rebecca Williams, Rukhsana Sultana, Joshua Owen, and Tanea Reed: "Quantitative proteomic analysis of differentially expressed proteins in Aβ(17-42) treated synaptosomes."
- Marco Ciocca and Jing Wang: "Watching and Listening to the Coefficient of Restitution."

We would also like thank those individuals who gave up their time to review the manuscripts. MANY THANKS. If you would like to become a peer reviewer, please contact our Journal Editor, Martin Matisoff, at martin.matisoff@kysu.edu. Your help is needed and greatly appreciated!

Submitted by Martin Matisoff, Journal Editor and Jeanne Harris, Executive Director

Hotel Options for the 2012 KAS Annual Meeting

Several Richmond hotels have room blocks that will be held at special Kentucky Academy of Science rates. The KAS website (http://www.kyscience.org/content/logistics.php) has a listing with location maps, rates, and cut-off dates for the following hotels:

- Best Western Holiday Plaza
- Days Inn
- Hampton Inn
- Jameson Inn
- Holiday Inn Express
- LaQuinta, and
- Red Roof Inn.

The Nature Conservancy

Preserving life. Protecting nature

Nature Conservancy Poll Results Released

The Nature Conservancy recently completed a bi-partisan national survey of voter attitudes about conservation with fascinating results—one of which is that four out of five voters think conserving America's lands and waters is patriotic. Results include:

- Three-quarters of the electorate believes that public lands are one of the things government "does best."
- In fact, public lands such as some of the iconic national parks, are far preferred in Americans' summer vacation plans.
- Three-quarters say that even with federal budget problems, funding for conservation should not be cut.
- Voters are willing to put their money where their mouth is. Fully 83 percent are willing to pay additional taxes to protect American land, water and wildlife.
- Underlying some of this support and willingness to pay may be a sense that there are economic benefits to conservation. Voters are twice as likely to say that protections for land, air, water and wildlife have a positive impact on jobs (41 percent), than a negative impact (17 percent), or little impact one way or the other (33 percent). Underlying some of this support and willingness to pay may be a sense that there are economic benefits to conservation.
- The overwhelming majority of American voters rejects the notion that protecting our environment is at odds.

For more information about how this poll was conducted, visit the Nature Conservancy Newsroom. You can visit our website at http://nature.org/kentucky to sign up for our Great Places e-newsletter to get free monthly updates about conservation in Kentucky and around the world.

Submitted by Terry Cook, State Director, The Nature Conservancy of Kentucky

Science Across the Commonwealth

WKU Professor's Work Recognized by Chinese

Dr. Chris Groves (left) has been named a finalist for the 2012 People's Republic of China Friendship Award, the country's highest honor for foreign experts who work in China. About 50 winners are given the award each year and will be honored Oct. 1, during the celebration of National Day, which marks the founding of the People's Republic of China.

Groves, a professor of geography and geology at Western Kentucky University, has been interested in caves since childhood, a passion that has taken him to study caves in China. He made his first trip to China in 1995 and has been back 25 more times since then. He'll embark on his 27th trip later this year.

The nomination recognizes Groves' work in China's karst landscape, which is an area with many caves. His main project in China deals with the water resources of the country's karst areas, working to help Chinese find and map where sources of water are in caves so they can drill wells there and collect the water. He's also part of a research team in China trying to understand how cave formation is affecting carbon dioxide levels and climate change.

New Statewide Chapter of the American Physiological Society

Drs. Robin Cooper (UK Biology), Michael Reid (UK Physiology), and Francisco H. Andrade (UK Physiology) have brought together physiologists from across the Commonwealth to form the Kentucky Chapter of the American Physiological Society (APS). The APS is an international organization with over 10,000 members that fosters education and research in the physiological sciences. The goal of the new Kentucky chapter is to bridge institutions and bring together researchers, educators and students interested in physiology. Later this year, this brand new APS chapter (which will be referred to as KYPhys) will hold its inaugural meeting at The University of Kentucky. Dr. Cooper announced "We encourage a state wide participation in the executive committee and the chapter that reflects the state wide membership. Please think about running for an office."

Founding officers are: President Dr. Robin L. Cooper, President Elect Dr. Michael B. Reid, and Secretary/Treasurer Dr. Francisco H. Andrade. You may contact Dr. Robin Cooper for further details at RLCOOP1@email.uky.edu.

James Krupa Receives Evolution Education Award

University of Kentucky Biology professor James Krupa recently received the 2012 Evolution Education Award from the National Association of Biology Teachers (NABT). This award recognizes innovative classroom teaching and community education efforts to promote the accurate understanding of biological evolution. Sponsored by the Biological Sciences Curriculum Study (BSCS) and National Evolutionary Synthesis Center (NESCent), the honor will be officially presented to Krupa at the NABT annual Professional Development Conference in Dallas, Texas. Krupa, who began teaching biology at UK in 1995, also received the NABT University Teaching Award last year.

