



UofA
UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE

Department of Biological and Agricultural Engineering Newsletter
Dale Bumpers College of Agricultural, Food and Life Sciences
and
the College of Engineering

From the Head

Lalit R. Verma
Department Head



It's been a great spring and summer for the department. The senior engineering design team won first place at the International ASAE Meeting in Las Vegas. Congratulations to the team of Willie Dillahunty, James Geurtz and Clay McDaniel and faculty advisors Tom Costello and Scott Osborn.



With support from the Colleges of Engineering and Agricultural, Food and Life Sciences we have hired our first **Biomedical Engineering** faculty. Dr. Mahendra Kavdia will start in October. Em Ward, M.D., Ph.D., will be an Adjunct Assistant Professor in the department. Three new adjunct faculty supporting Biomedical Engineering have joined the BAEG family. A proposal for Master of Science in Biomedical Engineering is also going through the approval process at the University level.



(See page 5)

Seniors Win National Design Competition

See page 7 for details.

New Engineering Dean & Biomedical Faculty Member Hired

See page 3 for details.

Highlights and Presentations

Jin-Woo Kim was invited to present "Micro and Nano Sensors for Agriculture and Food Systems" at the Technical Program of the Tri-national Workshop: Advances in Micro and Nano Technologies for Sensing Applications on December 12-14, 2002, in Melbourne, Australia.

Tom Costello was awarded a NASA Faculty Fellowship for summer 2003. Costello worked on Advanced Life Support at the Kennedy Space Center, Cape Canaveral, Florida. This was his second summer working with Dr. John Sager and Dr. Ray Wheeler at NASA.

Danielle Julie Carrier served as a panel member for Fonds de recherche sur la nature et les technologies, Quebec, Canada, January 2003.

Mian Li, Mike Hanford, **Jin-Woo Kim** and Tonya L. Peeples presented "Modeling of Enzymatic Reactions in Interfacial Catalysis" at the 94th AIChE Annual Meeting (Food, Pharmaceutical, and Bioengineering Session) in Indianapolis, Indiana.

Sarah Appel and Tracie Stauffer, graduate students of **Danielle Julie Carrier** and Ed Clausen, received 3rd place for their presentation at the Midwest American Institute of Chemical Engineering student competition, Lawrence, Kansas, April 5, 2003. The title of their presentation was "Extraction of Silymarin from Commercially Available Dietary Supplements."

Mian Li, Mike Hanford, **Jin-Woo Kim**, and Tonya L. Peeples presented "Interfacial Catalysis: Amyloglucosidase Entrapment in Dipalmitoylphosphatidylcholine Multilamellar Vesicles" at the 224th American Chemical Society (ACS) National Meeting (Advances in Biocatalysis Session) at Boston, Massachusetts.

(See page 11)

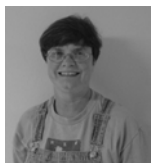
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New Staff Members



Ray Avery, Research Specialist, joined the BAE staff on May 19, 2003. Ray is a 2003 B.S. graduate from the BAE Department. He will be working with Dr. Brian Haggard, and his job duties include calibrating and validating a reservoir water-quality model and conducting field work, including bioassays for nutrient limitation determination and water-quality sampling. Ray will be also be pursuing his masters degree in Biological Engineering.



Betty Martin, Research Specialist, joined the BAE staff on June 1, 2003. She will be working with Dr. Rong Murphy managing the thermal processing and food safety lab. As the lab manager she will be conducting research projects on thermal processing and food safety, perform chemical analyses, evaluate pathogenic bacteria in food products, prepare reports and manuscripts, maintain the thermal processing and food safety laboratory, and perform other tasks such as organize industry workshops that are related to thermal processing.



Robert Morgan, Project/Program Manager/Research Associate, joined the BAE staff on January 13, 2003. Bob is working with the ecological group and is responsible for designing, supervising, interpreting and communicating field and laboratory research. He had previously worked as a Nonpoint Source Pollution Management Coordinator for the Arkansas Soil and Water Conservation Commission in Little Rock. Bob will also be working on his Ph.D. in Engineering. He and his wife, Sharon, reside in Fayetteville.



