



Kentucky Academy of Science

The Voice of Science in Kentucky

NEWSLETTER

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Susan Templeton, Editor

May 2012

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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.

Please mark your calendars for the 2012 KAS Annual Meeting which will be hosted by Eastern Kentucky University. The dates are OCTOBER 19-20 which is earlier than prior years. The deadline for pre-registration and abstract submission is September 21.

From the Editor...

The middle school, high school, and college students who participated in the programs featured in this issue of the KAS Newsletter reflect the bright side of the future of science in our state and our nation. The increase in the number of students participating in the Junior Academy and state Science Fair is encouraging. KAS members who served as judges at one of these competitions, or as mentors for students presenting at Posters-at-the-Capitol, were surely impressed with the variety and quality of the work these students have produced. It is important, therefore, that we constantly improve the quality of science education that these future scientists receive in the public schools. The 2012 [State of State Science Standards](#) report gives Kentucky a "D", a grade unchanged since 2005. Hopefully the adoption of Next Generation Science Standards (<http://www.nextgenscience.org/>) will address some of the problems. Additionally, we must keep mindful of efforts that could impede the progress in science education. One example of such efforts is a law recently enacted in Tennessee (<http://www.nature.com/news/tennessee-monkey-bill-becomes-law-1.10423>).



KAS President Dawn Anderson with the KJAS Annual Meeting winners. See the KJAS article on page 9.

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Messages from the Executive Director

Please welcome our newest Lifetime Members, Dr. Julia Carter with the Wood Hudson Cancer Research Laboratory and Mr. Gordon Lamb. Thank you for your support!

I am also pleased to share the University of Pikeville has increased their level of KAS affiliation to Enhanced! UPIKE faculty, administration, staff and students are now entitled to complimentary KAS annual memberships. Please join KAS online at www.kyscience.org using your University of Pikeville email address. Feel free to contact me if you have any questions.

KAS membership continues to grow and KAS now has approximately 2300 members! Since the beginning of 2012, 185 University of Louisville faculty, staff, and students have joined our organization. I would like to encourage all of member institutions to meet or exceed the level of U of L's increased participation in KAS.

Mark your calendars for the 2012 KAS Annual Meeting October 19-20 at ECU. Historically KAS annual meetings have been in November but due to limitations beyond our control, the meeting will be held in October so please plan accordingly. The deadline for pre-registration and abstract submissions will be Friday, September 21. Updates have been made to the meeting pre-registration and abstract submission webpage to make this a more user friendly process.

If your organization would like to exhibit or participate as a sponsor at the 2012 KAS Annual Meeting, contact Jeanne Harris (executivedirector@kyscience.org) regarding this opportunity.

Have a wonderful summer and see you in October!

Jeanne Harris, KAS Executive Director

Hotel Options for the 2012 KAS Annual Meeting

The following Richmond hotels have room blocks that will be held until September 3; please make your reservations by this date. Ask for the Kentucky Academy of Science rate.

Hotel	Address/Phone	Rate
LaQuinta	1751 Lexington Rd 859-653-9121	\$56/night plus tax
Best Western Holiday Plaza	100 Eastern Bypass 859-623-9220	\$69.99 (2 people) \$79.99 (3-4)
Hampton Inn	1099 Barnes Mill Rd 859-626-1002	\$91/night plus tax

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 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 (one paragraph) 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!

Call for Nominations for the 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
- Physical Sciences Representative
- Social & Behavioral Sciences/Science Education Representative

Any member may nominate another member for Vice President. However, for Physical Sciences and Social & Behavioral Sciences/Science Education representatives, the nominators must identify with the Division for which they are nominating. Please send nominations by **August 1, 2012** to:

Sean Reilley, Chair
KAS Nominations and Elections Committee
Department of Psychology
438 Reed Hall
Morehead State University
Morehead, KY 40351
(606) 783-2985
dr.sean.reilley@gmail.com

KAS Research Grants Awarded

George Antonious, Committee Chair, reported the electronic submission of the 2012 research grant proposals worked well. The Committee received 15 proposals for the Special Research Grant category. Dr. Antonious shared the Committees recommendations for the 2012 KAS Grant Awards with the KAS Board:

Special Research Program

1. (\$5000): Jarrett Johnson, Western Kentucky University: Comparative landscape genetics of amphibians.
2. (\$5,000): Chris Trzepacz, Murray State University: Assessment of neurodegeneration in a novel *C. Elegans* model of tauopathy.

Undergraduate Research Program:

1. (\$500) Quanta Taylor (Iva Katzarska-Miller), Transylvania University: Racial Identity development: Examination of the cross nigrescence theory and the experience of black students attending a predominately white university.
2. (\$500) Ben Adams (Ben Brammell), Asbury University: Effects of atrazine on chemical alarm cue response in predator and prey conarachid species

Marcia Athey:

1. (\$1,118) Jeffery Masters, University of Louisville: Effects of leaf litter depth on *ranunculus ficaris* (Ranunculaceae)
2. (\$764) Ryan O'Connor (Gary Ritchison), Eastern Kentucky University: Breeding biology of Chuck-Will's widows: nest-site selection and habitat use
3. (\$500) Kevin Tewell (Jarrett Johnson), Western Kentucky University: Comparative landscape genetics of the marbled salamander: *Ambystoma opacum*

These recommendations were approved by the KAS Board as listed. There were no submissions for the Botany Fund Grant and the monies available will roll over to the following year.