In an interview with UK Information Specialist Sarah Geegan, Krupa noted "From a historical perspective, it is also amazing that I ended up here because the first (unsuccessful) effort to pass anti-evolution laws, led by William Jennings Bryan, was in Kentucky in 1921…At the time, John Thomas Scopes was a student at UK watching the efforts of his three favorite teachers: Funkhouser, Miller, and Terrell. The reason the Scopes Trial occurred is in part due to inspiration by these great teachers."

Scopes' trial, the landmark court case in Dayton, Tennessee, was the first effort to overthrow a state's anti-evolution law in 1925. Scopes was found guilty of teaching evolution, and this decision was later thrown out on a technicality. Krupa said that he considers the nearly century-old case as motivation to provide exemplary teaching.

"I think it is great that the NABT has an award for teaching evolution," Krupa said. "It is such an important subject of biology that we must be encouraged to teach it as well as possible in every high school and college biology class."

The complete article with Krupa's interview is available online at http://bio.as.uky.edu/teaching-evolution.

UK Biology professor James Krupa

Themes in Evolution II: Mutual Aid and Peter Kropotkin

Not all of the forces driving evolution are competition for limited resources or striving to live at the expense of others. Mutual aid and cooperation were observed by the Russian prince Peter Kropotkin (1842-1921) who tried to explain them. Lee Alan Dugatkin, Professor and Distinguished University Scholar in the Department of Biology at the University of Louisville, is an authority on the "Prince of Evolution," who recognized the importance of Darwinian evolution in his time and sought to align it with his observations of communities of animals, including humans, in harsh Siberian environments. There, Kropotkin saw "the overwhelming importance which sociable habits play in Nature and in the...evolution of animal species and human beings." Kropotkin disagreed with "the followers of Darwin...[who] reduced the notion of struggle for existence to its narrowest limits and..[viewed] the animal world as a world of perpetual struggle among half-starved individuals." Kropotkin saw that evolution had resulted not in "that bitter struggle for the means of existence, among animals belonging to the same species," but the struggle of animals together "against an inclement Nature." Mutual aid was a fact of evolutionary history, "necessary for the preservation [and] welfare,...of every species." Hundreds of members of species of birds, rodents, and deer acted together in mutual aid and support to accomplish mutual survival. Mutual aid, was "...met with even amidst the lowest animals." In a statement reflecting his intuition that paramecia and algae may behave in cooperative ways, Kropotkin wrote "... we must be prepared to learn some day, from the students of microscopical pond-life, facts of unconscious mutual support, even from the life of microorganisms."

Kroptkin identified his "mutual-aid instinct" with what Darwin called a "permanent instinct," always at work in all social animals. Far from it being a moral imperative, he argued that "sociability is as much a law of nature as mutual struggle, and for him "sociability and intelligence always go hand in hand....The idea of good and evil has ...nothing to do with religion or a mystical conscience. It is a natural need of animal races."

In this view, Kropotkin was opposed by most Darwinians of his time, including Thomas Henry Huxley, one of Darwin's greatest promoters and defenders. Huxley's view focused on those evolutionary forces that were competitive, violent, and brutal in the "struggle for existence," whereby "the strongest, the swiftest, and the cunningest live to fight another day." But Kropotkin saw that "...those animals that acquire mutual aid are undoubtedly the fittest," and gave examples throughout nature: "... the burying beetles...live an isolated life, ...but when one of them has discovered the corpse of a..bird, which it could hardly bury itself, it calls...other beetles [who] perform the operation without quarreling as to which one will lay its eggs..." The examples of cooperation in ant colonies were favorites of Kropotkin: "...the ants greet each other and if one ...is hungry or thirsty, and especially if the other has a crop full...it immediately asks for food. The individual thus requested never refuses."

Reciprocity is not parasitism, but involves a kind of mutual benefit to both cooperating individuals. Reciprocal altruism is mutual aid that involves a lag between the time of initial giving and repayment. One individual's act benefits another individual, and is repaid at a later time. Reciprocal altruism requires that individuals recognize the beneficiaries of their acts, and the individuals who aid them. In primate societies, for example, kin recognition and friend-enemy discriminations may have spread throughout a population in part by the evolution of females' protective behaviors of their offspring.

However, in a population in which altruist-recognition genes are a majority, it may happen that an individual recognizes the altruist and takes advantage of the altruist by gaining favors from him without repaying the behavior. Kropotkin saw the human society of instinctive mutual aid threatened by what he called "parasites" in the form of individuals who tried to coopt all resources for themselves, without returning anything to others. For Kropotkin, parasites could be eliminated, along with the environment in which they thrived.