John Murdoch, Research Specialist, joined the BAE staff on July 1, 2003. John comes to the BAE Department from the Food Science Department Rice Processing Program. His job responsibilities will be designing, specifying, fabricating, testing and maintaining all electronic equipment in the department. John lives in Wesley and enjoys art, gardening, outdoors, instrumentation, water quality and music.



Dr. Sudhanshu Panda, joined the department as a Post Doctoral Research Associate working with the ecological faculty members. Dr. Panda comes to the University of Arkansas from North Dakota State University Agricultural and Biosystems Engineering Department where he completed his Ph.D. degree. He will be responsible for conducting research in the area of watershed hydrology, developing decision support systems for watershed management, application of GIS, remote sensing and water quality models to develop watershed management plans, and evaluation of BMP effectiveness in improving water quality.



Dr. Xiaole Su, Post Doctoral Research Associate, will be working with Dr. Yanbin Li. Dr. Su will be involved in research projects in biosensors, specifically immuno-electrochemical quartz crystal microbalance, immuno-SPR and immuno-impedance biosensors for rapid detection of *Salmonella typhimurium* and *E. coli* O157:H7 in food products. Dr. Su, his wife, Weihong Chen, and son, Yulong reside in Fayetteville.

Moving, changing jobs, new happenings Let us know...

Name: _____
 E-mail: _____
 Company: _____
 Address: _____
 City: _____
 State: _____ Zip Code: _____
 Home Phone: _____
 Business Phone: _____
 Comments: _____



Please mail, e-mail or fax updated information to:

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New Engineering Dean & Biomedical Faculty Member Hired



Dr. Mahendra Kavdia will be joining the BAE faculty on October 15, 2003, as an Assistant Professor of Biomedical Engineering. He comes to our department from the Center for Computational Medicine and Biology at Johns Hopkins University where he worked as a post doctoral fellow. Dr. Kavdia received his B.Tech in Chemical Engineering from the Indian Institute of Technology in Delhi, India, his M.Tech in Chemical Engineering from the

Indian Institute of Technology in Madras, India, and his Ph.D. in Chemical Engineering from Oklahoma State University. His research interests include computational modeling of biological systems, biological transport, kinetics and control, bioartificial organs and substitutes, cellular and tissue engineering and biomedical device design.

We look forward to having Dr. Kavdia in the department.



Dr. Ashok Saxena, Regents' Professor and former chair of the School of Materials Science and Engineering at Georgia Institute of Technology, has been named dean of the College of Engineering at the University of Arkansas, effective July 21, 2003.

Saxena, 54, also will serve as distinguished professor of materials science and engineering and as graduate research chair for the college. He will succeed Dr. Neil M. Schmitt, University professor of electrical engineering, who has been serving as interim dean since July 1, 2002.

In addition, Saxena will become the first UA faculty member to hold an endowed chair funded by the \$300 million gift from the Walton Family Charitable Support Foundation. As distinguished professor, Saxena also will hold the first of eight endowed graduate research faculty chairs. (Each research chair is funded through earnings from an endowment principal of \$3 million.) He will have a base salary of \$150,000, supplemented with \$75,000 annually from gift earnings.

Saxena's scholarly activities over the past 30 years have been in the highly interdisciplinary field of mechanical behavior of materials, with primary emphasis on fracture mechanics. In fact, he is internationally renowned for his contributions to the area of time-dependent fracture mechanics and has pioneered developments in this field since the late 1970s. His other research interests include creep, fatigue, microstructure-property relationships, composite materials, reliability and risk analysis and life extension of aging structural components.

Saxena received his B.S. in mechanical engineering from the Indian Institute of Technology and his M.S. (1972) and Ph.D. (1974) in materials science and metallurgical engineering from the University of Cincinnati.

His major industrial experience was at the Westinghouse Research and Development Center in Pittsburgh, where from 1974 to 1985 he rose to the rank of Fellow Scientist.

He joined the Georgia Tech faculty in 1985 as professor in the School of Materials Science and Engineering. From 1991-94 he served as director of Georgia Tech's Composites Education and Research Center. He served as chair of the School of Materials Science and Engineering from 1993 until 2002 and was named Regents' Professor in 2002.

