

Summer 2009



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ABE NEWS

**Agricultural and Biological
Engineering Department**



An Era of Excellence Has Begun!



Department Head Remarks

The past two years have ushered in a new era in the life of the department. We completed a successful fundraising drive to raise \$500k to complete the much anticipated new ABE building. The building is beautiful with highly equipped laboratories, excellent office space, high-tech classrooms, and a complete shop in the basement. We moved into the building in January 2008. Later that year, we achieved a record undergraduate enrollment of 302 students. Currently, we have over 320 undergraduate students and 35 graduate students enrolled for Fall 2009. We have hired several new faculty and extension specialists and achieved record levels in contracts and grants. Also, the students and faculty have received numerous awards. Our department currently leads the development of the Sustainable Energy Research Center and the Energy Institute, funded by approximately \$26 million in Department of Energy grants. We also established the Tissue Engineering Research Center funded by a grant from the Department of Health and Human Services. We are currently the third largest engineering program in the Bagley College of Engineering and the largest department in the College of Agriculture and Life Sciences. We are looking forward to much growth ahead, thanks to the support of alumni, students and the state.

We would like to give a warm welcome to the following new assistant professors: Dr. Radha Srinivasan and Dr. Fei Yu (renewable energy), Dr. Lakiesha Williams and Dr. Jun Liao (biomedical engineering), Dr. Jeremiah Davis (animal housing and renewable energy), and Dr. Joel Paz and Prem Parajuli (watershed management). In addition, we welcome three new members, Amy Schmidt (water quality), Jason Ward (grain handling and precision farming), and James Wooten (energy), to our extension staff.

ABE Thanks the Donors Who Supported Our Building Fund

We Would Like to Thank Alumni and Friends for Their Generous Support

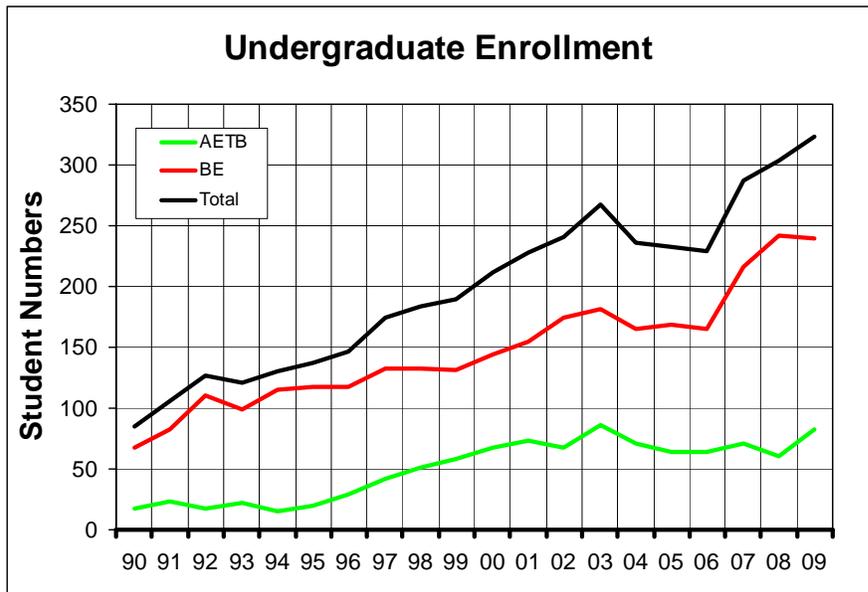
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Record Student Enrollment in 2008-2009

Biological Engineering

Biological engineering student enrollment continues to rise, with a total undergraduate enrollment of over 320 students for Fall 2009. We attribute the rise in enrollment to the public recognition that biological engineering is the next frontier in engineering. Most of the students in the program select biomedical engineering or premedical studies as their emphasis area. Over two thirds of the students continue their studies in professional or graduate school upon graduation. The program continues to attract approximately 50% women, and the average composite ACT score of 28.8 is the highest of any program in the state. Recent graduates have continued their studies in graduate school and professional schools, including medical school, law school, and graduate school in biomedical engineering.