The Academy would like to acknowledge the following individuals for all of their hard work as proposal reviewers: George Antonious (Chair), Kentucky State University; James (Ricky) Cox, Murray State University; Gary Ritchison, Eastern Kentucky University; KC Russell, Northern Kentucky University; and Ilsun White, Morehead State University.

Ky Society of Professional Geologists to Hold Joint Meeting with KAS

The Kentucky Society of Professional Geologists will hold their annual meeting in conjunction with the 2012 KAS Annual Meeting.

Superlative Award Nominations Sought

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.

- Outstanding Academy Service
- Distinguished College/University Scientist
- Outstanding College/University Teacher
- Outstanding Secondary School Science Teacher
- Outstanding Early Career in Post-Secondary Education Award
- Distinguished Professional Scientist (in a non-academic position)

For information about Superlative Award criteria and information required for nomination packets please visit <http://kyscience.org/content/nominations.php>.

August 15, 2012 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.

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UK Science Outreach Center to Celebrate a Major Milestone

The University of Kentucky Outreach Center for Science and Health Career Opportunities is celebrating the 100-year birthday of their home on campus on Friday, June 8, 2012 with an Open House and reception.

The event will be from 10:00 am to 2:00 pm on the first floor of the Medical Annex 5, located just off University Drive, behind the medical complex and home to the Outreach Center since 1993. Kentucky Science Teachers Association and Kentucky Academy of Science members are invited to attend.

In addition to celebrating with food and refreshments, all divisions of the Outreach Center will showcase the many education programs they provide for Kentucky youths interested in the fields of health and science.

Please come join us in celebrating the wonderful history of Annex 5 and the continued work of the Science Outreach Center.

Science Across the Commonwealth

Call For Papers: Climate Change Conference

**BELLARMINE UNIVERSITY, LOUISVILLE
KENTUCKY, SEPTEMBER 22**

The Center for Regional Environmental Studies at Bellarmine University will host a conference titled “Climate Change: What Do We Know, and How Do We Know It?” on Saturday, September 22, 2012. The conference is supported by a grant from NASA Kentucky EPSCoR, and by Bellarmine University. Dr. Gavin Schmidt, climate scientist at NASA’s Goddard Institute for Space Studies and Center for Climate Systems Research, will give the keynote address.

Audience for the conference will include climate scientists, environmental professionals, teachers, government and business leaders, and media representatives. Our purpose is to share a current understanding of climate science with regional professionals, who can in turn engage the public in evidence-based discussions of this important topic.

Participants who reserve a seat at the conference prior to August 31, 2012 may attend at no cost. Presenters may apply for funding to defray travel expenses by contacting Dr. Robert Kingsolver (see address below). Teachers in attendance will receive a digital packet of instructional guides and lesson plans aligned with the new Common Core standards on climate change.

Presentations will not focus on policy questions, but will instead emphasize research methods, data interpretation, and current scientific findings. The Center will entertain proposals for talks, posters, or panel discussions on climate-related projects, including geological studies of past climate phenomena, documentation of current climate changes, observations of ecological responses to climate shifts, and climate modeling.

Scientists interested in future collaboration on climate-related research in Kentucky and surrounding states are invited to a dinner and discussion with Dr. Schmidt on Friday September 21, the evening prior to the conference. Colleagues interested in participating are invited to contact the Center with reservation requests by August 1, 2012.

Prospective presenters should send a 500-word abstract in MS Word format by **August 1, 2012** to Dr. Robert Kingsolver, Dean and Director, Center for Regional Environmental Studies, Bellarmine University, 2001 Newburg Road, Louisville Kentucky 40205. Submissions can also be sent by e-mail to kingsolver@bellarmine.edu

Kentucky Space Announces Design of New Orbital Satellite

In February, Kentucky Space (KS) announced that it is beginning the design of its next orbital satellite KySat 2 with an expected launch the latter part of 2013. The satellite will carry a number of technology validation experiments including one exploring the effect of the space environment on a novel chemical solar cell coating. Kentucky students will play a primary role in the design and building of KySat 2.

Kentucky Space is an ambitious collaborative enterprise focused on R&D, educational, and small entrepreneurial space solutions. In addition to having been involved in developing and flying high-altitude balloons, orbital and suborbital space craft, KS has developed and flown payloads to the International Space Station (ISS). It has also just created the Exomedicine Institute to design and conduct R&D into medical solutions in the microgravity environment of space.

For more information, visit <http://www.kentuckyspace.com>.