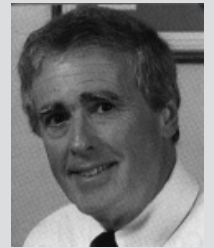
Recent Adjunct Faculty Additions



Dr. Simon Ang, Professor of Electrical Engineering, will join our department as an Adjunct Professor. Dr. Ang has worked on various projects with faculty members from our department and we look forward to having him as

one of our adjuncts. Ang earned his B.S. in Electrical Engineering at the University of Arkansas in 1980. He went on to earn his M.S. in Electrical Engineering from Georgia Institute of Technology in 1981, Degree of Electrical Engineer from Southern Methodist University in 1983 and his Ph.D. in Electrical Engineering from Southern Methodist University in 1985.

Neil B. Ingels Jr., Ph.D., presented a seminar titled "Rockets to Hearts...A Biomedical Engineering Odyssey" on April 3, 2003. Dr. Ingels is currently the Senior Staff Scientist and Head of the Laboratory of Cardiovascular Physiology and Biophysics at the Research Institute of Palo Alto Medical Foundation in Palo Alto, California, and the Consulting Professor of Cardiothoracic Surgery for Stanford University Medical Center in Stanford, California. He received his B.S.E.E. from the University of Arkansas in 1959, his M.S.E.E. from University of Santa Clara in 1963 and his Ph.D. in Electrical/Biomedical Engineering from Stanford University in 1967. Dr. Ingels will be serving our department in the position of Adjunct Faculty member and also Graduate Faculty status.



Dr. Em Ward has been chosen to serve as an Adjunct Assistant Professor for our Department. Dr. Ward is currently working in the Electrical Engineering Department. She received her B.S. degree from Louisiana

Tech University in Biomedical Engineering August 1985, M.S. in Electrical Engineering, August 1993, and Ph.D. in Electrical Engineering, May 2002, from the University of Arkansas. Ward had previously earned her Doctor of Medicine in December 1989 from the University of New Mexico. Her expertise in the medical field will be of great benefit to the department.

Awards and Accomplishments

Teaching & Advising Awards



Dr. Carl Griffis (left) was presented the John W. White Outstanding Teaching Award, and Dr. Tom Costello (right) was presented the Alumni Society Outstanding Advising Award for 2003. These awards were well deserved and reflect the total dedication of these two professionals.

Scholarship Recipients

Vijay Garg, Biological and Agricultural Engineering Ph.D. student, was awarded the W.R. Thomas Scholarship in the College of Engineering. The scholarship carries a stipend of \$8,000 per year.



Sunny N. Wallace has been awarded the William Randolph Hearst Ph.D. Fellowship in the amount of \$10,000 per year for three years. By accepting this fellowship Sunny will serve as the Program Coordinator of Women in Engineering (WIN). This will include organizing departmental WIN functions, choosing Department Mentor Coordinators and disseminating scholarship and fellowship opportunities for the Department Mentor Coordinators. Sunny has also been awarded a Doctoral Academy Fellowship to begin in the Fall 2003 in the amount of \$5,000 per year

Employee of the Quarter



Tammie Edrington, BAE Secretary II, was chosen Employee of the Quarter. Tammie received her award at the July Staff Senate Meeting. She will also be invited to attend the University of Arkansas Employee Awards Banquet in October and will be considered for Employee of the Year. Tammie has worked for the department since August 2001.

Promotions



Yanbin Li



Earl Vories

The department is proud to announce the promotion of four of our faculty members. Dr. Yanbin Li and Dr. Earl Vories have received a promotion from Associate Professor to Professor; Dr. Marty Matlock has received a promotion from Assistant Professor to Associate Professor; and Dr. Rong Murphy has received a promotion from Research Assistant Professor or Research Associate Professor. Congratulations to all four on promotions. Your hard work and dedication to the department is greatly appreciated.



Marty Matlock



Rong Murphy

Class of 2003



The department had seven students who completed their bachelor's degree. Pictured above are Ray Avery, Chris Long, James Geurtz, Clay McDaniel and Willie Dillahunty. Not pictured are Dylan Carpenter and Mark Orlicek. Below is a picture of the cake that was presented to the graduating seniors at the Dead Day Luncheon.



MEET OUR NEW GRADUATE STUDENTS

Dylan Carpenter, B.S. 2003, will be continuing his studies under the direction of Dr. Jin-Woo Kim. Dylan is a master's student working in the area of Food and Bioprocess Engineering. Dylan is from Waldenburg, Arkansas.