Agricultural Engineering Technology and Business

The AETB program has grown to over 80 students registered for the fall 2009 semester. The choice of land surveying as an emphasis continues to grow due to increased recruitment efforts such as visits to 14 Mississippi community colleges and the increased need for technically proficient students to fill numerous job openings with manufacturing and technology companies. Currently, students completing the AETB program have degree emphasis in land surveying, precision agriculture, cotton gin management, natural resources and environmental management or enterprise management. Students have been hired for technical positions in banking, equipment dealerships, poultry service and technology companies, only to name a few.

AETB program coordinator, Jeremiah Davis, PhD, has created the two following graduate programs for students in this program: Master of Science in Agriculture, with a concentration in Engineering Technology and Doctor of Philosophy in Agricultural Sciences, with a concentration in Engineering Technology. There are five students currently registered to begin the M.S. in Agriculture, Engineering Technology degree in the 2009 Fall semester. Those individuals are Wes Lowe, Daniel Chesser, Chris Ryals, Drew Massey and Jason Johnson. The projects in the program include densification of biomass, producing biofuels, and energy utilization of commercial poultry production.

Student News

BE Students Win iGEM Competition

Biological engineering undergraduates Caleb Dulaney and Sam Pote, along with graduate student Robert Morris, recently competed in the International Genetically Engineered Machine competition where they received the bronze medal. They designed a genetic part that breaks down lignin, the glue like substance in wood. The discovery is significant because, when lignin in wood is decomposed, scientists have ready access to cellulose and hemicellulose carbohydrates used to make bio-fuel. Also, the discovery will help America become less dependent on foreign oil and open up alternative markets for the timber industry in the southeastern U.S. Accompanying the students to the iGEM competition was ABE Associate Professor Filip To, the team's advisor.



ASABE 1/4 Scale Tractor Pull Competition

Several students in the AETB program have begun to raise funds to support “Bulldog Pullers”, a student tractor pull club. Funds will be used to help the club compete in the American Society of Agricultural and Biological Engineers International Quarter Scale Tractor Pulling Competition held each year in Peoria, Illinois. The competition consists of designing and fabricating a tractor, using applied engineering and ingenuity. Students create a tractor that incorporates safety, manufacturability, and serviceability standards, while conforming to competition guidelines. Students are challenged to maximize performance, using a single or multiple stock engine. Teams are then judged on pulling performance, thoroughness of written design, and an oral presentation. Competition gives students practical experience in machine design and manufacturing. Bulldog Pullers are looking for companies interested in partnering. If you are interested in becoming a partner or want more information, please contact Jeremiah Davis or Jason Ward, the team advisors.

STUDENT NEWS



Students working in the instrumentation lab



iGEM Jamboree at MIT



Graduation 2009



IBE Regional Conference



IBE Regional Conference



Enjoying a fish fry honoring graduating seniors

**ABE PARTICIPATION
2009 MSU Biofuels Conference
Jackson, Mississippi**



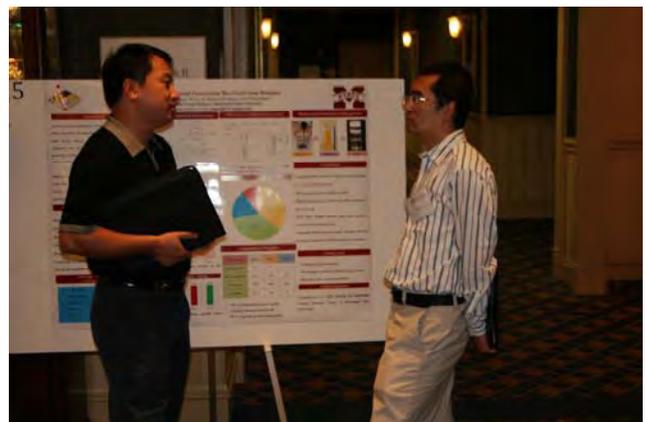
Registration with Sharron Miles



Lindsey Westbrook presents her poster to the judges



Department Head William Batchelor on the air with Paul Gallo



Hui Wang presents his poster to Dr. Fei Yu



Ravi Challa, second place winner, talks with a judge during the student poster competition