Another solution to the problem of "parasites," a genetic solution, has been proposed, suggested by game theory. In a population of individuals, some of which do altruistic behaviors, and some which accept, but do not repay, the "parasites" gain an advantage if benefits are higher than the cost of doing the behavior. However, if enough individuals remember incidents of serving and not being served in return, an evolutionary stable strategy can exist in a population. The exploiters will always be favored in the pay off, and individuals who always emit favors will be exploited, but individuals who "keep score" and do not give favors to those who do not repay them will strike a balance with the exploiters.

Even inner, unseen states, the same as those underlying classical drive-reduction theories of motivation, were proposed by Kropotkin as the origin of altruistic behavior. Since animals act to repeat behaviors that are followed by satisfying outcomes, as E.L. Thorndike proposed in his law of effect, Kropotkin saw evolutionary benefit for animals that associated ethical acts with pleasurable outcomes: "When monkeys [have] seen one of their members fall [from] a hunter's shot, these monkeys obey a feeling of compassion stronger than personal security. The feeling becomes so oppressive that [they] do everything to get rid of it."

Kropotkin recognized that human behavior and societies could be studied using the same scientific methods with which the evolutionary biologists studied all nature. Evolutionary science is founded on the premise of the continuity of species; as Kropotkin realized, "there is no cause for suddenly changing our method of investigation when we pass from the flower to man or from a settlement of beavers to a human town." In Peter Kropotkin's view of evolution, from ants rushing into flames to save their kin, through primate societies, the animal world knows "...what is good and what is bad, without consulting Bible or Philosophy."

Further Reading

Dawkins, R. (1976). The selfish gene. New York: Oxford University Press.

De Waal, F. (1996). Good natured; The origins of right and wrong in humans and other animals. Cambridge, MA: Harvard University Press.

Dugatkin, L.A. (2011). The prince of evolution; Peter Kropotkin's adventures in science and politics. Printed by CreateSpace, an Amazon.com company.

Submitted by Mary Janssen, Ph.D.,
Member-at-Large, Governing Board KAS

Posters-at-the-Capitol 2013

The 2013 Posters-at-the-Capitol will be held on Thursday, February 21st. Providing undergraduates with the opportunity to engage in scholarly, research, and creative work is important to our students' educational experience and professional development. We encourage faculty to have their students participate in Posters-at-the-Capitol to help those in Kentucky who fund higher education understand why these experiences are so important. If you are an undergraduate, we urge you to tell your story to your hometown and university legislators so that other Kentucky students can enjoy and benefit from the kind of experience you have had. The registration and abstract submission deadline is October 17, 2012. You may register at the P@C website at http://campus.murraystate.edu/services/URSA/.

P @ C Organizing Committee / Campus Contacts

Eastern Kentucky University
Dr. Darrin Smith darrin.smith@eku.edu

Kentucky Community and Technical College System
Dr. Mary Janssen marye.janssen@kctcs.edu

Kentucky State University
Dr. George Antonious george.antonious@kysu.edu

Morehead State University
Dr. Shannon Harr s.harr@moreheadstate.edu

Murray State University
Jody Cofer jody.cofer@murraystate.edu

Northern Kentucky University
Dr. Dan Curtin curtin@nku.edu

University of Kentucky
Dr. Diane Snow/
Ms. Evie Russell evie.russell@uky.edu

University of Louisville
Dr. Pamela W. Feldhoff pamela.feldhoff@louisville.edu

Western Kentucky University
Dr. Blaine Ferrell blaine.ferrell@wku.edu

Kentucky Competes Very Well in a National Competition

Society for Science and the Public, the organization that puts on the International Science and Engineering Fair, has partnered with the Broadcom Foundation to continue a tradition of encouraging young scientists to inquiry, independent research, hands-on-learning and teamwork through a competition for middle schools.

Middle school students are nominated to compete in the Broadcom M.A.S.T.E.R.S. (Math, Applied Science, Technology and Engineering for Rising Stars) competition at SSP affiliated science fairs held during the school year. From all entrants nationally, 300 semifinalists are selected, from which 30 finalists will be selected to go on an all-expense paid trip to Washington, D.C. to compete for awards and prizes with the top award being an education award of $25,000.

Kentucky's state science fair and 5 regional fairs are affiliated with SSP. Kentucky had 10 students selected as semifinalists from these fairs; our state ranked 7th nationally in the number of semifinalists selected. The names of the Kentucky's semifinalists and their schools are as follows.

