



SPRING 2008

Department of Biological and Agricultural Engineering

Dale Bumpers College of Agriculture, Food, and Life Sciences
and the College of Engineering



From the Department Head

Dr. Lalit R. Verma

Several faculty members have been recognized with awards (page 1-2).



Senior Jacob Irwin was named Outstanding Student in Arkansas from ASABE and was separately awarded a \$3000 scholarship from the Honors College for summer Study Abroad. (page 3)



Dr. Tom Costello and five Senior Design students travelled to Santo Domingo to work conjunctively with Victor Diaz and the Asociación Dominicana de Rehabilitación, Inc. (page 4)



Dr. Loewer and the UAEDI have been busy with several different state-wide functions. (page 4)



Dr. Haggard and Dr. Longing are working to keep Arkansas' natural beauty and aquatic marine life in tact. (page 5)



Dr. Matlock and Dr. Osborn have been keeping BlueInGreen going and creating new opportunities for Fayetteville and the surrounding areas. (page 5)

Kavdia Awarded 2008 Arthur C. Guyton Award & NIH Grant



Dr. Mahendra Kavdia

Dr. Mahendra Kavdia, assistant professor of biomedical engineering, was recently named the

2008 recipient of the Arthur C. Guyton Award for Excellence in Integrative Physiology and Medicine.

Kavdia's research interests are in the area of systems biology and medicine and integrative vascular physiology. His research includes integrative quantitative investigation of key processes involved in inducing and ameliorating oxidative and nitrosative stress and their effects in vascular tissue using computational models in conjunction with experiments. This quantitative analysis will have an impact on our understanding of basic mechanisms of oxidative and nitrosative stress leading to improved understanding of many diseases including cardiovascular diseases, diabetes aging-related diseases, cancer and their therapeutic applications.

The Arthur C. Guyton Award Fund was established in 1993 from an anonymous donation in order to recognize the contributions of Arthur C. Guyton

and his interests in feedback control and mathematical modeling of physiological systems. The award is given to an independent investigator who holds an academic rank no higher than assistant professor who is pursuing research that utilizes quantitative and integrative approaches and feedback control system theory for the study of physiological functions. Each award of approximately \$15,000 is designated for the use in the awardee's research program. An award is given annually to an individual demonstrating outstanding promise based on his/her research program in feedback control systems, quantitative modeling, and integrative physiology. Applications are accepted from Regular APS Members. An awardee is selected by members of the APS Awards Committee.

The award is announced during the APS Business Meeting held at the Experimental Biology meeting. The recipient receives complimentary registration to attend the meeting and a plaque presented at the APS Business Meeting held at the Experimental Biology meeting. The award does not include any indirect cost reim-

bursement.

Dr. Kavdia was also recently awarded a 1.3 million dollar grant from the National Institutes of Health to explore the underlying reasons why vascular complications occur in diabetes. This grant research will focus on endothelial cell dysfunction, a little-understood failure of the body to regulate blood flow.

Dr. Kavdia estimates the grant will provide work for five to six researchers, including undergraduate, graduate, and post-doctoral students.

The National Institutes of Health is the nation's medical research agency, making important medical discoveries that improve health and save lives. The NIH is part of the US Department of Health and Human Services, and is the primary Federal agency for conducting and supporting medical research. The NIH leads the way toward important medical discoveries that improve people's health and save lives by investigating ways to prevent disease as well as the causes, treatments, and even cures for common and rare diseases. More information on the NIH can be found at <http://www.nih.gov>.





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BAJWA GIVEN AWARD



Dr. Sreekala Bajwa, associate professor in the BAEG, was recently awarded the AMA-Shin-Norinsha-AAAE Young Researcher Award by the Asian Association for Agricultural Engineering (AAAE).

The award was established by the Shin-Norinsha Company of Japan to recognize and honor young researchers with outstanding contributions to the advancement of

the agricultural engineering profession.

Dr. Bajwa was given this award based on her overall success in the publication of over 35 research papers, most of which appear in peer reviewed international journals, as well as her meticulous development of the Arkansas Precision Agriculture Working Group (ARPAWG).

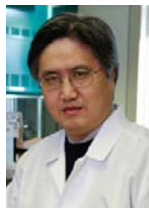
ARPAWG focuses on precision agriculture and geospatial information science needs in Arkansas, using participants from the J. William Fulbright College of Arts and

Sciences and the Dale Bumpers College of Agriculture, Food, and Life Sciences in conjunction with the BAEG. Dr. Bajwa accepted this award at the 9th International Agricultural Engineering Conference in Bangkok, Thailand in December 2007.



Prof. Nobutaka Ito (AAAE President), Mr. Yoshisuke Kishida (AAAE President-Elect and Award Founder) present Dr. Sreekala Bajwa the Young Researcher Award.