Wes Lowe, third place winner, talks with a judge during the student poster competition

Student News

IBE CLUB NEWS

The Institute of Biological Engineering (IBE) at Mississippi State University is an organization dedicated to biological engineering students. It strives to create a network among students while providing them with information about the infinite opportunities lying ahead. Since the fall of 2008, IBE has been involved in a number of different activities. It hosted the first ever regional conference at MSU where schools from all over the southeast were



able to come and participate in poster presentations, listen to keynote speakers, participate in question-and-answer sessions with qualified engineers, and network with other students. Along with the conference, IBE reestablished the learning community (LC). The LC consists of five biological engineering students who serve as mentors for fellow students. They also provide tutoring, host biweekly lunches, and maintain a website that consists of potential internships, upcoming activities within the university, and much more. IBE also holds monthly meetings with keynote speakers from medical schools, researchers in the field, graduate students, and career advisors. In the future, IBE plans on participating in E-week, a university engineering competition and various community service project.

AETB CLUB NEWS

Members of the Agricultural, Engineering Technology, and Business Club have joined in a collaborative effort with the department by actively recruiting students for their major. Recruiting and outreach is essential for any department, and who better to participate than those who believe in their program and have a network of family and friends as a starting point? The club members have been busy over the past semester with several fundraisers, one of which was cooking and selling boston butts. The fundraisers allow the club members access to funds needed in their recruiting efforts such as designing T-shirts that are given out to perspective recruits. The club would like to ask for continued support and thank all individuals who have purchased boston butts.

Heart Health Club News

Bulldogs for Heart Health, the departments newest organization has come a long way since its creation in November of 2007. Founded by a group of biomedical engineering students, Bulldogs for Heart Health aims to educate and motivate the state of Mississippi to lead healthier, more active lives. This fall our club visited every 3rd grade class in Starkville to promote health education. Biomedical engineering students explained how the heart works and the importance of maintaining the most vital organ in the body via pig heart dissection.

Student Awards

Leigh Booth — Inducted into the Society of Scholars in the Arts and Sciences

Blake Jeter—Elected Student Government President

Scott Metzler—Winner of the Physical Sciences Oral Competition of the 7th Annual Graduate Research Symposium

Ravi Challa —Nominee for Graduate Assistant of the Year Award in the 7th Annual Graduate Research Symposium

Anna Goblirsch — Received the Spirit of State Award recognizing students who have made exceptional contributions to student life at MSU

Caleb Dulaney and **Sam Pote**— Received third place for their poster presentation at the First Annual Undergraduate Research Symposium at MSU

Kaitlin Wheatley—Received the Jimmy Lee Dodd Scholarship recognizing student athletes with exceptional scholastic performance

Faculty Awards

Dr. William Batchelor

- Inducted as Fellow in the American Society of Agricultural and Biological Engineers
- Selected by the Southern Growth Policy Board as the Mississippi winner of the Innovator Award for the work of the Sustainable Energy Research Center
- Certificate of Appreciation for service as editor of Information and Electrical Technology Division, American Society of Agricultural and Biological Engineers

Dr. Filip To

- Inducted into the Bagley College of Engineering Academy of Distinguished Teachers

Dr. Steve Elder

- Won the MAFES Researcher of the Year award

Alumni News

Randy L. Raper, Ph.D., P.E. (BS, Ag & Bio Engineering, 1983) On January 16, 2009, Syngenta Crop Protection and No-Till Farmer magazine honored four winners of the 2008 No-Till Innovator Awards during their annual National No-Tillage Conference. Randy L. Raper, Ph.D., P.E. was one of the recipients of this prestigious award. Dr. Raper was recognized as a trailblazer in conservation tillage, helping producers to recognize the importance of soil compaction management. He has traveled extensively in an effort to share his research and his lab is active in posting research findings on their website. Dr. Raper has been published in academic journals and trade magazines, including Farm Journal, Progressive Farmer, Soybean Digest, Southeast Farm Press, Southern Farmer and No-Till Farmer. He works for the US Department of Agriculture and Agricultural Research Service