Introduction to a new series of KAS Newsletter articles

Evolutionary principles and hypotheses derived from them drive research in all areas of biology, including biogeography, population genetics, development, ecology, and bioinformatics. In Kentucky, researchers in laboratories and in the field investigate the genetics and behavioral phenotypes of organisms, from microorganisms such as *Caenorhabditis elegans*, to frogs and salamanders, and including primate social behaviors. Their work contributes to the understanding of evolutionary processes taking place on the earth over vast spans of time.

KAS is starting a series of articles that will present brief accounts of the research of scientists across Kentucky, whose work investigates evolutionary themes and demonstrate how findings in genetics, classification, morphology, and ecological adaptation of species add to the knowledge of dynamics of evolution. The first article, in this issue of the KAS Newsletter, is about the work of Howard Whiteman of Murray State University on adaptive morphology of salamanders.

If you are a scientist working in an area of research that has implications for evolutionary themes, and you would like to contribute an article, please contact:

Mary Janssen, Ph.D. (marye.janssen@kctcs.edu),

Nancy Martin, Ph.D. (ncmart01@louisville.edu), or

Pamela Feldhoff, Ph.D. (pwfeld01@louisville.edu).

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

Themes in Evolution I: Facultative Paedomorphosis in Tiger Salamanders

Polyphenisms are adaptations to predictable variations in the environment that occur in a number of species, including amphibians such as the tiger salamander (*Ambystoma tigrinum*) of western Colorado, a cylindrical-tailed amphibian that lives in permanent ponds. Howard



Whiteman at Murray State University seeks to understand mechanisms underlying the two pathways these salamander larvae may “choose” to adulthood - metamorphosing into a terrestrial adult, or attaining sexual maturity while retaining larval gills and remaining in the ponds. In metamorphosis, a terrestrial adult stage is reached that is different from the immature form, when the juvenile larva with external gills and keeled tail changes into the adult air-breathing amphibian. However, if the salamander larvae become paedomorphic in an alternative path to adulthood, sexual maturity is reached with the retention of external gills and other juvenile features. The sexually mature paedomorph continues to live in its original watery habitat. Its life history, from eggs to carnivorous larval adult, can take years to complete.

Environmental conditions provide the trigger for genetic variation that underlies alternative polymorphisms such as larval or terrestrial adults. Mechanisms exist in these amphibians, as in insects, to assess body size and condition, as well as population density. The “decision” whether to be a terrestrial adult or a paedomorphic adult depends in part on the environmental factors of population density and the presence of insects as a food source, but there is no systematic correlation between low/high density and the choice of morphology. Two theories as to the mechanism for the “choice” of facultative paedomorphosis exist. One proposes that in uncrowded pond conditions with the presence of large insects as nourishing food, larger salamander larvae become paedomorphic to take advantage of favorable pond conditions (“paedomorphic advantage”). However, Whiteman found that with high population density, smaller larvae may “make the best of a bad lot” by attaining sexual maturity through paedomorphosis.

Whiteman and his colleagues examined the usefulness of the “paedomorphic advantage” and “best of a bad lot” hypotheses. They compared the developmental fate of multiple cohorts of salamander larvae from several different permanent sub-alpine ponds in Colorado, where larvae take 2-3 summers to mature as metamorphic or paedomorphic adults. These researchers were able to associate environmental variables influencing larval growth with the frequency of paedomorphs.

Since the Colorado ponds are not drying, cohorts from successive years live together in the ponds. Cohorts that follow in the same pond develop in the environmental context of high densities and depressed resources. Whiteman and his team could assess relationships between external stimulus factors in larval growth and numbers of larvae becoming paedomorphs. The researchers examined body size, density of population, and size structure, or the variability of body size within a pond. In some ponds, larvae were closer to the same

size, therefore within a smaller size range, while in other ponds containing different cohorts, the range of larval size varied greatly, with extremes of large and small individuals present.

Whiteman monitored a population of tiger salamanders in five permanent ponds between 1988 and 2002, using capture-recapture methods. His results showed that most larvae that became paedomorphic adults were smaller, with poorer body condition, than larvae that underwent metamorphosis. The percentage of larvae that matured as paedomorphic, gill-retaining adults was negatively related to body size and condition, but was positively related to size structure in the ponds. There were more paedomorphic adults in ponds with greater variability in sizes of larvae. These researchers were able to show paedomorphosis to be an adaptive solution that allows smaller larvae to make the “best of a bad lot,” rather than large larvae taking advantage of favorable environmental conditions. In habitat conditions with several cohorts, in which large larvae might prey on smaller larvae, or at least compete for resources, the “choice” to attain sexual maturity as a larval adult is an adaptive solution to the problem of staying alive to reproduce the next generation.

Heterochrony, the dissociation of rates of development of somatic organs and systems, is one factor underlying evolutionary change. Changes in the time of maturity, and therefore potential of reproduction, of an animal relative to its somatic development may make it possible for a new type of adult to emerge, one more likely to be able to adapt to its environment. Heterochrony is an ultimate cause of evolutionary change. Adaptation of the individual is not for a future goal, however, but is in the here-and-now, and each change must serve a present need of the animal.