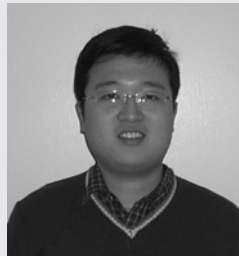
Jayarani Kandaswamy joined the department on July 6. Jayarani will be pursuing her master's degree under the direction of Dr. Sreekala Bajwa and working in the area of Bioimaging. She received her B.S. degree from Bharathidasan University, Tamilnadu, India.



Inoka Kodikara will be pursuing her master's degree in Cell and Molecular Biology under the direction of Dr. Jin-Woo Kim and Dr. John Kirby. Inoka comes to Fayetteville from Sri Lanka. She received her bachelor's degree in Chemical Engineering from the University of Arkansas, May 2002.



Xiaole Mao comes to the University of Arkansas from China. He received his B.S. degree from Southern Yangtze University in Wuxi, China. Xiaole will be working with Dr. Yanbin Li in the area of Bioprocess Engineering.



Ashish Mishra joined the department for the spring 2003 semester. Ashish will be working with Drs. Sreekala Bajwa and Dennis Gardisser in the area of Precision Agriculture. He received his B. Tech degree in Agricultural Engineering from Allahabad Agricultural Institute in Allahabad, India.



Eylem Mutlu joins the department after completing her M.S. in Environmental Engineering from the University of Missouri-Rolla. Eylem is originally from Ankara, Turkey. She received her B.S. in Environmental Engineering from Ondokuz Mayıs University, Samsun, Turkey. She will be working towards completion of her Ph.D. with Dr. Indrajey Chaubey.



From the Head — continued from page 1



Our faculty, staff, and students continue to receive well-deserved recognitions for their outstanding contributions. Four faculty members were recently promoted in academic ranks, two faculty members were recognized with Faculty Excellence Awards, a staff member was recognized as "Employee of the Quarter" for the University and two graduate students received prestigious graduate scholarships.



We expect another healthy freshmen class this fall and have added six new graduate students in the department.



Our academy members are currently reviewing candidates for the next class. The ceremony to induct the new members will be held on January 8, 2004.



The summer retreat with our Advisory Board and Academy members was held May 29-30 at Mount Sequoyah. The primary focus of this retreat was our academic programs.



Biological Engineering Faculty Members

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Dr. Otto Loewer
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Dr. Earl Vories
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Dr. Rong Murphy
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Phil Tacker
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Dr. Karl VanDevender
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Assistant Professors

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Dr. Indrajeet Chaubey
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Dr. Jin-Woo Kim
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Dr. Scott Osborn
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BAEG 2003 SUMMER RETREAT



The Biological and Agricultural Engineering Department held its annual Summer Retreat May 29-30 at Mount Sequoyah. Faculty members were present on the first day to discuss changes for the coming academic year. Dr. Tom Costello led the discussion concerning the ABET review results and the department's plans to make adjustments to the current ABET plan. Several changes were discussed and some of those will be implemented as soon as possible. Other topics of discussion included defining what a BSBE graduate should be able to do upon graduation and how our department can help our students meet those qualifications, space (infrastructure), the addition of new adjunct faculty members and reviewing the first draft of the proposal for an M.S. degree in Biomedical Engineering.

An evening social was held at the dining facilities of Mount Sequoyah on May 29 with faculty, academy, and advisory board members and their families. Everyone enjoyed the evening dinner and socializing.

Academy and Advisory Board members were present on Friday, May 30, to review the progress of the department over the last year and discuss upcoming events for the Academy. The dues amount for the academy members has been increased from \$100/year to \$150/year for the annual amount and from \$1,000 to \$1,500 for the lifetime dues. The date was set for the next induction ceremony of the academy. It will be held on Thursday, January 8, 2004 in the Student Union Ballroom.



BAEG faculty and academy members mingle during a break from discussions at the summer retreat.



Dr. Lalit Verma and Dr. Neil Schmitt, College of Engineering Interim Dean, discuss issues relating to the department.



Pictured above are faculty members Tom Costello, Carl Griffis, Scott Osborn; Research Specialist, Ken Shelby, and Extension Engineer, Karl VanDevender.