Thomas R. Byrd, DDS (BS, Ag & Bio Engineering, 1981) received the 2009 Distinguished Fellow of the Bagley College of Engineering Award. Since his graduation in 1981, Dr. Byrd has continued to remain involved and support MSU. Dr. Byrd currently serves on the Biological Engineering Advisory Board and is an active member of the Central Mississippi MSU Alumni Board. He also sponsors the Don Byrd Memorial Scholarship. After graduation Dr. Byrd served as a loss prevention consultant for Factory Mutual Engineering in Atlanta, GA. He later returned to Mississippi to work for the State and later attended the University of Mississippi School of Dentistry. Dr. Byrd has practiced dentistry in his clinic, Florence Dental Clinic, for the past twenty years. He and his wife Lauri have three children: Adam, a senior in biological sciences and Jessica, a sophomore in graphic design, both MSU students and India, their youngest child, is a freshman at Florence High School.

David Beasley, PhD (BS Ag & Bio Engineering 1971) was recently selected as the Dean of the College of Engineering at Arkansas State University in Jonesboro. Dr. Beasley received his BS and MS from the department in 1971 and 1973 and earned his PhD from Purdue in 1977. He served as a faculty member at Purdue from 1978-1988. From 1988-1991, Dr. Beasley served as Head of the Agricultural and Biological Engineering Department at Tifton, GA. Also, he served as Head of the department of Agricultural and Biological Engineering at North Carolina State University from 1991-1999.

Send Us Your Contact Information

We would like to hear from you! Please share with us any news that you would like displayed in the departmental newsletter. Just send us an email at bbatchelor@abe.msstate.edu.

Meet Our New Faculty and Staff



Dr. Jeremiah Davis joined the ABE Department in July 2007 as an Assistant Professor. Dr. Davis received his Ph.D. in Agricultural Engineering from Iowa State University and his M.S. in Biosystems and Agricultural Engineering from the University of Kentucky. His research interests include the development of sensors and instrumentation for the remote monitoring of livestock, livestock environmental management, and, more recently, densification and logistics in biomass feedstock engineering. Dr. Davis coordinates the Agricultural Engineering Technology and Business (AETB) Program.



Dr. Jun Liao received his Ph.D. in Applied Biomedical Engineering from the Cleveland Clinic Foundation/Cleveland State University in 2003. He then finished his postdoctoral training in 2005 and was promoted to Research Assistant Professor at the University of Pittsburgh. Dr. Liao joined the Department of Agricultural and Biological Engineering in 2007. Dr. Liao's research interest is focused on cardiovascular tissue biomechanics and tissue engineering with emphasis on the structure-function relationship of heart valves, myocardium, and blood vessels. Dr Liao's goal is to: (i) identify the essential mechanisms that determine the optimal physiological functions, (ii) determine the structural and mechanical abnormality in diseased tissues, and (iii) facilitate better surgical intervention and biomimetic replacement development.



Dr. Radhakrishnan Srinivasan was born in Theni, Tamilnadu, India. He graduated with a Bachelors degree in Chemical Engineering from the Karnataka Regional Engineering College, Surathkal (now known as National Institute of Technology, Karnataka) in 1991. He worked as a trainee engineer at Asian Peroxides Limited, Sullurpeta, India for one year and worked as a Scientific Officer at Rare Materials Project (RMP), Bhabha Atomic Research Centre (BARC), Mysore, India from 1992 to 2001. With a keen desire for change, challenge and growth, he decided to pursue higher education in the USA. He graduated with his Masters degree in Nuclear Engineering from University of Illinois at Urbana Champaign (UIUC) in 2003 and chose to enroll in the Ph.D. program in Agricultural and Biological Engineering at UIUC in the area of ethanol production from corn. Dr. Srinivasan graduated with his doctoral degree in 2006. He joined our department in 2007 as an Assistant Research Professor in the area of bioenergy. In addition, he has published ten peer reviewed journal publications and applied for a patent for his work on elusive processing to separate fiber from animal feeds.