LI NAMED TO BIOSENSING CHAIR



Dr. Yanbin Li

Dean Greg Weidemann announced Professor Yanbin Li has been named to the Tyson Endowed Chair in Biosensing Engineering.

Li is one of the world's leading scientists in the development of biosensing technology for food safety and quality applications, Weidemann said in an announcement in

the atrium of the Agricultural, Food and Life Sciences Building.

A \$1.5 million endowment for the new chair was provided by the Tyson Foods Foundation from a gift announced in May 2005 and the UA Matching Gift Program previously endowed by the Walton Family Charitable Trust, Weidemann said. Investment earnings from the endowment will help support Li's research in the de-

partment of biological and agricultural engineering and the Center of Excellence for Poultry Science, which is a unit of the University of Arkansas System's Division of Agriculture.

Dr. Li was also awarded the John W. White Outstanding Research Award in January. This award is given to the outstanding researcher in the College of Agriculture, Food and Life Sciences.

Loewer Named to LSU Hall of Distinction



Dr. Otto J. Loewer

The LSU Engineering Hall of Distinction was established in 1979 to recognize individuals who have made significant contributions to the engineering profession. Criteria for election are based on

distinguished professional achievement, dedicated service to engineering, and outstanding humanitarian activities. Eligibility is not limited to LSU alumni, although it is expected that nominees will have had some connection with and show interest in LSU.

Dr. Loewer earned his engineering degrees in agricultural engineering from LSU (BS, 1968; MS, 1970) and Purdue University (PhD,

1973) and a MS in Agricultural Economics from Michigan State University in 1980. After a career in education that included a six year term as Dean of the University of Arkansas College of Engineering, Dr. Loewer became the founding director of the University of Arkansas Economic Development Institute, a position he has been serving in since 2004. Dr. Loewer was honored at a banquet at LSU on April 17, 2008.



NEW STAFF MEMEBERS JOIN DEPARTMENT

Several new faces have recently joined our staff in the Biological and Agricultural Engineering Department Office.



Paul Algee

Paul Algee recently joined the department as the Technology Support Specialist. He is currently working on updating all the technology in the building and dealing with any problems as they arise.

Gloria Brown joins the department as the Administrative Secretary for the office. She handles the administra-

tive responsibilities for the graduate students and prepares many of the publications for the department.



Gloria Brown



Elaine Smiley

Elaine Smiley joins the department as our new Fiscal Manager. She has her degree in administrative management from the University of Arkansas. She previously worked for Elkins School District as an accountant. She handles all financial responsibilities for the department.

Several other new faces in the department include Eylem Mutlu and Zara Clayton-Niederman. Both are working with Dr. Matlock on several projects. Dr. Scott Longing and Leslie Bartsch have also joined the staff and are working with Dr. Haggard as program associates.

Mutlu, Longing, and Bartsch are all recent graduates from the department. Clayton-Niederman has begun his doctoral degree program and will finish in 2010.

FORMER RESEARCH ASSOCIATE APPOINTED CHAIRMAN



Dr. Tariq Osaili

Dr. Tariq Osaili was appointed Chairman for the Department of Nutrition and Food Technology for the Faculty of Agriculture of Jordan University of Science and Technology in Irbid, Jordan.

The Nutrition and Food department was established in

1996 and offers students the opportunity to gain either a Bachelor's degree in Nutrition and Food Technology and, added in 2003, a Master's degree in either Nutritional Sciences or Food Technology.

Dr. Osaili worked in the BAEG Department as a research associate with Dr. Carl L. Griffis. While in Jordan, Dr. Osaili continues to

be involved in cooperating projects with Dr. Griffis and Dr. E.M. Martin, publishing manuscripts in Journal of Food Science and Journal of Food Protection. Dr. Griffis and Dr. Osaili are now in the process of composing a book chapter in the field of thermal inactivation of food borne pathogens.

IRWIN NAMED OUTSTANDING STUDENT

Jacob Irwin, a senior biological engineering major, was named the Arkansas Section American Society of Agriculture and Biological Engineers outstanding student for 2007.

This award is given every year to a student who maintains an excellent GPA, participates in extra-curricular activities, is involved with internship programs, and is

involved with the college and the department programs throughout the year.

Recently, Irwin was awarded a \$3,000 Honors Study Abroad Grant. With this award, he plans to study in San Sebastian, Spain to finish his business degree and then begin his career with Merck & Co, Inc.



Irwin was named the 2007 ASABE Outstanding Student for Arkansas.

MEET OUR STAFF

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STUDENTS' PROJECTS HELP REHABILITATION CLINIC

In January 2008, Dr. Tom Costello travelled with five students from his Senior Design class to Santo Domingo to work with Victor Diaz and the Asociación Dominicana de Rehabilitación, Inc.



