



Applied Research & Technology Program NEWSLETTER



*Program of Distinction
Ogden College of
Science and Engineering*

Issue 4 1st Quarter---July, August, September 2004

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*A
Program of Distinction*

Western Kentucky University

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Applied Research and
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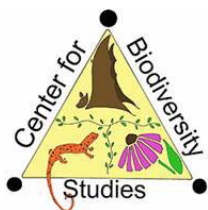
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The Complex for Engineering and Biological Sciences Opened in January

The ARTP and Ogden College of Science and Engineering are excited about the grand opening of the Complex for Engineering and Biological Sciences that occurred in January. The Complex houses the Engineering Services Center, the Biotechnology Center and the Center for Biodiversity Studies. Besides having a wonderful new environment to involve students in hands-on research projects, there is new equipment available to improve the quality of instruction. Thanks to a Department of Education earmark acquired through the efforts of Senator Mitch McConnell, \$2,310,421 was made available to purchase this equipment for the new building. Although there are few traditional classrooms within the building, the entire building is a learning environment where students apply what they have learned in the traditional classroom setting to novel problems that have the added benefit of serving our constituents. Past experience indicates students that have been involved in ARTP projects are very competitive in the workforce and are gaining acceptance to graduate/professional educational programs. When a student can turn down a full assistantship to Yale University to attend Johns Hopkins University, the program is having a positive impact on the learning and success of our students.

~Submitted by Blaine Ferrell
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WKU's Biology Department Developing a Cooperative Agreement with University of Kenya



"...my time with you (the WKU exchange group) here will go down in history as one of my best moments in life..." writes Jackson Mugweru of the University of Nairobi. Kenya may well be the world's most polite nation, and this sentiment is shared by the students and faculty of the WKU Biology Department. The Department of Biology and the Centers for Biodiversity Studies and Biotechnology are developing a cooperative research and training agreement with the UofN in the area of wildlife conservation.

Even though hunting is prohibited in Kenya, wildlife are in serious trouble in many parts of this spectacular East African country. Poaching and habitat modification are the primary risks to such species as black rhino, lions, Grevy's zebra and many others. Dr. Charles Kimwele of the UofN Faculty of Veterinary Medicine is WKU's primary collaborator at the UofN and is an adjunct Assistant Professor at WKU. He was attracted to WKU by our program in wildlife forensics. While most people think of forensics in terms of CSI and other popular books and programs, such methods can also be applied to nonhuman crime. Dr. Kimwele and WKU are building the capacity in Kenya to use molecular forensics to identify bush meat (illegally taken game meat) to species and eventually to region. This will allow the Kenya Wildlife Service to more aggressively pursue indictments against those involved in the bush meat trade.

The Department of Biology at WKU has provided the equipment necessary to outfit the molecular forensics lab at the UofN, including everything necessary for PCR-based (polymerase chain reaction) analyses. In August, WKU students Leslie Beavin, Eli Brainard, Ben Hutchins and Bradley Smith accompanied WKU faculty Doug McElroy and Mike Stokes to Kenya to assist in setting up the lab and to investigate research, internship, and educational opportunities for this exchange program. Our students were paired with students from the UofN's Wildlife Conservation program and visited many areas in southern Kenya, including the Maasai Mara, Lake Naivasha in the Rift Valley, Nairobi National Park, Tsavo East National Park, and the Shimoni Marine Park. All of these areas are facing serious encroachment due to development or agriculture, and Tsavo and the Maasai Mara experience considerable poaching pressure. Our students viewed this trip as a seminal experience in their lives, and are exploring options for returning to Kenya on research projects.

In the near future, we hope to build multidisciplinary teams of students and faculty from WKU and the UofN to address some of the challenges in rural Kenya that contribute to poaching pressure on wildlife. Many rural communities have no other source of income than that derived from wildlife trade and rely primarily on subsistence agriculture. Youth for Conservation is a Nairobi-based multinational NGO that developed as a grass-root, student-led organization. They educate rural communities on wildlife conservation issues and help them develop alternative sources of income, primarily through ecotourism. Mr. Franklin Omondi of Youth for Conservation visited WKU in October and November to discuss student involvement, student organizations, and the role volunteers can play in wildlife conservation. Youth for Conservation will partner with WKU and the UofN for future conservation efforts in Kenya. We invite participation in these efforts by both students and faculty, especially in the areas of marketing, public health and medicine. Vice-Chancellor Professor Crispus Kiamba of the UofN, meeting with the WKU students and faculty particularly emphasized their interests in collaboration across a range of disciplines, and extended a welcome to those interested in visiting the UofN. Please contact Michael.Stokes@wku.edu or Doug.McElroy@wku.edu if you are interest in becoming a part of these efforts.