Meet Our New Faculty and Staff



Dr. Prem B. Parajuli joined the faculty of the Agricultural and Biological Engineering Department in August of 2009 as Assistant Professor in Environmental Engineering and Watershed Modeling. Dr. Parajuli received his PhD in Biological and Agricultural Engineering from Kansas State University, KS and a Masters Degree from Auburn University. He has extensive experience in environmental engineering, watershed water quality modeling (surface runoff, sediment, nutrients, and pathogen transport), developing modeling methods to surrogate physical conditions, and using statistical analysis for the complex water quality data analysis.



Dr. Joel O. Paz joined the faculty of the Agricultural and Biological Engineering Department at Mississippi State University as an assistant professor in August 2009. He moved to MSU from the University of Georgia where he previously worked as an Extension Agrometeorologist. Dr. Paz received a doctorate degree in Agricultural Engineering and Water Resources from Iowa State University. His research program at MSU will focus on Environmental Quality, GIS and Climate Change



Dr. Fei Yu joined the faculty of the Agricultural and Biological Engineering Department as an assistant professor in August of 2009. Dr. Yu earned his PhD in Biosystems and Agricultural Engineering from the University of Minnesota in 2007. His PhD research focused on thermochemical processes to convert biomass into bio-oils. After graduation, Dr. Yu came to the Forest Products Department as a Postdoctoral Associate and was promoted to an Assistant Research Professor in August of 2008. He authored and co-authored over twenty peer-reviewed research articles. Dr. Yu's current research activities at MSU focus on biomass pretreatment, biomass pyrolysis and gasification, bio-oil upgrading into heating fuel and transportation fuel, and synthesis gas to gasoline process.



Michele Anderson joined the staff of the Agricultural and Biological Engineering Department in March of 2008 in a dual role as the ABE Business Manager and Project Coordinator for the Sustainable Energy Research Center. Michele received her Bachelors degree from the University of Alabama and a Masters Degree in Business Administration from Southern New Hampshire University. Michele has extensive experience in grants and contracts administration. She came to MSU in 2005 when her husband Tommy accepted a position with the MSU English Department.

Meet Our New Faculty and Staff



Jason Ward joined the Mississippi State Extension staff in 2008 as an Extension Associate III. His program areas include precision agriculture, global positioning systems (GPS) and geographic information systems (GIS) technologies, grain storage, and other areas with an emphasis on the improvement of crop and animal production systems through engineering. Prior to joining MSU extension, Mr. Ward was a research technician with the USDA-ARS National Soil Dynamics Lab in Auburn, AL. Working with the Conservation Systems Research Group, he participated in research involving conservation tillage systems in field crops, winter cover crop selection, and bio-energy crops. Mr. Ward, originally from Ashland, Kentucky, is an alumnus of the University of Kentucky and will be pursuing a doctorate in Biological Engineering at Mississippi State University.



James Wooten joined Mississippi State Extension as an Extension Associate III in October 2008. His primary areas of work are renewable energy and energy efficiency, but additional areas include general energy and feed manufacturing. For the past eight years, he has worked for MAFES (Mississippi Agricultural and Forestry Experiment Station) mainly with bio-gasification and feedstock densification. Occasionally, he teaches GPS and remote sensing classes. He previously worked as a graduate teaching assistant, teaching bio-instrumentation labs and studying machine vision. Mr. Wooten graduated from the Agricultural and Biological Engineering Department at Mississippi State University in 1994 and received his Masters degree from the department in 1996.



Amy Schmidt assumed a new role as an Extension Instructor with programming responsibilities in water quality, waste management and related environmental topics in June 2008. Prior to joining MSU, Ms. Schmidt spent six years as an Assistant/Associate Extension Professor with the Commercial Agriculture Program at the University of Missouri – Columbia. Ms. Schmidt’s programming focused on livestock waste and nutrient management, air quality, agricultural regulatory issues, and water quality. She also spent two years as an Environmental Engineer for Premium Standard Farms’ north Missouri operation prior to her time at the University of Missouri. Ms. Schmidt is a licensed professional engineer in Missouri and Mississippi and is currently pursuing a doctorate in Biological Engineering at Mississippi State.