One theory of the change from an aquatic to land life history has come from Alfred Sherwood Romer, who proposed that during Devonian times, fish in shallow or drying pools might have benefitted by being able to escape drying pools for terrestrial habitats, or for another, distant pool. Present amphibians have life histories variously adapted to both land and watery environments, including the borderline environments of swamps and marshes. The polymorphisms of the tiger salamander serve the animal by offering the individual a choice of alternative life histories, depending on genetic and environmental factors.

Further Reading

- Dawkins, R. (2004). *The ancestor's tale: A pilgrimage to the dawn of evolution*. Boston: Houghton Mifflin.
- Gould, S.J. (1977). *Ontogeny and phylogeny*. Cambridge, MA: Belknap/Harvard University Press.
- Whiteman, H.H., Wissinger, S.A., & Brown, W.S. (1996). Growth and foraging consequences of facultative paedomorphosis in the tiger salamander, *Ambystoma tigrinum nebulosum*. *Evolutionary Ecology*, 10, 433-446.
- Whiteman, H. H., Wissinger, S.A., Denoel, M., Mecklin, C.J., Gerlanc, N.M., & Gutrich, J.J. (2011). Larval growth in polyphenic salamanders: Making the best of a bad lot. *Oecologia*, 168, 109-118. DOI 10.1007/s00442-011-2076-z
- Whiteman, H.H. (2004). The secret lives of salamanders. Colorado Outdoors. May/June.



Posters at the Capitol 2012

Posters-at-the-Capitol (Posters@Capitol), the annual exhibition of undergraduate research from Kentucky state colleges and universities and the Kentucky Community & Technical College System (KCTCS), took place in January

2012 in Frankfort. Research projects representing areas of sciences included themes in microbiology and applied biomedical research, techniques and applications of nanoparticles in medical research and drug delivery procedures, environmental monitoring, and environmentally favorable agricultural techniques, as well as research integrating psychological themes and demographics with coincidence and treatment of disorders such as obesity and diabetes.

Environmental themes were reflected in habitat studies. Environmental monitoring of the Bee Creek watershed was reported in several studies. Dylan Benningfield and his mentor, Bommana Loganathan, from Murray State University, reported triclosan levels and coliform and bacterial counts in water from Bee Creek, Clark's River, and Red Duck Creek in Kentucky. There may be a negative correlation between triclosan levels and bacterial counts due to the antibacterial nature of triclosan. Katlyn Hitz, with faculty directors Howard Whiteman and Chris Mecklin of Murray State University, studied the effect of herbicides used to manage common water reeds (*Phragmites australis*) on the diversity of breeding frog species at Clear Creek Wildlife Management Area. Surveys of anurian species using recorded frog calls at three sites showed no decreases, but researchers expected diversity to decrease as phragmites die and habitat changes. Matthew D. Fitzgerald and his faculty mentor, Micah W. Perkins, from KCTCS Owensboro Community and Technical College, captured and measured endangered copperbelly water snakes (*Nerodia erythrogaster neglecta*) to determine a baseline population level to measure future change.

Effects of environmental pollutants and alternatives to toxic fertilizers were considered in agricultural research themes. Kyla Ross and mentors George Antonious and Tejinder Kochhar of Kentucky State University, examined the fate of field-applied synthetic pesticides by spraying endosulfan on pepper and melon plants and sampling plant tissue with a gas chromatograph at various times after spraying. Their results showed metabolites of endosulfate in residues. Early high residues of endosulfan on pepper leaves before dissipation could be important indicators for timing field operations, since endosulfan is toxic to mammals. An environmentally favorable agricultural outcome to reduce populations of stink bugs on organically-grown blackberries by timely mowing was reported by Marquita Grayson-Holt and mentors John D. Sedlacek, Karen L. Friley, Kirk W. Pomper, and Jeremiah D. Lowe from Kentucky State University.

Air pollution as a risk in heart and cardiovascular disease was reported by Daniel Murphy and mentors Daniel Conkin and Petra Habertzettl of the University of Louisville. These

researchers investigated effects of pollutants and obesity combined, on increased risk of cardiovascular disease, by way of endothelial progenitor cells, important in cell repair and cardiovascular health. Mice exposed to high levels of air particulate matter and/or high fat diet, showed decreases in peripheral blood levels of endothelial progenitor cells; however, not additive when both factors of pollutants and diet were combined.

Nanoscale particles for uses in various applications, including cancer therapy were topics of research in areas of chemistry and biotechnology. Two types of functionalized silsesquioxane nanoparticles were synthesized from silicone-derived siloxane by Leslie Wilson and mentor Hemali Rathnayake of Western Kentucky University. The resulting nanoparticles with reactive amine groups were found to be better than functionalized silica or organically-modified silica nanoparticles for potential applications in cancer-targeted drug delivery.