◆◆◆ Seniors Win National Design Competition ◆◆◆

Three biological engineering students at the University of Arkansas won an international award for designing and building a plant growth chamber that can help NASA scientists study the requirements for growing food crops on Mars.

The student team includes Willie Dillahunty of Gentry, James Geurtz of Fort Smith and Clay McDaniel of Stuttgart. They placed first for their senior design project in the AGCO Student Design Competition sponsored by ASAE (the Society of Engineering in Agricultural, Food, and Biological Systems) at its annual meeting in Las Vegas, July 27-30, 2003.

The team members split an award of \$1,250, and the department will receive an award plaque and a \$300 scholarship from ASAE.

The winning entry, "Growth Chamber for Bio-Regenerative Life Support," included the design, fabrication and testing of a low-pressure plant growth chamber. The team collaborated with NASA researchers at Kennedy Space Center on the chamber which can simulate plant growth conditions in a Mars greenhouse that could support long-term space missions. Such a greenhouse can provide food for astronauts and help regenerate oxygen, remove carbon dioxide and recycle organic wastes.

The team competed against students from across the nation, with the top three entries invited to make oral presentations at the national meeting to determine the winner. The UA team beat the Oklahoma State University and Kansas State University teams in the final.

"We had a lot of problems to solve for the design," Dillahunty said. "We had to learn what environmental conditions the chamber had to simulate and then figure out how to accomplish it. For example, pressurizing a greenhouse in the thin atmosphere of Mars to the atmospheric pressure of Earth, which is 100 times greater, is cost prohibitive. We had to figure out a pressure that could reasonably be provided on Mars that would be sufficient for growing plants."



(L to R) Clay McDaniel, James Geurtz and Willie Dillahunty receive their award checks.

The project was born out of a faculty summer fellowship that Tom Costello, associate professor of biological and agricultural engineering, served with NASA last year.

"During the fellowship, I gathered information on projects NASA was interested in," Costello said. "Part of NASA's mission statement is to inspire the next generation of explorers, and this project fits that mission."

With a grant of about \$6,000 from the Arkansas Space Grant Consortium,

Dillahunty, Geurtz and McDaniel, with advisors Costello and Scott Osborn, Assistant Professor of Biological and Agricultural Engineering, visited the Kennedy Space Center in Florida. They toured the center and met with John Sager and Ray Wheeler, scientists in NASA's bioregenerative life support group with whom Costello worked during his fellowship.

During the meetings the students learned the conditions their growth chamber would have to simulate. They would have to design and build a vacuum chamber that could lower the atmospheric chamber to one-tenth that of Earth, a pressure that could reasonably be provided in an inflatable greenhouse on Mars. It would have to control the composition of gases and provide plant nutrients and external light, Osborn said. In addition, they designed and built a heat exchanger to lower the temperature to about 15 degrees Celsius, a problem the NASA scientists had not solved.

The completed chamber is an acrylic cylinder 18 inches in diameter with a heat exchanger that uses 200 feet of coiled stainless steel tubing in the bottom. It is connected to equipment that controls atmospheric pressure and gases and regulates the temperature. After some redesigns the team successfully grew a tomato plant to prove the chamber worked.

"The student team built a device that enables scientists to run experiments they could not run before," Osborn said. "We've had requests from scientists at NASA and the University of Florida who want to use it in their research."

"One of the reasons Willie, James and Clay won the competition was the extra hours they put into this project, far more than was necessary for the academic credit they were getting," Costello said. "I attribute that to meeting with the NASA scientists, seeing their work and what they were trying to do and how their senior project could contribute to it. I think they picked up some of that NASA enthusiasm."





Karl VanDevender attended the National Pork Board's Swine Educator's Group Meeting in Harrisburg, Pennsylvania, June 19-21. This national group consisting of extension and other adult educators advises and assists the NPB's swine educational efforts. VanDevender provides input in the areas of environmental and regulatory issues.

Karl VanDevender has been awarded a \$7,000 grant from the National Pork Board to coordinate the development of curriculum for an E Learning course on "Environmental Documentation and Record Keeping." He will be working with Extension Swine specialist in Alabama and Pennsylvania to develop the material.