The WKU Department of Biology is proud of its growing African programs. In addition to our Kenyan projects, we have an NSF-funded research initiative in Ghana, teach a wildlife conservation course in South Africa, and are beginning a South African research program. *(Written by Michael Stokes)*

~Submitted by
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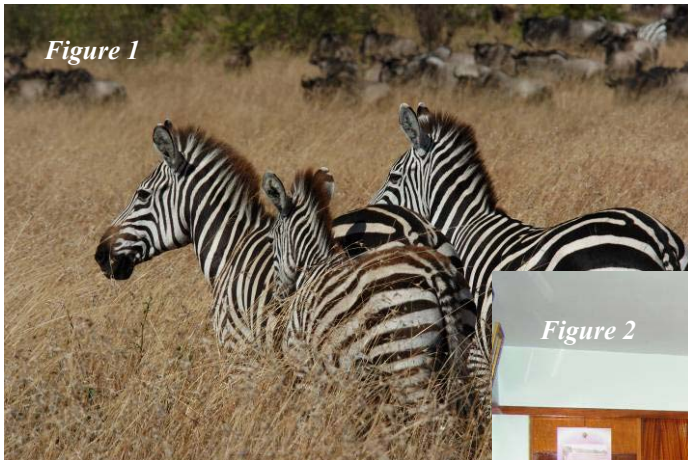


Figure 1

Figure 1: Zebras wary of the WKU and the University of Nairobi contingent in the Maasai Mara.



Figure 2

Figure 2: WKU faculty and students meet with University of Nairobi administrators.

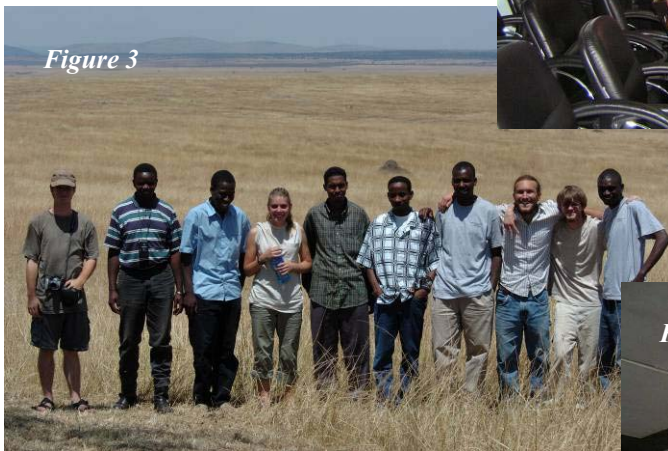


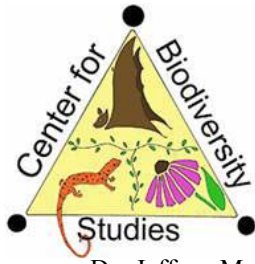
Figure 3

Figure 3: WKU students and their University of Nairobi student partners in the Maasai Mara.



Figure 4

Figure 4: Rebuilding a lab for WKU and the faculty of the University of Nairobi at the university.



The Center for Biodiversity Studies:

Lepidopteran Surveys at the Upper Green River Biological Preserve

Dr. Jeffrey Marcus, a WKU Department of Biology professor, has been coordinating a series of surveys of butterflies and moths at the Upper Green River Biological Preserve (UGRBP) in conjunction with the Society of Kentucky Lepidopterists and with the assistance of WKU Biology undergraduates Tim Shehan and Brooke Polen, as well as Maria Buckley and Christian Downing (employees of the Lost River Cave Butterfly Pavilion). Sixty-two species of moths and 47 species of butterflies have been found at UGRBP, although this likely represents a small fraction of the total expected diversity.

Already discovered species include the Olympia Marble (*Eucloe Olympia*), found at only a few sites in Kentucky, and *Lactura pupula*, a rare moth with no common name that is known from only two other places in Kentucky. Future surveys will focus on expanding the number of moths on the species list. Special effort will be devoted to determining if the snake-master borer moth (*Papaipema eryngii*), which is on the Kentucky endangered species list, is present on the UGRBP property.

~Submitted by Scott Grubbs
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Figure 1

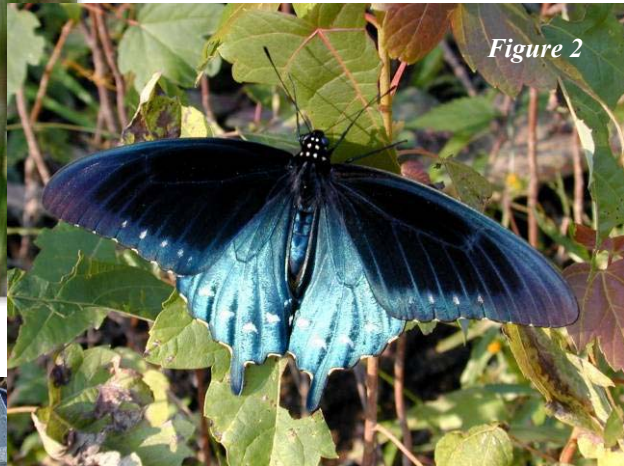


Figure 2



Figure 3

Figure 1: Monarch butterfly (photo by Jeffrey Marcus)

Figure 2: Pipevine swallowtail (photo by John Andersland)

Figure 3: Eastern blue butterflies "mud-puddling" on dung (photo by John Andersland)