- Joanna Slusarewicz – Winburn Middle School
- Amanda Wallin – Lexington Traditional Magnet School
- Cassa Drury – St. Francis of Assisi
- Logan Franxman – St. Pius
- William Southall – Lexington Christian Academy
- Sarah Schwartz – Meyzeek Middle School
- Sophie Korner – Meyzeek Middle School
- Diya Mathur – Meyzeek Middle School
- Sasank Vishnubhatla – Meyzeek Middle School
- Jiazhen Yang – Meyzeek Middle School

The 2012 Broadcom M.A.S.T.E.R.S. finalists will be announced August 29. Visit the Broadcom website http://www.societyforscience.org/masters to see how Kentucky's semifinalists did, or follow the 2012 Broadcom MASTERS on Facebook!

The Girl Scouts in Fayette County are planning an exciting STEM program for girls - GEMS (Girls in Engineering, Math and Science). The University of Kentucky Department of Engineering is partnering to host 250 girls in grades 4-12 at hands-on workshops held November 10, 2012, from 10:30 am to 4:00 pm. Girls from the 67 county jurisdiction of the Wilderness Road Council will attend. Contact Susan Miller, smiller@gswrc.org, if you're interested in leading a workshop at the event.

Submitted by the Kentucky Girls STEM Collaborative Project

Kentucky Heritage Land Conservation Fund

Upper Green River Biological Preserve of Western Kentucky University

Drs. William H. Martin and Richard K. Kessler
(Contributions from Drs. Albert and Quida Meier)

The Western Kentucky University Upper Green River Biological Preserve is nearly 1200 acres of land purchased through the Kentucky Heritage Land Conservation Fund (KHLCF). It is located on both banks of the Green River in Hart County, Kentucky, about 2 miles upriver of Mammoth Cave National Park. Two of the land tracts within this contiguous aggregation belong to the state's Wild Rivers program, but are managed by WKU. The mission of the Upper Green River Biological Preserve is to foster knowledge and protection of this diverse region and our natural heritage through research, education, and conservation. The habitats of the Preserve include bottomlands, uplands, barrens, caves, limestone glades, sandstone "rockhouses", waterfalls, karst springs, and of course, the river itself. The upper Green River and its tributaries are centers of diversity for freshwater mussels and fish, hosting 109 fish species and nearly 60 mussel species. The Preserve lands surround several mussel beds including one where five federally listed endangered mussels have been documented historically. McCoy Blue Hole is a large spring on the northern part of the Preserve. It empties an underground karst drainage that is also habitat for the endangered Kentucky cave shrimp. The federally endangered gray bat has been recorded from a cave on the Preserve and the land also provides critical breeding and migratory habitat for neotropical songbirds along the Green River corridor. Bald eagles patrol the river for unaware fish. During winter months, large flocks of sandhill cranes announce their presence for all to hear. The Preserve is truly a jewel in conserving critical elements of Kentucky's biodiversity.

Western operates a biological station on site to facilitate research and instruction. Here, students engage in research on the influences of barrens restoration on songbirds. Faculty and students try to deduce the structure of riverine food webs by examining stable isotopes. Current student research projects include bioacoustics to study frogs and birds; effects of prescribed fire on forest herbs; and movements of cave salamanders. Ecology classes use the land and the Green River for a variety of outdoor laboratory exercises. Archeology classes search for artifacts and reconstruct settlement history, while students of vernacular architecture restore the oldest house in Hart County.

Over 80 acres of barrens (Kentucky's historic grasslands) have been recreated on site with diverse seed mixes and plugs of rare plant species. Thirteen thousand bottomland hardwood trees including Dutch elm disease-resistant American elm and canker-resistant butternuts have been planted in the alluvial floodplain. Scattered plots of vernal herbaceous wildflowers including twinleaf, Jacob's ladder, Dutchman's breeches and woodland poppies have also been planted. The Preserve plans to recreate a marsh in the alluvial floodplain.

The first land purchase of the WKU Upper Green River Biological Preserve was funded by the KHLCF ten years ago and Western has just begun to explore the opportunities to study and restore the rich biodiversity of the upper Green River watershed. Drs. Albert and Quida Meier at Western have been instrumental in the development of this Biological Preserve. Their involvement, leadership, and dedication to management of this land has been recognized with Western Kentucky University receiving the initial Stewardship Award presented by the KHLCF Board for excellence in land conservation and stewardship.

All colleges and universities—public and private—can apply for Kentucky Heritage Land Conservation Funds to preserve and conserve natural lands that they can utilize for outdoor education experiences; ecological, geologic, and archeological research; provide these lands to K-12 schools in immediate and surrounding communities; and provide outdoor recreation for communities in their area. KAS members are urged to consider land protection and conserving biodiversity by taking advantage of this opportunity.

Other universities have KHLCF projects and we'll be discussing them in future newsletters.

NEW LICENSE PLATES

Please support the Kentucky Heritage Land Conservation Fund by buying one of the plates. The additional $10 for the plate will go directly to the Fund.