Dennis Gardisser, Professor and Associate Head of Extension, Biological & Agricultural Engineering was an invited speaker at the annual Aerial Agricultural Association of Australia in Adelaide the first week of June. Dennis made three presentations: 1.) The keynote opening address "Air Ag and Homeland Security in the USA," 2.) "Adjuvants - Another Tool?," and 3.) a two-hour short course on "Spraying Better." The following week Dennis participated in regional cotton industry association meetings addressing the utilization of agricultural aviation and chemical application accuracy in general to produce cotton in Australia. Dennis presented a three hour seminar at each of the following full day sessions: St. George, QLD; Narrabri, QLD; and Goondiwindi, QLD. Dennis holds an Australian private pilot's license, so he was able to fly to these and various other venues utilizing a borrowed private aircraft.

Gary Huitink participated in the Association of Equipment Manufacturers Product Safety Seminar in St. Louis, Mo. on January 21-23. The engineers from most agricultural equipment manufacturing companies and some professors from biological and agricultural engineering departments conferred on European safety standards, safety innovations for agriculture and implementing safe practices by "designing out" hazards, educating clientele using various approaches and regulatory means and legal action. Risk assessment, safety standards and other topics were covered in depth.

Sreekala Bajwa, Julie Carrier and Gary Huitink did preliminary work on an \$8,000 grant from the Cotton Foundation for improving gin waste handling. Gin waste was sampled from two Arkansas cotton gins during the past season and evaluated

in the laboratory at various stages of deterioration up to 14 months of ambient outdoor storage. The project will continue throughout the upcoming cotton harvesting, ginning and gin waste storage season.

Douglas Kratz, support specialist-forages, CES; **Kenneth Shelby; Gary Huitink** and **Karl VanDevender** teamed together with Cooperative Extension Agents from several Ark. counties to conduct the annual 4-H O'Rama Tractor Driving Activity on the University of Arkansas campus at Fayetteville on July 24. Jared Attwood, 15, of Rison, Ark. was this year's 4-H youth winner. He will represent Arkansas at the National Engineering Competition in Indianapolis, Ind., in September. This year's Tractor Driving Activity included more participants, and they were more competitive than those who participated in the past few years.

A committee of Cooperative Extension specialists chaired by **Gary Huitink** assembled and distributed Edition 1 of a University of Arkansas Cooperative Extension Service Disaster Response Handbook. This reference for communication, media and county agents includes more than 100 pages and more than 25 publications and internet references on disaster assistance contacts, drought, earthquake, agricultural biosecurity, floods, tornadoes, ice storms, intense cold, snow storms, etc. The committee was comprised of more than 15 Extension personnel with expertise in a variety of topics, who compiled the first edition. They met on July 14 to begin making additions, revisions, modifications and improvements to the present entries in order to publish Edition 2. The information is currently available at the following web site: <http://www.uaex.edu/disaster>.

Several biological and agricultural engineers have contributed to the latest Corn Production Handbook, MP437, published and distributed by the University of Arkansas Cooperative Extension Service. **Dennis Gardisser, Gary Huitink, Phil Tacker** and **Earl Vories** made contributions to topics on cultural practices, drainage and irrigation, grain storage and aflatoxin in corn, corn harvesting, on-farm storage and drying, identifying hazards and preventing accidents and renewable energy. The increased acreage and increased interest in more corn production in Arkansas makes this a valuable, current reference for corn growers, especially those with limited experience with the water management, equipment, safer management in agricultural environs and other corn-related issues.



The State Section Meeting will be held on Friday, October 3, 2003, at Extensions State Office in Little Rock.

Extension - continued from page 8

Sreekala Bajwa, Gary Huitink, Mitch Crow, County Extension Agent-Staff Chair in St. Francis County, and William Baker, Professor of Agriculture, Arkansas State University, have a precision agriculture project underway that is funded by the National Cotton Council. This study includes mapping of the soils with various tools, including a current VERIS model. Other factors include soil tillage (subsoiling) of cotton. Mapping of the cotton plant development is underway, and the treatments will soon be harvested and the cotton yields mapped by a cotton picker monitor.