Stevi Johnson and mentor Isabelle Lagadic of Northern Kentucky University reported work on mesoporous silica nanoparticles which can limit interactions with healthy cells and reduce negative side effects when used as anti-cancer drug delivery systems in cancer therapy. The surfactant cetyltrimethylammonium bromide (CTAB) used in formation of mesoporous silicates has been shown to have cytotoxic effects on cancer cells without affecting normal cells. These researchers functionalized the exterior pore surface of mesoporous silicate nanoparticles with cancer-targeting folate groups and a dye to follow nanoparticle cell uptake to a silicate shell. They were able to track the effects of their silicate nanoparticles, confirming the presence of functional groups and CTAB in them.

Environmentally-friendly starch-encapsulated gold nanoparticles were synthesized and their antibacterial effects on gram-negative (*Escherichia coli*) and gram-positive (*Staphylococcus epidermidis*) were studied by Dillon S. Pender and Lakshmisri M. Vangala, with faculty mentor Rajalingam Dakshinamurthy, of Western Kentucky University. David Spencer and faculty mentors J. Zach Hilt, Travis R. Sexton, and Louis B. Hersh, from the University of Kentucky, reported research on a strategy of isolating, functionalizing with specifically-designed surface properties, and subsequent releasing (ISOFURE) of gold nanoparticles (GNP) for use as effective carriers in various biomedical applications. The ISOFURE method has been shown to be an effective way of enhancing the loading of carrier molecules without using additives that decrease the overall surface area of the particles available for therapeutic functionalization.

Physics themes included a report from Kentucky Space. Cara L. DeMoss and Will L. Grey, with their mentors Darrin L. DeMoss and Benjamin K. Malphrus, from Morehead University, reported on GlioLab, a project of Kentucky Space and Morehead University, University of Roma, and the National Aeronautics & Space Administration (NASA) Ames Research Center. These researches are developing a 2U CubeLab (GlioLab) to enable biomedical research on the International Space Station (ISS), and are carrying out ground-based and flight experimentation in the process of its development. The CubeLab will include development of a liquid-mixing apparatus and systems required to support various biological specimens while on the ISS.

Other physics projects included the use of radio wave detection and computer processing to detect the presence of pulsars in binary star systems in the Large and Small Magellanic Clouds by Mary Ann Hodge and faculty mentor Joshua Ridley of Murray State University. Aaron Bell and faculty mentor Steven Gibson, from Western Kentucky University, examined interstellar dust within molecular clouds that collapse to form the precursors of stars. The process how the molecular clouds themselves are formed was indirectly studied by examining the infrared heat radiation emitted from dust within a target cloud in the Perseus spiral arm.

Psychology and neuroscience research was represented by studies of neuron growth, research into effects of energy drinks consumption, and associations of body image and weight gain and loss.

Dendrite outgrowth in the developing nervous system was investigated by James Jones and faculty mentors Michal Hetman and Lukasz Sommnicki, from the University of Louisville. These researchers studied growth signals which modify the activity of specific processes in the transcription of ribosomal RNA (rRNA). They measured the response to brain-derived neurotrophic factor (BDNF)-induced dendritic growth under conditions of inhibited ribosomal protein genesis and observed that knockdown of rRNA proteins attenuated neurotic morphogenesis. Azita Bahrami and mentor Diane Snow, from the University of Kentucky, investigated whether sensory neurons can produce their own anti-inhibitory factor to promote regeneration after spinal cord injury and scarring. When sensory neurons were cultured on one side of a chondroitin sulfate proteoglycan (CSPG) stripe capable of inhibiting regeneration, neural processes were inhibited at the edge of the stripe. However, when neurons were grown on both sides of the stripe, there was outgrowth across the CSPG stripe, suggesting that sensory neurons may secrete factor(s) that promote their own elongation.

Among themes in cognitive psychology were effects of a glucose energy drink on cognition and subjective ratings of stimulation by Amy Henges, Clifford Brown, Sarah Maloney, Adrienne Daugherty, Amber Guzman, Michael Statham, with

mentor Cecile Marczinski, from Northern Kentucky University. Subjects assigned to one of six dose conditions were required to do two tasks at once, and report subjective measures at baseline and 30 minutes after administration of an energy drink. Results showed no effect of the energy drink on cognition, but self-reported feelings of increased stimulation.

Aspects of social cognition affected by environmental change in howler monkeys were studied by Erik Wilson with faculty mentor Ben Freed of Eastern Kentucky University, who analyzed the spacing of populations of howler monkeys in undisturbed primary forest and reclaimed secondary forest by triangulation of “dawn chorus” vocalizations, a troop-spacing mechanism. Results showed larger groups and greater distances between groups of monkeys in secondary forest.

The physiology and psychology of obesity were themes in applied research. Erica Coleman with mentors Changzheng Wang, Lingyu Huang, and Cecil Butler, from Kentucky State University, found that subjective body weight was perceived lower than objective measures by men and women. People in the “overweight” range considered themselves “normal,” while people in the “obese” range considered themselves “overweight.” Women were less likely than men to have a distorted view of their weight. Tom Wagoner and Katy Newlin, with mentor Joseph Steffen, from the University of Louisville, reported gender differences in a hormone, adiponectin, related to obesity. These researchers found higher blood levels of adiponectin in females, but higher levels in visceral fat pads in males. The data raise questions about functions of synthesis and release of the hormone.