Educational Objectives of the Biological Engineering Program

1. To educate students in the academic discipline of Biological Engineering so that they can formulate and solve engineering problems involving biological systems
2. To ensure that students develop effective written and oral communication skills
3. To instruct students in the latest computer-based technology in engineering
4. To develop the students' ability to work individually and in teams to complete engineering design projects
5. To prepare students for employment in engineering jobs or for study in graduate and professional schools and for continual professional development

Accreditation

There is much work required by the faculty and staff to insure that our programs remain accredited by ABET and, more recently, SACS (Southern Association of Colleges and Schools). Our next ABET accreditation visit for the Biological Engineering program is in 2011. We have implemented a program to insure constant feedback and improvement of all of our educational programs. During the past two years, we have collected statistics and feedback from many sources about the outcomes of students in our programs. We utilize our advisory board members as a sounding board for new educational ideas and to provide input and advise on improvements to our programs. We would like to thank our advisory board members for their hard work over the years. If you are interested in serving on our advisory board, please contact Dr. Batchelor at bbatchelor@abe.msstate.edu.

BE Advisory Board Committee 2009-2010

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 Mrs. Sarah Tracy
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Dr. Teri Rosenbaum Chou
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Seth Davis
 Chad Lowe
 Nathan Smith
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Randy Dismuke
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 David Tolliver
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Energy Research

The Agricultural and Biological Engineering Department has obtained grants from the Departments of Energy and Agriculture to perform bio-energy research. Professors Jeremiah Davis, Radha Srinivasan, Filip To, Fei Yu, along with Eugene Columbus and James Wooten, are leading the ABE research effort in this area. Some of the projects include generating electricity utilizing alternative fuels including, but, not limited to, syntheses gas, bio-oil, biodiesel, and ethanol. Another study involves the design of a two-stage evaporative cooling system in a tunnel-ventilated commercial broiler facility powered by syntheses gas derived from biomass. A survey is being conducted to quantify the composition of debris produced for a given size, location, and intensity of weather related disaster and to test the feedstock potential of debris considering type and state of deterioration. The team will design unit operations for the biomass handling for an integrated syntheses gas production facility involving Cooling Heating and Power (CHP) technologies. An economic model profile for an integrated syntheses gas production facility involving CHP technologies is being developed. Feedstock engineering issues related to harvesting, handling, densification, transportation, storage and preconditioning of biomass prior to generation of biofuels is being researched in order to identify delivery system bottlenecks, improve efficiencies, minimize material loss, and reduce delivery costs.

Tissue Engineering Research

Tissue engineering is an interdisciplinary field that applies the principles of engineering and life sciences toward the development of biological substitutes that restore, maintain, or improve tissue function. The Tissue Engineering Research Center (TERC) at Mississippi State was established in August 2008 with a grant from the U.S. Department of Health and Human Services Health Resources and Service Administration. The TERC's mission is to achieve advancements in tissue engineering which can be developed into new treatment alternatives for organ or tissue failure. TERC is composed of ABE faculty members Dr. Elder (Director), Dr. Warnock, Dr. Liao, and Dr. Williams, as well as their graduate assistants and undergraduate student workers. Research is performed in the biomedical engineering and Core Services laboratories, which includes a tissue culture facility and specialized equipment for dissection and biomechanical testing. TERC's thrust areas are cardiovascular disease and osteoarthritis. Some progress has already been made towards the following: engineering cardiac patches to repair damage from myocardial infarctions, engineering constructs to replace stenotic aortic valves, and growing cartilage on top of a bone-like scaffold to replace cartilage eroded by osteoarthritis.



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*ABE Alumni!
Please Let Us Hear From
You!*

*We would like to keep in touch with you about ABE activities
and events, as well as other **MSU** and Departmental events.*

Be sure to send your e-mail address to

*Dr. William Batchelor at
bbatchelor@abe.msstate.edu*

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