Gary Huitink, along with a team of extension agricultural engineers, design engineers from a half-dozen gin equipment manufacturing companies and ginning researchers from across the cotton-producing regions of the U.S. conducted a national cotton ginning school at the USDA Cotton Ginning Laboratory at Stoneville, Miss. Ginners from Virginia to Kansas and California attended the equipment fundamentals/management training June 19. Four concurrent classes were conducted, with Gary Huitink covering topics on gin safety and cotton gin waste utilization and handling.

Distinguished Doctoral Fellowships and Doctoral Academy Fellowships

The Department of Biological and Agricultural Engineering at the University of Arkansas has two Distinguished Doctoral Fellowships and four Doctoral Academy Fellowships as well as graduate research assistantships available in several research areas in biological engineering.

FELLOWSHIPS:

Two Distinguished Doctoral Fellowships offer a stipend of \$30,000 per year plus tuition for up to four years.

Four Doctoral Academy Fellowships offer a stipend of \$18,700 per year plus tuition for up to four years.

RESEARCH PROJECTS:

- Bioimaging for Monitoring Food Safety and Quality
- Bioinformatics
- Biomass Energy
- Biomedical Engineering
- Bioprocess Engineering
- Biosensors for Detection of Biological Agents
- Decision Support System Development for Natural Resource Management
- Ecological Engineering
- Extraction of Dietary Supplements
- Food Thermal Processing and Food Safety
- Micro/Nanobiotechnology
- Nonpoint Source Pollution Control and Modeling
- Precision Agriculture
- Reducing the Occurrence of Bacterial Resistance to Medical Antibiotics in Environment
- Remote Sensing for Bioresources Monitoring and Management
- Water Management for Agricultural Production

REQUIREMENTS:

Distinguished Doctoral Fellows should have a master's GPA of 3.85 or B.S. GPA 3.65 or higher, a GRE verbal plus quantitative score at least 1300 and a GRE writing score of 5.5 or 6.0.

Doctoral Academy Fellows should have a master's GPA of 3.65 or B.S. GPA 3.5 or higher, a GRE verbal plus quantitative score of at least 1200 and a GRE writing score of 5.0 or higher.

TO APPLY:

Send a letter of application, a resume and transcripts of all college work and three reference letters to:

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Several students and faculty members enjoy the conversation and the Dead Day Luncheon.

This spring was a busy time for the department. The student club continued its sales of salsas, jams, jellies, and steak sauces. The money will go to help defer costs of club activities.

The students competed in the annual Engine Week festivities. While our department did not take away top honors this year, the students had a good time participating in the events. Our club finished second overall.

Dead Day Luncheon for the spring semester was held on May 2. The graduating seniors were recognized by the department, and Dr. Tom Costello presented each of them with their BAEG award. Elections were also held for the officers of the club for the coming year. Drake McGruder was elected president, Andrea Ludwig, vice president, and Tyler Gipson treasurer. There will be a runoff election for the secretary position when the students return in the fall. Dr. Scott Osborn will take over as faculty advisor.



Jalene Ramsey, left, and Virginia Glass, right, pose for a picture with graduate student Debabrata Sahoo.



Marty Matlock gets caught in the chips and dip!

Edible Balance Contest Winners

Dr. Carl Griffis' BENG 1022 class competed in a team project. Each team was to design, construct and test a balance capable of determining the mass of objects from 1 to 100 grams. Then the teams competed to see which balance was most accurate and most aesthetically pleasing. As is the case in most design problems, there were some constraints that influenced their design decisions.

The balance had to be constructed entirely from edible materials. In order to leave no doubts as to whether the balance was entirely edible, each team had to consume the balance as soon as the contest was completed. Spectators such as other students, faculty and department staff were allowed to help consume the device, so the students were instructed to choose materials of construction that were gastronomically pleasing. The teams were also limited to spending no more than \$100 in constructing their balances.

Pictured below are the contest winners.

Section 1 - The Copernicus'



Leslie Mooney, Colt McClain and Sean Holden

Section 2 - The Lavoisiers



Jennifer Raible, Dylan Ballard, Andy Riester and Waleed Naseem

Most Innovative Design



Nova-Dawn Fant, Gabriel Vigh and Aaron Hilborn

Highlights and Presentations — continued from page 1

Indrajeet Chaubey and **Bob Morgan** from the Biological and Agricultural Engineering Department and Tommy Daniel from the Department of Crop, Soil, and Environmental Sciences attended a meeting in Miami, Okla., on February 18, 2003, to discuss water quality concerns in the Grand Lake watershed. This meeting was attended by scientists and policy makers from Oklahoma, Missouri, and Kansas.