Several members of the ADR worked with Dr. Costello and the Senior Design class members in January in Santo Domingo.

The Asociación Dominicana de Rehabilitación, Inc. was founded in 1959 to help organize necessary services for people with limitations. The ADR offers three basic programs to the community. Medicine of Rehabilitation helps people with problems in the neuro-musculo-skeletal system by providing medical services, equipment, and other types of specialized care. Special Education helps children with mental delay and learning difficiencies by offering training,

evaluation and diagnosis. Professional Rehabilitation helps people 16 years of age and older learn to adapt through guidance and formation and offers labor placement.

Julie Abbott and Linda Tarantino have designed a prosthetic foot for use in the clinic. They were able to meet directly with their client and receive feedback that has helped in improvements and adjustments to their design. They also were able to research the type of materials available for the creation and manufacturing of the prosthetic limb.



Abbott-Tarantino Prosthetic Foot Design



Helms-Strobel Fatigue Testing Machine

Aaron Strobel and Nathan Helms have developed a fatigue testing machine to test the stress and wear for the prosthetic foot design from the other team. This machine will run a three million cycle test on the prosthetic foot.

The machine has pneumatic air cylinders and solenoid valves. Production has started on the machine, and the students expect the final product to be completed by May.



Dr. Costello and Aaron Strobel exam the new prosthetic created from last year's Senior Design project.

While at the Asociación Dominicana de Rehabilitación, Inc., the current members of the class presented the clinic with last year's class design. The leg designed from the 2006-2007 class was presented to Dr. Diaz and will soon help several area residents.

The students did take time to visit the local sites and partake in the local culture provided in Santo Domingo.



Linda Tarantino, Julie Abbott, Aaron Strobel, and Nathan Helms enjoyed a break from design work in Santo Domingo.

UAEDI preparing people for prosperity through broad-based development and breakthrough solutions.

The University of Arkansas Economic Development Institute continues to play a key partnership role with the creation and development of the Crossroads Coalition, a 10-county region in Arkansas near Memphis. UAEDI is the sponsor of the Crossroads Coalition website (<http://CrossroadsCoalition.org>) and the generator of the Crossroads Connection Newsletter. Over the last part of 2007, UAEDI-Crossroads Coalition partnership has upgraded the website, begun the hiring process for an Executive Director, and was a finalist for the Partnership Development Award presented by the University Economic Development Association (UEDA) in November 2007. CARL was also created and implemented as another resource for the partnership. CARL (Crossroads Asset and Resources Library) was created as part of the Crossroads Coalition website to

allow for periodic updating of data, reports, linkages, and maps in nine different information categories. A major expansion of SEED (Students Engaged in Economic Development) is underway with the Crossroads as the major community partner. SEED is a type of service learning program administered by UAEDI that focuses on "real world" student projects within regular "for credit" courses. The goal is to link the needs of the communities (any private or public entity) for economical creative solutions with the faculty in higher education who seek real-world experience and projects for their students in for-credit courses that focus on some aspect of community need. SEED is not a type of consulting and must conform to the academic expectations of the class teacher. A SEED project can cover virtually any

topic if there is a willing faculty-community sponsor partnership. There is no set cost, source, or sharing of funding, but the average cost per project is \$1,500. A SEED project may involve a single "regular" class or multidisciplinary team over one or more semesters. Theses, dissertations and individual for-credit special problems or independent study also qualify for SEED. SEED began in 2003 and has averaged three projects per year since then. The goal this year is 10 projects. The long term goal is 50-100 projects per year throughout Arkansas. Please contact Dr. Otto Loewer, UAEDI Director, if you would like more information in participating as a community or sponsor at ojl@uark.edu.





LONGING, HAGGARD HELP CONSERVE ARKANSAS AQUATIC BIODIVERSITY



Sulphur Springs
Diving Beetle,
*Heterosternuta
sulphuricus*.

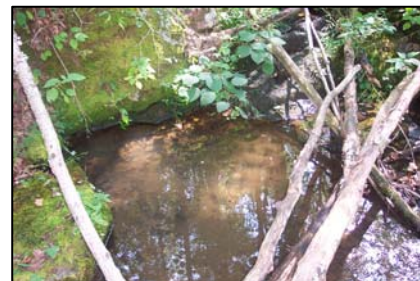
Dr. Scott Longing and Dr. Brian Haggard are leading a State Wildlife Grant Program project to track down populations of a small, predaceous diving beetle (*Heterosternuta sulphuricus*, the Sulphur Springs diving beetle) found in the Ozarks and

nowhere else. There have only been a few collections of this species since it was first found in 1955 at Sulphur Springs in Northwest Arkansas, and therefore the Arkansas Wildlife Action Plan has it listed as one of 369 Species of Greatest Conservation Need. At present, *H. sulphuricus* has been collected at an additional four locations as part of the current study, including populations in the Buffalo River National Park and Hobbs State Park -

Conservation Area adjacent to Beaver Lake. Preliminary findings show that *H. sulphuricus* prefers small, mountain stream habitats with spring sources, and therefore the protection of these habitats is essential for sustaining populations of this endemic water beetle.