All these researchers from Kentucky four-year universities and KCTCS belong to a group of young students whose interest in science and the applications of scientific findings to real-world problems will be Kentucky’s investment in the future. The January 2012 Posters@Capitol was the eleventh year of the exhibition, and reflects the time, effort, and expertise of the faculty mentors who have shaped these students’ understanding of the methods and value of the scientific endeavor.

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



Posters-at-the-Capitol attendees gathered on the Capitol’s Senate Staircase for a photo on January 26, 2012. Governor Steven L. Beshear proclaimed this date as UNDERGRADUATE RESEARCH DAY in Kentucky.

The 2013 Posters-at-the-Capitol will be held on Thursday, February 21. The registration and abstract submission deadline is October 17, 2012. You may register at the P@C website below:

<http://campus.murraystate.edu/services/URSA/>

KJAS Kentucky Junior Academy of Science 2012 Symposium

The 2012 meeting of the Kentucky Junior Academy of Science (KJAS) was held on Saturday April 28th on the campus of the University of Kentucky. Over 146 students participated in the event.



The KJAS High School winners (pictured above with KAS President Dawn Anderson) were Monica McFadden of Notre Dame Academy and Karan Babbarwal, Neela Saha, and Alice Darling, all of duPont Manual High School. These students will be competing at the American Junior Academy of Sciences National Meeting in Boston in February 2013.

The KJAS Middle School winners were:

Rose Chancy – 1st place,
Tess Whitfield – 2nd place, and
Will Kimmerey and Preston Sabharawal – 3rd place.

Individual section winners are listed below.

Behavioral and Social Sciences 1

First Place Madison Fraser
Second Place Brandy Edwards
Third Place Samantha Dearing

Behavioral and Social Sciences 2

First Place Brian Yuen
Second Place Aarthi Vadhanam
Third Place Jon Tran

Biological Topics 1

First Place Alice Darling
Second Place Ankur Kanotra
Third Place Adya Jain

Biological Topics 2

First Place Neela Saha
Second Place Shriga Ganti
Third Place Miranda Richardson

Botany, Microbiology and Zoology

First Place Laura Iron
Second Place Kaitlin Mans
Third Place Tasheem Karim

Chemistry, Earth and Space

First Place Maggie McLeod
Second Place Josie Hammon
Third Place Sravya Vishnubhatla

Computer Science and Mathematics 1

First Place Szofia Komaromg-Hiller
Second Place Allen Jiang
Third Place Mitali Chitre

Computer Science and Mathematics 2

First Place Andrew Rosenstrom
Second Place Saramy Moorin
Third Place Aaron Mueller

Engineering/ Physics 1

First Place Karan Babbarwal
Second Place Katelyn Meng
Third Place Mykalin Jones

Engineering/Physics 2

First Place Naethan Munckur
Second Place Hannah Ziegelmeyer
Third Place Jacob Powlak

Environmental Science 1

First Place Sonal Gupte
Second Place Kevin Jacob
Third Place Sara Assef

Environmental Science 2

First Place Monica McFadden
Second Place Alice Liu
Third Place Cassidy Ryan

Many thanks are due to all the judges who gave of their time on April 28th.

The following students were elected officers of the Kentucky Junior Academy of Science:

Jenci Hawthorne, President;
Monica McFadden, Vice-President; and
Szofia Komaromy-Hiller, Secretary.



KAS President Dawn Anderson and the 2012 KJAS officers.

2012 Kentucky Science and Engineering Fair (KY-SEF)

The Tenth Annual Kentucky Science and Engineering Fair was truly a success this year. A record number of over 300 students from across the state competed for awards and scholarships. The Best of Fair high school projects will be entered in the ISEF competition in Pittsburgh in May.

Middle School (MS) & High School (HS) Best of Fair

LIFE SCIENCE

MS 1st - Jeremy Borden, St. Francis of Assisi
MS 2nd - Katie Harris, St. Francis of Assisi
HS 1st - Dishant Chhabra, duPont Manual High School
HS 2nd - Valerie Sarge, Paul L. Dunbar High School
HS 3rd, Vania Ma & Julie Graf

PHYSICAL SCIENCE

MS 1st - Logan Jelsma, Meyzeek Middle School
MS 2nd - Mitchell MacKnight, St. Pius X
HS 1st - Sravya Vishnubhatla, duPont Manual High School
HS 2nd - Yuki Inoue, Paul L. Dunbar High School
HS 3rd - Sanal Gupte, duPont Manual High School

Individual section winners are listed below.