Sreekala Bajwa presented “Remote Sensing and Precision Agriculture: Where are we? What is the future?” on February 16, 2003 at the First Arkansas Remote Sensing Symposium— Precision Agriculture and Forestry Application in Little Rock.

Indrajeet Chaubey and **Marty Matlock** participated in National Science Foundation Graduate Education review panel. March 4-8, 2003. The meeting was held in Washington, D.C.

Julie Carrier served as a member of the Interdisciplinary Panel for Natural Sciences and Engineering Research Council of Canada, February 2003.

Tom Costello and **Scott Osborn** took five students on a trip to NASA’s Kennedy Space Center, Cape Canaveral, Florida on February 6-9, 2003. They visited the Advanced Life Support Life Sciences Laboratory. They also toured behind the scenes at Epcot Center – The Land. Students attending were: **Willie Dillahunty, James Geurtz, Clay McDaniel, Mark Orlicek, Chris Long** and **Johnny Mason**. **Dillahunty, Geurtz** and **McDaniel** consulted with NASA engineers regarding their senior design project, a growth chamber for growing plants at low atmospheric pressure (to simulate a greenhouse on Mars).

Jin-Woo Kim, **Ajay Malshe** and **Steve Tung** gave a technical presentation, “Bio-Inspired MEMS: A Novel Microfluidics System Actuated by Biological Cell Motors” at the 2003 Institute of Biological Engineering (IBE) Annual Meeting in Athens, Georgia.

Marty Matlock was invited to make a presentation at the TMDL Program – Challenges and Opportunities Texas A&M University Seminar Series; Soil, Crop, and Environmental Sciences Department; College Station, Texas, on April 2, 2003.

Indrajeet Chaubey and **Brian Haggard** attended the National Animal Manure Management Center meeting in Kansas City, Mo., on May 15-16, 2003.

Brian Haggard presented a poster titled “Phosphorus sources in the Illinois River Basin: Effect of Chemical Amendments on Sediment-Phosphorus Interactions” at the annual meeting of the North American Benthological Society in Athens, Georgia, May 27-31. Coauthors were **Sujit Ekka, Marty Matlock** and **Indrajeet Chaubey**.

The following items were presented at the Spring Specialty Conference of the American Water Resources Association May 12-14 in Kansas City, Mo. **Brian Haggard**: oral presentation titled “Nutrient and Estradiol Loss in Runoff Water From Various Poultry Litters.” **Kati White**: oral presentation titled “Periphytic chlorophyll a response to triclosan exposure at the White River, Northwest Arkansas;” Departmental coauthors included: **Brian Haggard, Marty Matlock** and **Jin-Woo Kim**. **Brian Haggard**: poster presentation titled “Phosphorus concentrations and loads in the Illinois River Basin, 1997-2001;” Coauthored with hydrologists from the U.S. Geological Survey. **Sujit Ekka**: poster presentation titled “Impact of wastewater treatment plants in streams of the Illinois River Basin;” Departmental coauthors included: **Brian Haggard, Marty Matlock** and **Indrajeet Chaubey**. **Kati White**: poster presentation titled “Changes in water quality at Buffalo National River, 1991-2001;” Departmental coauthors included: **Brian Haggard** and **Indrajeet Chaubey**. **Debabrata Sahoo**: poster presentation titled “Stream nutrient retention and limitation in Moores Creek, Northwest Arkansas;” Departmental coauthors included: **Indrajeet Chaubey, Brian Haggard** and **Marty Matlock**. **Vijay Garg**: poster presentation titled “Effect of suspended sediment distribution on spectral reflectance;” Departmental coauthors included: **Sreekala Bajwa, Indrajeet Chaubey** and **Brian Haggard**.

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Calendar of Events

OCTOBER

TBA Fall Outing
3 State Section ASAE Meeting, Little Rock
11 Homecoming - Auburn

NOVEMBER

26-28 Fall Break
27-28 Thanksgiving Holiday (UA closed)

DECEMBER

10 Dead Day
11-17 Final Exams
24-31 Christmas Holiday (UA closed)

BAE *Lifeline*

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