Major Grant Awarded to Biotech Center Faculty

Five faculty members from the Biotechnology Center, in collaboration with Dr. Nigel Cooper of the University of Louisville School of Medicine, were recently awarded funds of approximately 2 million dollars to be spent over five years from the National Institutes of Health. The grant entitled, "KY-IdeA Networks of Biomedical Research Excellence" aims to improve the biomedical research infrastructure in the state of Kentucky. The five WKU faculty participating are Cheryl Davis, Joe Bilotta, Rodney King, Jeffrey Marcus and Nancy Rice. Projects to be funded by this grant include the following: Joe Bilotta's project, *"Comparing the processes of neural development and regeneration in zebrafish"*, Rodney King's work, *"RNA-based mechanisms of transcription elongation control"*, Jeffrey Marcus' research, *"A butterfly transposon mutagenesis screen for the study of wingless signal transduction"*, and Nancy Rice's project, *"Mechanisms of transcriptional coordination among phosphorylase kinase genes"*. Cheryl Davis will act as the lead faculty member who will be coordinating and providing administrative support for all of the WKU projects.

~ Submitted by

Sigrid Jacobshagen, Director
Biotechnology Center

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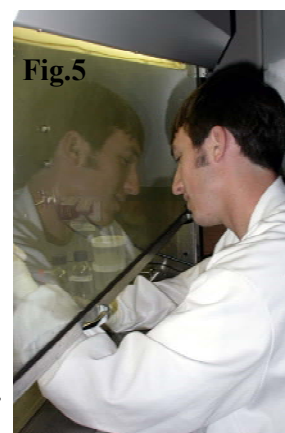
Fig. 1: The Marcus Lab:
(From Left to Right)
Amanda Maupin, Brooke Polen,
Amber Harper, Tia Hughes, and
Tara Powell with Jeff Marcus.

Fig. 2: Soleil Archilla graduate
researcher in the Rice Lab.

Fig. 3: Courtney Miles
undergraduate researcher in the
King lab.

Fig. 4: Jyoti Sahi undergraduate
researcher in the Bilotta lab.

Fig. 5: Brent Fisher undergraduate
researcher in the Davis lab.





Hoffman Institute in Vietnam for United Nations Karst Conference

In September 2004, a group of five from the Hoffman Institute (Debbie Kreitzer, David Keeling, Pat Kambesis, Deana and Chris Groves) joined about 200 scientists, resource managers, and cavers from nearly 40 countries in Hanoi Vietnam for the *First International Transdisciplinary Conference on Sustainable Development of Karst Regions*, sponsored by UNESCO's International Geological Correlation Program Project 448.

The conference not only included opportunities to discuss and examine multidisciplinary approaches to karst landscape development around the world, but also allowed participants to experience the natural landscapes of northeast Vietnam. The group participated in a four-day field trip that visited the spectacular karst islands of Halong Bay, Cat Ba Island Park and Cuc Phong National Park in northcentral Vietnam. Great contacts were made for future Hoffman Institute collaborations with karst scientists from around the world. As a result, planned events for 2005 already include WKU participation in a Belgian expedition to continue exploration and mapping of Vietnam's deepest cave system, as well as, a study tour to interact with cave researchers in Slovenia, Bosnia, Serbia-Montenegro, and Greece.

The group gave the following presentations during the conference:

Debra Kreitzer and David Keeling, *Land-Use Planning in a Karst-Biosphere Reserve Environment*

Pat Kambesis, *A Systematic Approach and Partnership in the Study of Contaminant Sources and Transport in a Karst Groundwater Basin*

Pat Kambesis, *Use of Subterranean Field Studies as a Baseline for Karst Research and Resource Management, Case study: Lechuguilla Cave, New Mexico*

Chris Groves and Yuan Daoxian, *Recent United Nations Efforts for the Global Study and Protection of Karst Resources*

Chris Groves, Joe Meiman, Pat Kambesis, and Robert Osburne, *The Role of Cave Exploration and Survey in the Protection of the World's Longest Cave System: Mammoth Cave, Kentucky USA*

All pictures were taken by Deana (dg) or Chris Groves (cg)

~Submitted by Chris Groves, Director
Hoffman Environmental Research Institute
and David Keeling
Dept. Head, Geography and Geology



Figure 1

Figure 1: Conference opening ceremonies. (dg)

Figure 2: Entrance to Hospital Cave in Haiphong Province, a reasonably extensive and very well fortified cave system that served as an army officer's hospital during the early to mid 1960's war years. (cg)

(More pictures continued on Page 7)



Figure 2



Figure 3: Boat village among karst towers on the eastern coast of Cat Ba Island. (dg)

Figure 4: Islands in Ha Long Bay. (cg)



Figure 5: Large passage within Sung Sot (Surprising) Cave. (dg)

Figure 6: Fine tower karst landscape near the Dinh-Le Temples, Ninh Binh Province. (cg)

Figure 7: Pat Kambesis examining the incense-filled site of a 7,000 year old human burial in Nguoi Xua (Ancient Man) Cave, Ninh Binh Province. The cave was discovered by a hunter chasing a wounded monkey up a steep jungle slope. (cg)





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