Animal Science

MS 1st - Tess Whitfield, St. Francis of Assisi
MS 2nd - Lucas Tanaka, Trinity Christian Academy
HS 1st - Valerie Sarge, Paul L. Dunbar HS
HS 2nd - Laura Irons, Notre Dame Academy

Behavioral & Social Science

MS 1st - Holly Zoeller, St. Francis of Assisi
MS 2nd - Joanna Slusarewicz, Winburn MS
HS 1st - Abigail Menefee, duPont Manual HS
HS 2nd - Stephanie McCormick, Model Lab School

Biochemistry

MS 1st - Katie Harris, St. Francis of Assisi
MS 2nd - Uma Subrayan, Meyzeek MS
HS 1st - Jingjing Xiao, duPont Manual HS
HS 2nd - Christopher Brown, Ballard HS

Cell and Molecular Biology

MS 1st - Cassie Drury, St. Francis of Assisi
MS 2nd - Sam Belza, St. Francis of Assisi
HS 1st - Jay Kumar, duPont Manual HS
HS 2nd - Ankur Kanotra, duPont Manual HS

Environmental Management

MS 1st - Divija Sharma, Meyzeek MS
MS 2nd - Rachel Seevers, Rosa Parks Elementary
HS 1st - Varia Ma & Julie Graf
HS 2nd - Monica McFadden, Notre Dame Academy

Medicine & Health

MS 1st - Jeremy Borden, St. Francis of Assisi
MS 2nd - Rose Chancy, St. Francis of Assisi
HS 1st - Dishant Chhabra, duPont Manual HS
HS 2nd - Jenci Hawthorne, duPont Manual HS

Microbiology

MS 1st - Brad Woodie, Royal Spring MS
MS 2nd - Matthew Logsdon, St. Francis of Assisi
HS 1st - Riley Meyerratken, Notre Dame Academy
HS 2nd - Tasneem Karim, duPont Manual HS

Plant Sciences

MS 1st - Makalyn Kearney, St. Francis of Assisi
MS 2nd - Lindsay Haffner, St. Francis of Assisi
HS 1st - Neena Phan & Leia Wedlund, Paul L. Dunbar HS
HS 2nd - Emma Hughes, Notre Dame Academy

Chemistry

MS 1st - Bilal Shaikh, Meyzeek MS
MS 2nd - Amanda Wallin, Lexington Traditional Magnet School
HS 1st - Sravya Vishnubhatla, duPont Manual HS
HS 2nd - Corrine Elliott & Elizabeth Walsh, Paul L. Dunbar HS

Computer Science

MS 1st - Joy Li, Meyzeek MS
MS 2nd - Greg Schwartz, Meyzeek MS
HS 1st - Samantha Moorin, duPont Manual HS
HS 2nd - Allen Jiang, duPont Manual HS

Earth Science

MS 1st - Mahathi Gavuji, Meyzeek MS
MS 2nd - Andrew Crittenden, Meyzeek MS
HS 1st - Josie Hammon, Notre Dame Academy
HS 2nd - Elizabeth Lee, duPont Manual HS

Energy and Transportation

MS 1st - Logan Jelsma, Meyzeek MS
MS 2nd - Tanya Gupta & Natasha Gupta, Anchorage Public School
HS 1st - Alice Liu, duPont Manual HS
HS 2nd - Maria Shelton, Notre Dame Academy

Engineering (Electrical and Mechanical)

MS 1st - Mitchell MacKnight, St. Pius X
MS 2nd - Roberto Bolli, Jr., Meyzeek MS
HS 1st - Yuki Inoue, Paul L. Dunbar HS
HS 2nd, Zachary Brewer, duPont Manual HS

Engineering (Materials and Bioengineering)

MS 1st - Sophia Korner & Diya Mathur, Meyzeek MS
MS 2nd - Sarah Schwartz, Meyzeek MS
HS 1st - Naethan Mundkur, duPont Manual HS
2nd, Caroline Harrison, North Oldham HS

Environmental Science

MS 1st - Rashmi Bharadwaj, Meyzeek MS
MS 2nd - Ryan Crump, Christ the King
HS 1st - Sanal Gupte, duPont Manual HS
HS 2nd - Ellen Kendall, Notre Dame Academy

Mathematical Science

MS 1st - Rishi Talati, Meyzeek MS
MS 2nd - Avani Kabra, Meyzeek MS
HS 1st - Andrew Rosenstrom, duPont Manual HS
HS 2nd - Szofia Komaromy-Hiller, Notre Dame Academy

Physics & Astronomy

MS 1st - Thomas Ostertag, St. Francis of Assisi
MS 2nd - Sundus Chuneim, Lexington University Academy
HS 1st - Vincent Cao, Paul L. Dunbar HS
HS 2nd - Brian Schweinhart, duPont Manual HS

The KY-SEF organizers and participants wish to thank all the judges who volunteered their time and expertise. The following KAS members were among the judges for the event:

Dr. Sanjeev Adhikari, Dr. Ruth Beattie, Dr. Amy Braccia, Dr. Ben Brammell, Dr. Suzanne Byrd, Dr. David Cunningham, Dr. Paul Cupp, Dr. John Delfino, Dr. Tim Dowling, Mr. Brent Eldridge, Dr. Charles Elliott, Mrs. Dana Emberton-Tinius, Mr. Quentin Ennis, Mr. Brandon Franklin, Dr. Benjamin Freed, Dr. Malcolm Frisbie, Dr. Wilson Gonzalez-Espada, Dr. John Hoppe, Ms. Samantha Hoskins, Dr. Pierce Johnson, Dr. Md. Jahurul Karim, Dr. Karan Kaul, Dr. Sherie Kendall, Dr. Syed Khundmiri, Dr. Adam Lawson, Dr. Rajeev Madhavannair, Dr. Alexandre Martin, Dr. Raymond McDonnell, Dr. William McGowan, Dr. Laurel Morton, Mr. Ryan O'Connor, Dr. Donghui Quan, Dr. Tanea Reed, Dr. Jaleh Rezaie, Mr. Jeffrey Schaefer Mrs. Carnetta Skipworth, Dr. Agus Sofyan, Dr. Bill Staddon, Mrs. Melony Stambaugh, Mr. J. Scott Stauble, Miss Alyssa Underwood, Dr. D. Alexander Varakin, Dr. Jing Wang, Mr. Todd Weinkam, Dr. Ilsun White, and Dr. Demetrio Zourarakis.

Kentucky Heritage Land Conservation Fund

Update on Conserve Kentucky

Drs. William H. Martin and Richard K. Kessler

In the last newsletter, we discussed the Conserve Kentucky initiative, an effort to obtain increased funding for land conservation in Kentucky. The effort was led by a coalition of conservation interests to support conservation of wildlife habitats; provide for outdoor recreation and tourist destinations in Kentucky's beautiful natural lands and waters; and protect agricultural and forest resources.

The current rate of land conversion of 120 acres per day of forests and fields to permanently developed land is not sustainable. Such land conversion includes development of residential, commercial and industrial properties; highways and connecting corridors; surface mining in Kentucky's two coal fields; utility corridors. All of this conversion is in response to the current and projected space demands of a growing population in the state and energy and transportation needs across the nation. On the other hand, forest and agricultural products and tourism are multi-billion dollar contributions to the state's economy that are often not well-recognized nor appreciated and these natural resource contributions are lost to development.

The conservation coalition, led by the Kentucky Chapter of The Nature Conservancy, was established in 2011. The coalition included members of the Kentucky Heritage Land Conservation Fund Board, the Kentucky Conservation Committee, League of Kentucky Sportsmen, Sierra Club, Kentucky Horse Council, and other organizations that developed a strategy to present legislation for the 2012 session of the General Assembly.

Bolstered by a favorable feasibility study and by a state-wide bipartisan poll that showed overwhelming support of state-funded conservation programs, Conserve Kentucky came into being. Originally, the proposed legislation would dedicate sales tax revenue from sales of sporting goods to the Kentucky Heritage Land Conservation Fund; add additional members to the KHLCF Board; and allow non-profit land conservation organizations to apply to the Fund, greatly expanding the eligibility of interested conservation groups across the state to acquire land by acquisition, conservation easements, or leases.

Early in 2012, it was recognized that there was little support for dedicating any funds for new programs given the state of the economy, tax revenues, and demands on the state of existing priorities--education, social services, corrections,

and various taxpayer service programs of numerous state agencies. Thus the proposal for dedicating tax revenue for conservation was dropped. The introduced legislation, HB 427, originally contained the items of adding members to the KHLCF Board and allowing conservation organizations to apply to the Fund. Adding members to the Board was also dropped and so the final language of HB 427 simply amended the KHLC Fund statute to allow non-profit, land conservation organizations to apply for and receive funds to conserve land. Obviously, the legislation was a far cry from the acquisition effort so strongly supported by the coalition.

HB 427 passed the House unanimously, and passed out of the appropriate Senate committee with no visible opposition, but the bill was not allowed to be brought to the Senate floor for consideration. In the hectic closing days of the General Assembly, the bill, along with many others died for the 2012 session. A most disappointing end to legislation that was a far distance from the goals and aspirations of Conserve Kentucky.

So, what is to be done now with Conserve Kentucky as an effort to obtain substantial and sustained funding for land protection and conservation in Kentucky? The coalition will simply need to hold together and prepare for the 2014 session of the legislature and work for better support for the initiative through continuing education and lobbying of the legislators. We will also need to work with Governor Beshear and his staff for support and identify other groups and organizations that will help advance the next round of legislation. Stay tuned.

NEW LICENSE PLATES

This summer, "new" Nature's Finest license plates will be on the road replacing the hummingbird, dragonfly, and Cumberland Falls plates. Actually, they will be the more popular "old" plates of the bobcat/rhododendron; cardinal/Kentucky coffeetree leaf; and Viceroy butterfly/ goldenrod. If you have nature plates already, please switch to one of these as your renewal comes due; if you don't have one of the 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.



The new Kentucky Nature's Finest license plates will be available to the public Monday, July 2.