So, tread lightly if you're around these special aquatic habitats and let Dr. Longing or Dr. Haggard know if you are interested in knowing what critters may be hiding there. Dr. Longing and Dr. Haggard have recently submitted research proposals to conduct biological surveys for a large number of spring habitats in the Buffalo River National Park and to develop habitat protection and educational conservation signs for the spring habitat on the Pigeon Roost Trail at Hobbs State Park -

Conservation Area. An image library that includes some of Arkansas's species of concern (including this recently donated picture of *H. sulphuricus*) is located at www.naturalheritage.org. Information about the State Wildlife Grant program and the Arkansas Wildlife Action Plan can be found at www.wildlifearkansas.com.



Habitat where *H. sulphuricus* was recently found in Newton County.

BlueInGreen™ Dissolved Gas Solutions for Water Quality

BlueInGreen, LLC (www.blueingreen.biz) is a company co-founded by BAEG faculty members Scott Osborn and Marty Matlock in partnership with Virtual Incubation Company of Fayetteville. Osborn and Matlock, along with former graduate student Shandi Teltshik, invented a technology to improve the efficiency of dissolving oxygen and ozone in water. The University of Arkansas holds the patent on the invention and has exclusively licensed BlueInGreen to sell the technology.

BlueInGreen, LLC offers equipment that incorporates the new approach for cost effective dissolved oxygen delivery. The supersaturated dissolved oxygen (or SDOX™) systems offer low capital and operating costs, precisely controlled delivery of dissolved oxygen at a wide range of target concentrations, ease of operation, and virtually 100% gas utilization efficiency (no off-gassing) for wastewater

treatment and other environmental water applications. In a full-scale trial study conducted at the Paul R. Noland Wastewater Treatment Facility in Fayetteville, an 80% operating cost savings was documented as compared to the oxygen delivery technology currently in use.

The Fayetteville facility was the first to purchase an SDOX™ system and installation of the SDOX™ was completed in January 2008. Trials at other locations have documented similar savings, and BlueInGreen is presently setting up a national sales and distribution system for its SDOX™ product line.

The SDOX™ line offers solutions for many difficult applications, including increasing wastewater treatment capacity, maintenance of specific dissolved oxygen concentrations and odor control. BlueInGreen, LLC is headquartered at the Arkansas Research and Technology Park in Fayetteville, Arkansas. The company has

had funding for the development of this technology through grants from the National Science Foundation and the National Institutes of Health. BlueInGreen is also currently developing a system for delivering dissolved ozone (the HYDOZ™) to be released at a later date.



The SDOX™ units can deliver oxygen up to a rate of 3300 lb/day. This system was used in a shallow stream.

OU AND CHEN VISIT DEPARTMENT

Dr. Yinggang Ou and Dr. Liancheng Chen visited the Department of Biological and Agricultural Engineering in August 2007.

Dr. Ou is a professor and former dean for the College of Engineering at South China Agricultural University, Guangzhou, China. Prof. Ou received

his PhD in 1991 in Silsoe College, Cranfield University, UK, and re-started his career in South China Agricultural University, China. His research interests involve design and experiments of paddy field and sugarcane machinery, as well as soil-machine system mechanics.

Dr. Chen, Dr. Ou's wife, is a colleague of Dr. Ou in information engineering.

Drs. Ou and Chen met with Dr. Walter Bottje, Dr. Lalit Verma, and Dr. Otto Loewer while visiting the university. Dr. Ou gave a presentation on the Introduction of South China Agricultural University and Agricultural Engineering



Dr. Yinggang Ou, Dr. Lalit R. Verma, and Professor Liancheng Chen

and met with several faculty to discuss potential collaboration in research.

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DIVISION OF AGRICULTURE


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of AGRICULTURAL, FOOD AND LIFE SCIENCES
UNIVERSITY of ARKANSAS COLLEGE OF ENGINEERING

Educational Objectives

To produce graduates who:

- Effectively apply engineering to biological systems and phenomena (plants, animals, humans, microbes, and the environment) with demonstrated proficiency in basic engineering skills, technical knowledge, and professional and personal skills.
- Are well prepared for diverse careers in biological engineering, lifelong learning, and professional and ethical contributions to society through sustained accomplishments in biomedical engineering, ecological engineering and biotechnology.



Biological Agricultural Engineering @ University of Arkansas

Upcoming Events

- May 1** Senior Design Project Presentations
- May 1-2** Biomedical Forum
- May 10** University of Arkansas Graduation Ceremony